

## Original Article

# Who shares the profit margin: Economics of cabbage (*Brassica oleracea*) marketing channels in Kano metropolis, Kano State, Nigeria

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### ABSTRACT

This study was carried out to analyze the economics of cabbage marketing in Kano metropolis, Kano State, Nigeria. Primary data were collected using a structured questionnaire. A multi-stage sampling procedure was used to select 170 cabbage marketers for the study. The data collected were analyzed using descriptive and inferential statistics, Gini coefficient, and market margin analysis. The result revealed that wholesalers had an average age of 43 years and a mean of 15 years of marketing experience. The result shows that cabbage retailers had an average age of 48 years and a mean of 12 years of marketing experience. The result for the market structure shows a Gini index of 0.20 and 0.15 for wholesalers and retailers, respectively, both tending toward equality, implying a competitive market. The result for cost and return shows that the wholesalers had a marketing margin of 60% per kg; with a return on investment of ₦2.06k, retailers had a marketing margin of 20% per head with a return on investment of ₦1.2k. The result, therefore, shows that cabbage marketing for both wholesalers and retailers is a profitable enterprise in the study area. The Copenhagen cabbage variety is the most common type of cabbage found in Kano metropolis. The study concludes that cabbage marketing is a profitable venture for both wholesalers and retailers. The study therefore recommends that marketers should explore ways to optimize transportation efficiency since the cost of transporting cabbage constitutes a significant portion of the total cost.

**Keywords:** Cabbage, channels, marketing, profitability

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## INTRODUCTION

Cabbage (*Brassica oleracea*) is an important vegetable crop that is widely grown across the World. It is one of the main cash crops of the season. Cabbage is commercially cultivated for its large and leafy head that is rich in Vitamin C.<sup>[1]</sup> Due to the demand for cabbage by consumers, it has now become a staple vegetable much like potatoes. Retailers, restaurants, processors, and fresh produce markets sell fresh cabbage. There is a need to increase vegetable production to improve income, ensure food security, and offer employment opportunities to many rural farmers in Nigeria, who are smallholder farmers and depend on the income from their farm holdings to survive.<sup>[2]</sup> The market for cabbage is non-stop throughout the year and serves as an income source among groups most affected by poverty, including small farmers, youths, and, most especially,

women who play an important role in agricultural production.<sup>[3]</sup> The marketing of cabbage is gradually developing as many people develop an interest in engaging in the enterprise, especially as market intermediaries and thereby, assist in the process of distribution. This activity will provide a good source of income for cabbage marketers and will also ensure a ready market for the produce.<sup>[4]</sup> The agricultural products are mostly perishable and cannot be spared for a long time if there are no proper storage facilities. The perishable products have a shorter life, and they need specialized marketing system to make them available at the proper place, time, and form designed by the consumer at the right price.<sup>[5]</sup> The well-functioning of the horticulture marketing system depends on its organizational structure and how efficient the marketing channels are in moving products from farm-gate to final consumers at prices that ensure fair returns to all market participants.<sup>[6]</sup> Marketers of

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cabbage experience lots of problems in trying to meet demand for the vegetable due to fluctuations in supply.

The demand for cabbage is nationwide and the bulk of it is being consumed in the Southern part of Nigeria, while production is high in the Northern section of the Country. This situation has led to excessively high prices of cabbage due to transportation costs.<sup>[2]</sup> Cabbage has long been regarded as a minor crop in Nigeria and thus has attracted little marketing research attention, in comparison to other major food crops and cash crops. Despite the significant contribution of cabbage marketing to the economic activities in Kano State, there is a less comprehensive economic analysis of the cabbage marketing system, which has resulted in a limited understanding of the factors that influence the profitability of cabbage marketing, as well as the challenges faced by marketers in the sector. Therefore, there is a need for an in-depth economic analysis of the cabbage marketing system to identify the actors who gain more profit, right variety combination, and the constraints faced by market actors. The findings tend to guide policymakers, farmers, and marketers to improve the efficiency and competitiveness of the cabbage marketing system in the study area, while also providing researchers with the basic information necessary for further research into vegetable marketing in Nigeria.

### Objectives of the Study

The broad objective of the study was to analyze the economies of cabbage marketing channels in Kano Metropolis, Kano State. The specific objectives were to:

- i. Describe the socio-economic characteristics of cabbage marketers
- ii. Describe the marketing channels and structure of cabbage marketing
- iii. Estimate the costs and returns associated with cabbage marketing
- iv. Examine the market quality profile of cabbage varieties.

## METHODOLOGY

### Study Area

The study area for the marketing of cabbage was the Kano State capital, Kano. Kano is the State capital of Kano State in Northwest Nigeria. It is situated in the Sahelian geographic region, south of the Sahara. Kano is the commercial nerve center of Northern Nigeria, and it is situated between latitude 10° 33" and 12° 37" North of the equator and longitudes 7° 43" and 9° 35" East of Greenwich. It is bordered to the Northwest and Northeast by Katsina and Jigawa States, respectively, while to the South and Southwest by Bauchi and Kaduna States, respectively. The State has a total land area of 20,760 km<sup>2</sup> with a population of 9,383,682 people, amounting to 6.70% of the nation, and a projected population of 14,278,381 people by 2023 based on an annual growth rate of 2.5%. The State has 44

local government areas (LGAs). Farming is among the major occupations of the people who are predominantly of Hausa/Fulani ethnic origin. The Kano metropolis initially covered 137 km<sup>2</sup> (53 sqmiles) and comprised eight LGA's: Kano municipal, Fagge, Dala, Gwale, Tarauni, Nassarawa, Ungoggo, and Kumbotso. The total area of the metropolitan Kano is now 499 km<sup>2</sup> (193 sqmiles) with a population of 2,828,861 as of the 2006 Nigerian census, and the latest official estimates for 2016 are 3,931,300.<sup>[7]</sup>

There are seven specialized agricultural markets located in the metropolis; these include Dawanau known for staple food, tubers, and grains; Yanlemo at Maikalwa known for fruits; Yankaba, Tarauni, and Yankura markets also known for vegetables, respectively; Yan Awaki market at Unguwa Uku which specialized in the sale of animals; Kara market also for animals; Yan Goro for Kola nut market located at Mariri; and Yan Rake at Goron Dutse for sugarcane.<sup>[8]</sup> Out of the seven specialized markets in Kano State, the Yankaba market was selected alongside two others (Yankura and Tarauni) for the study. Three main reasons influenced the choice. (i) These markets are particularly large, staple foods markets. (ii) They are located along main roads in the city. (iii) Each of the markets specializes in the marketing of a large group of products, especially important in the diet: Vegetables and fruits.

### Sampling Procedure

Multistage sampling procedure was employed for this study. The first stage involved purposive selection of Kano state due to the concentration of marketing and high cabbage consumption activities. The second stage involved the purposive selection of three (3) main markets based on the intensity of cabbage marketers, which are Yankaba Market (Wholesalers), Tarauni and Yankura markets (Retailers), respectively. The list of registered marketers in these markets was collected from the Secretariat of the vegetable community association situated at the Yankaba, Tarauni, and Yankura markets. These lists served as a sampling frame for the selection of cabbage marketers. The final stage involved the random sampling of selecting the marketers proportionately, where a total of 301 marketers (200 marketers from Yankaba market, 54 marketers from Yankura market, and 47 marketers from Tarauni market) formed the sampling frame. A total of 170 marketers were selected to form the sample size generated from the Raosoft sample size calculator.

### Data Collection Method

Primary data were employed for this study, which was done with the aid of well-structured questionnaire administered to the selected cabbage marketers. Data collected include socio-economic characteristics of cabbage marketers such as age, years of education, household size, years of experience and level of income, costs of variable and fixed inputs; and returns elicit information on marketing activities, channels and

structure of cabbage marketers, marketing margin, marketing efficiency, cost and return of marketers, and also constraints faced by cabbage marketers in the study area.

### Analytical Technique

Data collected were analyzed using Descriptive statistics, Gini coefficient, and Marketing margin analysis.

### Gini Coefficient

The Gini coefficient is a statistical measure of income or wealth inequality within a population. The method is widely used by economists, policymakers, and social scientists to understand the distribution of income and wealth within a society. The Gini coefficient ranges from 0 to 1, with 0 indicating perfect equality (i.e., everyone has the same income or wealth) and 1 indicating perfect inequality (i.e., one person has all the income or wealth). The Gini coefficient is then calculated as the ratio of the area between the two curves and the total area under the line of perfect equality. It was used to achieve part of objective ii.

Mathematically expressed as:

$$GC = 1 - \frac{\sum_{k=0}^n (X_k - X_{k-1})(Y_k + Y_{k-1})}{2} \quad (i)$$

Where GC=Gini coefficient

The cumulated proportion of the population variable, for  $k = 0 \dots n$ , with  $X_0=0$  and  $X_n=1$ . The cumulated proportion of the income variable, for  $k = 0 \dots n$ , with  $Y_0=0$  and  $Y_n=1$ .  $\Sigma$ =summation sign.

### Marketing Margin

This was used to achieve objective iii. It is the difference in price between what a marketer receives from a product and the amount the consumer pays for an equivalent amount of that product. It can be expressed in percentage terms as:

$$\text{Marketing margin} = \frac{\text{Selling price} - \text{Cost price}}{\text{Selling price}} \times 100 \quad (ii)$$

Where: Selling price = Wholesale/retail price and Cost price = purchase price.

## RESULTS AND DISCUSSION

### Socioeconomic Characteristics of Cabbage Marketers

The age distribution of cabbage wholesalers is presented in Table 1. The results reveal that the average age of wholesalers and retailers in the area was 43 years and 48 years, respectively, with both age brackets falling between 47 and 56 years old in the study area. This result indicates that most of the marketers are in their middle age; hence, it is expected that more strength is put

into cabbage marketing activities, explaining that the marketers are still in their active age. The result from these findings is consistent with that of Ibrahim *et al.*,<sup>[9]</sup> who found that the majority of fresh tomato marketers in Kano State had a medium age, which is economically active. The result shows that the average year of marketing experience of both wholesalers and retailers is 15 years and 12 years, respectively. This shows that the marketers can survive any unfavorable conditions in marketing, such as a hike in transportation and production, as well as economic shocks. This finding aligns with Alimi *et al.*,<sup>[5]</sup> who observed that experience influences an actor's ability to enhance scarce resources. The wholesalers had a mean annual income of ₦1,189,677, while retailers had ₦624,343. This possibly could be attributed to the commercial status of the study area, with high demand for vegetable products, market availability, and suitable pricing of vegetable produce. The annual income gives the proxy that the vegetable marketing business was profitable and contributed to household welfare.<sup>[10]</sup>

The results reveal that all (100%) of the wholesalers and retailers who are involved in cabbage marketing are males, which implies that the female counterpart does not venture into the cabbage enterprise. This result agrees with Wahab *et al.*,<sup>[11]</sup> who posited that cabbage marketing in Kano State was predominantly dominated by males. The results show that 55% of the wholesalers belong to cooperatives, while 45% does not belong to cooperative societies, whereas 69% of the retailers do not belong to a cooperative, while 31% belongs to cooperatives. The important role this association plays is mainly in the sanitation of the market, loan acquisition for the members, and conflict resolution among the marketers. This result is in line with Ibrahim *et al.*,<sup>[9]</sup> who posited that tomato marketers in Yankaba market, according to their cooperative membership status, show that most of them were members of the association. The result shows that (51%) of cabbage wholesalers had secondary school education, (43%) had primary school education; on the other hand, (61%) of the retailers had primary education, while (30%) had secondary school education. The level of education should help marketers have little or no constraint in communicating with the customers, especially in terms of price bargaining. This finding is in agreement with Abdurrahman *et al.*<sup>[12]</sup> who discovered that most of the vegetable marketers in Kano State had access to formal education.

### Marketing Channels and Structure of Cabbage Marketing

The marketing channel of cabbage in the study area shows the path of distribution of cabbage from the producer (Farmer) to the middlemen like wholesalers and retailers and to the final consumers.

Producers-----Wholesalers-----Retailers-----  
Consumers

**Table 1: Age, marketing experience, and annual income of cabbage marketers**

Variables	Wholesalers (65) Frequency	Percentage	Variables	Retailers (105) Frequency	Percentage
<b>Age (Years)</b>					
27–36	10	15.0	21–31	15	14.0
37–46	10	15.0	32–42	15	14.0
47–56	25	39.0	43–53	35	33.0
57–76	14	22.0	54–64	18	17.0
67–76	6	9.0	65–75	22	21.0
Mean	43		48		
Maximum	72		73		
Minimum	27		21		
Standard deviation	10.23		13.4		
<b>Marketing experience (Years)</b>					
3–9	14	22.0	2–10	18	17.0
10–16	25	38.0	11–19	38	36.0
17–23	14	22.0	20–28	27	26.0
24–30	7	11.0	29–37	12	11.0
21–36	5	7.0	38–45	10	10.0
Mean	25				
Maximum	35				
Minimum	3				
Standard deviation	9.57				
<b>Annual income (₦)</b>					
216,000–1,615,999	19	30.0	210,000–1,742,59	46	47.0
1,616,000–3,015,999	12	18.0	742,600–1,275,199	31	30.0
3,016,000–4,415,999	11	17.0	1,275,200–1,807,799	11	11.0
4,416,000–5,815,999	13	20.0	1,807,800–2,340,399	8	8.0
5,816,000–7,216,000	10	15.0	2,340,400–2,873,000	6	6.0
Mean	1,189,677		624,343		
Maximum	7,200,000		2,873,000		
Minimum	216,000		210,000		
Standard deviation	385,000		267,900		
<b>Sex</b>					
Male	65	100	Male	105	100
Female	-	-	Female	-	-
<b>Cooperative membership</b>					
Members	36	55.0	Member	33	31.0
Non-member	29	45.0	Non-member	72	69.0
<b>Educational level</b>					
Primary	22	43.0	Primary	64	61.0
Secondary	33	51.0	Secondary	32	30.0
Tertiary	10	15.0	Tertiary	9	6.0
Total	65	100		105	100

Source: Field Survey, 2022

The wholesalers often buy from the producers at the farm gate or from cabbage-producing areas such as Zaria and Jos, as reported by the marketers. Wholesalers sell to the retailers directly in the selected markets. The retailers then sell to the final consumers. They buy vegetables from the producers and later sell to the wholesalers or retailers. Wholesalers are merchants who buy cabbage in large quantities. The three channels of distribution of vegetables identified in this study agree with Mosisa,<sup>[13]</sup> which also identified similar three marketing channels for horticultural crops marketing in Ambo town, Ethiopia. The study shows that the principal actors in the vegetable marketing channels are farmers, wholesalers, retailers, and consumers.

### Market Structure of Cabbage Marketing

Gini index is shown in Table 2, with a value of Gini coefficient 0.20, for cabbage wholesalers, which is tending toward the line of equality, indicating that there is a nearly perfect equality or low level of seller concentration at this level. The Lorenz curve in Figure 1 explains the extent of deviation in the curve from equality line, which indicates competitive market of 20% gini index, such that no market participant is large enough to have

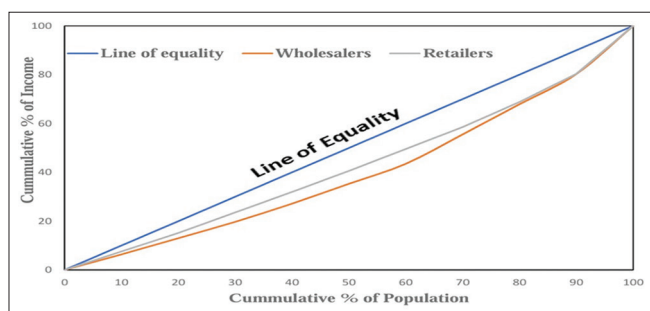


Figure 1: Lorenz curve of cabbage marketers

the power of setting cabbage prices, but traders handle a major share of the quantity transactions in the market.

The value of the Gini coefficient (0.15) for cabbage retailers tends toward the line of equality, indicating that there is a nearly perfect equality or low level of seller concentration at this level. The market was found to be purely competitive, with a Gini of 15% as indicated in the Lorenz curve [Figure 1]. The calculated Gini coefficient of 0.15 pointed toward a low level of seller concentration. It could be said that there are many buyers in the market purchasing a standardized product. The result shows that retailers were closer to the line of equality than wholesalers, implying a highly concentrated market for both actors. This suggests that the cabbage market in the study area has an oligopoly structure where only a few actors control a large share of the market.

### Costs and Return Associated with Cabbage Marketing for Wholesalers

The information on cost components as reflected in Table 3 showed the total cost of marketing to ₦121.5 per kg for the wholesaler. The total cost consisted of variable costs; the variable costs included cabbage cost price 82% for wholesalers, which constituted the highest percentage of the total variable cost. The cost of transporting the cabbage accounted for 8.5% for wholesalers. Stall rental cost accounted for 2% for wholesalers, cost of storage accounted for 1% for wholesalers, sorting cost accounted for 0.4% for wholesalers, packaging cost accounted for 0.4% for wholesalers, loading/offloading accounted for 1.8% for wholesalers, market commission accounted for 1.2% for wholesalers, and union dues accounted for 1% for wholesalers. However, market equipment cost accounted for 1.7% for wholesalers. Furthermore, it can be deduced from this result that all the variable costs accounted

Table 2: Gini coefficient of Cabbage marketers

Income (*000)	Wholesalers				Retailers				
	Cum. % of Population	Cum. % of Income	Area Lorenz	GI	Income (*000)	Cum. % of Population	Cum. % of Income	Area Lorenz	GI
2,322	10	6.36	0.31	0.2	1,105	10	7.56	0.37	0.15
2,424	20	13.00	0.96		1,110	20	1.516	1.13	
2,448	30	19.72	1.63		1,224	30	23.54	1.93	
2,720	40	27.16	2.34		1,230	40	31.96	2.77	
2,970	50	35.30	3.12		1,258	50	40.57	3.62	
2,983	60	43.47	3.93		1,314	60	49.56	4.50	
4,400	70	55.52	4.95		1,318	70	58.56	5.40	
4,510	80	67.68	6.17		1,508	80	68.83	6.36	
4,521	90	80.20	7.40		1,680	90	80.33	7.45	
7,200	100	100	9.01		2,873	100	100	9.01	
36,498			39.87		14,608			42.61	

Source: Field survey, 2022

for 100.00% of the total cost. The result shows that the average gross revenue for wholesalers of cabbage was ₦250.5 per kg, with a marketing margin of 60%. High market margin, as

**Table 3: Costs and returns associated with cabbage marketing measured in (₦/Kg)**

Costs	Wholesalers		Retailers	
	Amount (₦)	Percentage	Amount (₦)	Percentage
Marketing Cost	250.5		300	
Gross Revenue (₦/Kg)				
Variable Cost (₦/Kg)				
Purchase price	100	82	240	96
Store Rentals	2.5	2	1.0	0.4
Transportation	10	8.5	5	2.47
Storage	1.2	1	0.19	0.08
Sorting	0.5	0.4	0.09	0.04
Packaging	0.5	0.4	0.12	0.05
Loading and offloading	2.2	1.8	0.8	0.32
Market commission	1.5	1.2	0.5	0.2
Union dues	1.0	1	0.5	0.2
Market equipment	2.1	1.7	1.1	0.44
Total variable cost	121.5	100	249.3	100
Market Margin (%)	60		20	
Return on investment	2.06		1.2	

Source: Field Survey, 2022

indicated by Abdullahi *et al.*,<sup>[14]</sup> can be attributed to the ability of the marketers to finance risk. These ratios showed that cabbage marketing in the study area was profitable and viable. The return-on-investment values imply that for every naira invested in small-scale cabbage marketing, ₦2.06k was returned to the wholesalers as revenue. This implies that small-scale cabbage marketing in the study area was profitable because buying in bulk directly from the farmers at the farm gate price is a more viable business,<sup>[15]</sup> who posited that some of the wholesalers in Port-Harcourt indicated that they buy directly from the farm gate and could be said to have the potential to wield greater profits than the retailers.

The results further showed the total cost of marketing to be ₦249.3 per kg for the retailer. The total cost consisted of variable costs; the variable costs included cabbage cost price 96% for retailers, which constituted the highest percentage of the total variable cost. The cost of transporting the cabbage accounted for 2.47% of the total cost incurred by the retailers in the marketing venture. Stall rental cost accounted for 0.4%, cost of storage accounted for 0.08%, sorting cost accounted for 0.04% for retailers, packaging cost accounted for 0.05%, loading/offloading accounted for 0.32% of the total cost, market commission accounted for 0.2 for retailers, and union dues accounted for 0.2% for retailers. However, market equipment cost accounted for just 0.44% for retailers. Furthermore, it can be deduced from this result that all the variable costs accounted for 100.00% of the total cost. The result shows that the gross revenue for retailers of cabbage is ₦300 per kg, with a marketing margin of 20%. These ratios showed that cabbage marketing in the study area was profitable and viable even for marketers selling in bits to restaurants, eateries, and other customers. The return on investment values imply that for every naira invested in small-scale cabbage marketing, ₦1.2k was returned to the retailers as revenue. This implies that

**Table 4: Marketing qualities of cabbage varieties**

S. no.	Varieties	Type	% Sellers	Av. cost (₦/Kg)	Average size (Kg)	Shelf life (days)	Marketing qualities
1	Victoria F1	Hybrid	6	300	4–5	21–30	Excellent head uniformity, good transport, and storage uniformities
2	Gloria F1	Hybrid	20	300	4–5	30–45	Round shape, firm and compact, long shelf life
3	Pruktor F1	Hybrid	5	300	1.5–1.9	15	Fresh consumption and short-term storage, gray-green in color
4	Drumhead	Hybrid	18	300	4.5–5.5	21–30	Very firm, crisp, and tender, with good storage ability
5	Nuzaka F1	Hybrid	16	300	1.8–2.3	21	Semi flat in shape, firm and medium in color
6	Copenhagen Market	OPV	25	300	2–3	21–30	Very firm and compact, long shelf life
7	Red Acre	OPV	10	300	1–2	30	Great for slaw, salad, and kraut, reddish purple head, and good storage capabilities

Source: Field Survey, 2022

small-scale cabbage marketing in the study area was profitable, although buying in bulk directly from the farmers at the farm gate price is a more viable business.

### Market Qualities of Cabbage Varieties

Table 4 reveals seven cabbage varieties, categorized into two types, which are hybrid and open-pollinated varieties (OPVs). The hybrid varieties include Victoria F1, Gloria F1, Pruktor F1, Drumhead, and Nuzaka F1. The OPV varieties are Copenhagen Market and Red Acre. The percentage of sellers for each variety indicates the market distribution. Gloria F1 has the highest percentage of sellers at 20%, while Pruktor F1 has the lowest at 5%. All varieties are priced at 300 Naira/kg. The uniform pricing may be influenced by market factors, demand, or production costs. The average size of cabbage heads varies across varieties. For instance, Copenhagen market OPV has an average size of 2–3 kg, while Drumhead (Hybrid) has an average size of 4.5–5.5 kg. Shelf-life ranges from 15 days for Pruktor F1 to 45 days for Gloria F1. This information is crucial for both sellers and consumers, influencing storage and market strategies. Each variety is described based on its marketing qualities. Gloria F1 is known for its round shape, firm and compact structure, and long shelf life. Drumhead is characterized as very firm, crisp, and tender, with good storage ability. The inclusion of both hybrid and OPV types offers variety to sellers and consumers. Hybrid varieties often exhibit specific traits due to controlled breeding, while OPV varieties may have more genetic diversity. The percentage of sellers provides insights into the popularity or availability of each variety in the market. Gloria F1, with the highest percentage, may be a preferred choice among sellers. This result agrees with NABC<sup>[16]</sup> which posited that Copenhagen and Gloria F1 cabbage varieties are the widely available cultivars in the study area. The uniform pricing at ₦300/kg suggests a standardized market rate for cabbage, possibly influenced by factors such as competition and consumer expectations. Sellers and consumers make decisions based on the size and shelf life of the cabbage varieties. The varieties with longer shelf life may be preferred for storage and transport. The marketing qualities descriptions are valuable for buyers, helping them choose varieties based on specific attributes, such as shape, texture, and color. This information is essential for farmers, sellers, and consumers to make informed decisions about cultivation, marketing, and consumption.

### CONCLUSION

There was low-level seller concentration and high competition in the market for both wholesalers and retailers which could necessitate them to invest in unique branding, customer service, or other value-added services to stand out. The Copenhagen cabbage variety is the most common type of cabbage while the Gloria F1 variety has the longest shelf life. Both varieties are versatile and can be used in a variety of dishes, making them

a popular choice among consumers. The study concludes that marketing was a profitable venture for both the wholesalers and retailer channels, which could further increase their livelihood status, thus leading to poverty reduction.

### RECOMMENDATION

Market unions and associations should ensure that they are registered to increase their chances of accessing credit facilities from financial institutions, since poor access to credit facilities is a major constraint affecting the marketers. Vegetable stakeholders should tailor interventions and support mechanisms that align with transportation and price-setting constraints faced by wholesalers and retailers in the market. Marketers should explore ways to optimize transportation efficiency since the cost of transporting cabbage constitutes a significant portion of the total cost.

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