

Analysis of Head Cabbage Market Performance in Kofele and Kore Districts, Oromia Region, Ethiopia

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Abstract

The study analyzed market performance of head cabbage in Kofele and Kore districts with the objective of identifying actors involved in head cabbage markets and examining market performance of head cabbage. A two-stage sampling procedure was used to select sample households. A total of 120 head cabbage producers, 50 traders and 50 consumers were randomly selected and interviewed using structure questionnaires and checklist. The descriptive statistics and market margin model were applied to analyze head cabbage market performance. The result of the study shows that farmers used three market outlet to sell their product. These are collectors, wholesalers and consumers. However, they earn low/little market margins from the large volume of head cabbage they sold to collectors and wholesaler compare to consumers. This is due to brokers who have the power to determine prices paid by the traders and thus extract huge marketing margins. Therefore, this study suggests that it shall be better to improve the farmers' market margins from collectors and wholesalers by strengthening farmers-traders linkage through reducing brokers' exploitation and solving related production and marketing problems in the study area.

Keywords: Actors, Head Cabbage, Market Margin, Market Performance, Kofele, Kore

1. Introduction

Head cabbage belongs to a class of vegetables called Brassica, also known as cruciferous vegetables because their flowers are cross-shaped (Anonymous, 2012). It has 90% water and an excellent source of minerals, Vitamin A and C and the B vitamins. According to Anonymous, (2012) head cabbages are mostly produced for and marketed through informal market. Head cabbage grows best under cool conditions. Ethiopia is one of the top five African countries producing head cabbage (Anonymous, 2012). Head cabbage is a major economically important vegetable in Ethiopia (Bezabih *et al.*, 2015). Agricultural marketing is conducted mainly through the informal sector through traders. Poor marketing services, facilities and transport in rural areas affects agricultural commercialization (MoARD, 2010). The Ethiopian government attempts to promote production and marketing of economically important vegetables to increase competitiveness in domestic, regional, national, and international markets through improving market performance (MoARD, 2010).

Head cabbage is widely produced in Kofele and Kore districts due to its suitable environmental condition (DoA, 2013). It is also one of the cash crop vegetable produced and marketed by farmers in the districts. However, market incentive gained from head cabbage products supply to market is very low due to poor market performance, in adequate market infrastructure, facilities, and perishability of the product (DoA, 2013). Poor performance of market chain (that is if market performance is not efficient, sufficient and price signal arising at consumers level are not adequately transformed to farmers) places farmers at a disadvantage (Bosena *et al.*, 2011). Therefore, this study was initiated to identify and indicate factors affecting head cabbage markets and improve output market performance in the study areas.

1.1. Objectives of the Study

- To identify actors involved in head cabbage markets;
- To examine market performance of head cabbage in the study areas

2. Research Methodologies

2.1. Description of the study Area

This study was conducted in Kofele and Kore districts, West Arsi zone, Oromia region, Ethiopia. Kofele and Kore are located at 275 kilometer and 305 kilometer from capital Addis Ababa towards south Ethiopia. The major agro-ecology of Kofele and Kore districts are high land which cover 90% and 88% respectively (DoA, 2013). The annually rain fall and temperature received by both districts are 1500 mm-2100 mm and 1200mm-1800mm, 5°C-17°C, and 19°C-23°C respectively. Kofele and Kore districts are found within the attitude of 2400-2700 and 2650-3000 meter above sea level having clay loam soil which is the dominant soil type in the areas (DoA, 2013). The districts have bi-modal rainfall distribution which the main rainy season starts from June to September/October and short rainy season from March/April to May (DoA, 2013). The districts feature a crop-livestock mixed farming system. Barley, Potato, Wheat, Maize, Enset, Cabbage and Head Cabbage are

widely grown in the districts both for food and marketing purposes. Head cabbage is a major cash crop vegetable produced in is the districts to earn income (DoA, 2013).

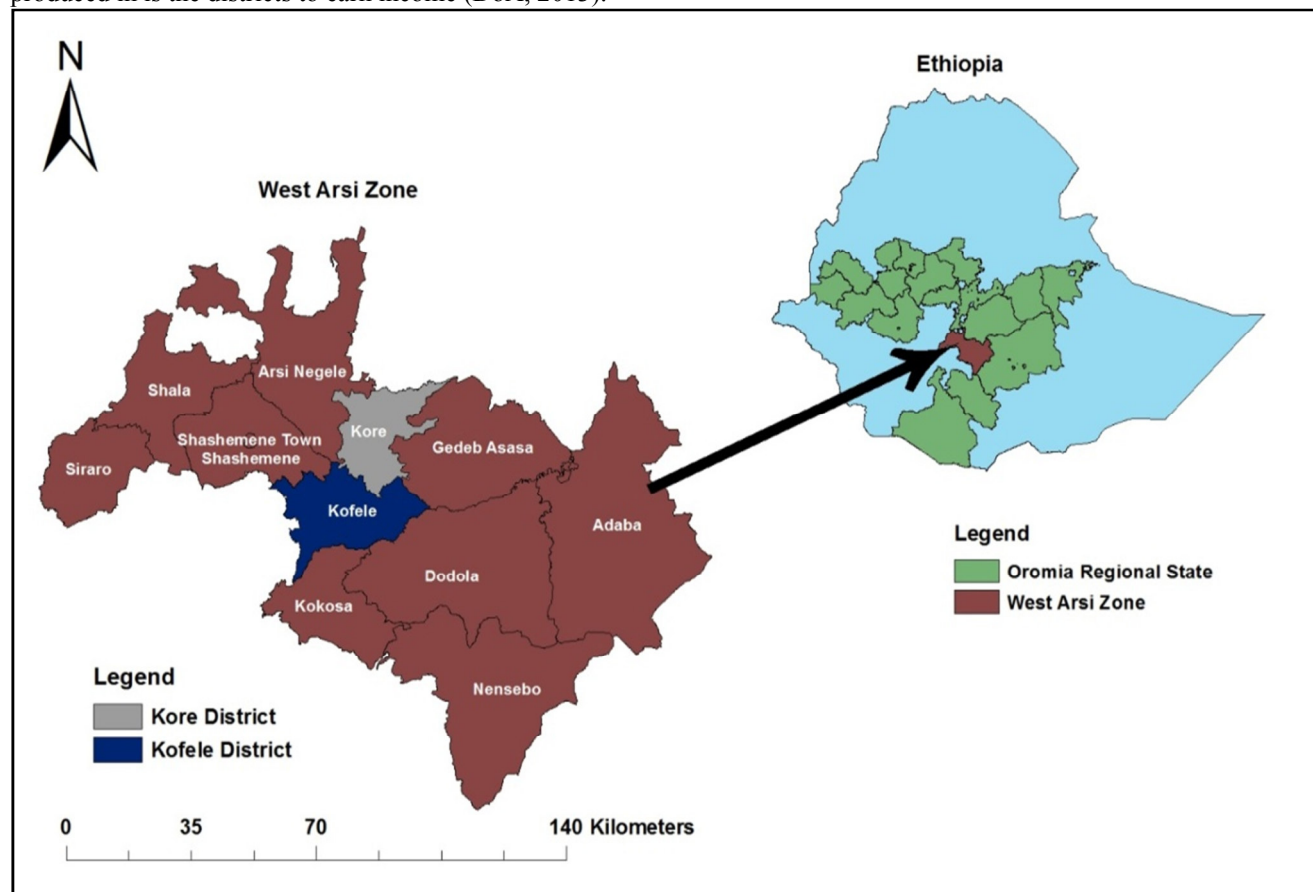


Figure 1. Map of the study area
 Source: Own sketch from GIS data, 2016.

2.2. Sampling procedure

A two-stage sampling procedure was used to select sample household. First, six Kebeles from Kofele and Kore districts were selected through purposive approaches. During the selection, the Kebele intensity of head cabbage production and the accessibility of the areas to travel were taken into consideration. In the second stage, using the population list of head cabbage producer farmers from sample each Kebeles, the intended sample size of 120 head cabbage producer households was determined using (CSA, 2015). From the predetermined size of the sample farmers, probability proportional to size was used to drawn sample households from each Kebele and then simple random sampling was followed to select head cabbage producer households. The sample size of head cabbage traders was 50. Since numbers of head cabbage traders in each locality of the districts were few, almost all of them were interviewed. Fifty (50) head cabbage consumers were also interviewed.

The following formula was used to determine sample size of head cabbage producer households:

$$n = \frac{N}{1+N(e)^2}$$

Where, n = is the sample size of head cabbage producer households, N= total number of households producing head cabbage in the districts, e= margin of errors at 10% non-response rate.

Table 1: Sampling frame and sample size of Head Cabbage producers

No	Kebeles	Total number of head cabbage producers (N=10,000 both districts)	Number of sampled households
1	Shire Kombolcha	1667	20
2	Bolo Hinlensa	1667	20
3	Doda Dayu	1667	20
4	Wamagn Alkaso	1667	20
5	Koma Bitacha	1582	19
6	Germama	1750	21
Total		10,000	120

The sites for the trader surveys were market town in which a good of sample of head cabbage existed. On the basis of flow of head cabbage, four markets (Kofele, Kore, Shashemene and Hawassa) were selected as, the main head cabbage marketing sites for the study areas. Here sampling was the very difficult task due to absence of recorded list of population of traders and the opportunistic behavior of the traders. Hence a purposive sampling method was used to select wholesalers, rural collectors and retailers from specified markets. As a result, 50 head cabbage traders were selected for the purpose of the study. Furthermore, 50 consumers were interviewed from the above mentioned market district, which were selected randomly to obtain information related to consumers (Table 2).

Table 2: Sampling frame and sample size of traders and consumers of head cabbage

No	Name of market	Trader	Consumer
1	Kofele	14	13
2	Kore	6	12
3	Shashemene	21	15
4	Hawassa	9	10
Total		50	50

2.3. Data collection and analysis methods

Both primary and secondary data were used for this study. Primary data was collected from head cabbage producer households, traders (collectors, wholesalers, retailers), and consumers by using structured questionnaires and checklist. Secondary data, which relevant for this study, was collected from district office of agriculture (DoA), Central Statistically Agency (CSA) and from published and unpublished sources. Data analysis employed descriptive statistics (frequency, percentage, mean, and standard deviation) and marketing margin to analyze head cabbage market performance in the Kofele and Kore districts. The total marketing margin was calculated using the following formula: Where TGMM is total gross marketing margin

$$TGMM = \frac{\text{Consumer price} - \text{Farmers' price}}{\text{Consumer price}} \times 100$$

3. Results

3.1. Demographic and Socioeconomic characteristics of sample households, traders and consumers

The proportion of male among all interviewed sample were 87.5%, 60% and 26% from farmers, traders, and consumers respectively (Table 3). The average family size of Head cabbage market supplier farmers was 9 (Table 4). The average experience of farmers and traders is 6 and 5 years in head cabbage selling respectively (Table 4). The farmers, traders, and consumers' average age were found to be 37, 29 and 27 year respectively. The majority of the farmers in the study areas had more access to market information and less access to credit services. This study also revealed that the majority the farmers, traders and consumers are literate in the study areas. Although most farmers are member of cooperative, did not solve the marketing problem of head cabbage.

Table 3: Demographic and socioeconomic characteristics of sample farmers, traders and consumers

Actors	Sex (%)		Education (%)		Coop. m/ship (%)		Credit serv (%)		Extension services (%)		Market info.(%)	
	Fem.	Male	Illit.	Lit.	Yes	No	Yes	No	Yes	No	Yes	No
Farmers	12.5	87.5	17.5	82.5	97.5	2.5	30	70	68.3	31.7	96.7	3.3
Traders	40	60	14	86								
Consumers	74	26	14	86								

Table 4: Demographic and socioeconomic characteristics of samples (continuous variables)

Variables	Farmers (N=120)		Traders (N=50)		Consumers (N=50)	
	Mean	SD	Mean	SD	Mean	SD
Age	37.33	10.55	28.72	9.54	26.82	8.45
Farm/trade experience	5.78	3.84	4.57	5.35		
Family size	8.67	3.34				

3.2. Land holding and head cabbage production

The average landholding of the respondents in the districts is 2.5 hectare. Of all the average holding the mean land allocated for head cabbage production is 1.5 hectare during the study time. The head cabbage productivity is 62.35 quintal/hectare. It is lower than the national average yield which is 68.20 quintal/hectare (Bonabana *et al*, 2013). According to farmers response this is related to lack of good quality seed, pests attack, diseases, and inadequate input supply such as fertilizer and chemical. Two sample t - test indicates there was a significant difference in head cabbage productivity between the districts at 1% significance level (Table 5). The mean

productivity is higher for Kofele.

Table 5: Production of head cabbage

Head cabbage	Kofele(N=60)		Kore (N=60)		Total (N=120)		t-test	p-value
	Mean	SD	Mean	SD	Mean	SD		
Head cabbage productivity	76.93	47.98	47.78	19.58	62.35	39.32	4.35	0.000

3.3. Head cabbage value chain actors and major functions

The main actor involved in the head cabbage value chain, their roles and inter relationships are discussed below.

Inputs suppliers

Agriculture value chain analysis begins at the input supply level. Inputs such as seeds, fertilizer, and chemicals are supplied by Union, Cooperative, Woreda Office of Agriculture (WoA), NGOs, traders at market and farmers to farmers exchange mechanism. Most (97%) of the farmers were purchase seeds (Euro and Holland) from market for head cabbage production. Source of fertilizers were cooperatives (67.26%), WoA (22.12%) and market (9.73%).The major suppliers of chemicals are private traders (63.77%) from market, Union (26.09%), agricultural office (7.25%) and cooperative (2.90%).

Producers

Farmers are the primary and most valued actor in the head cabbage value chain. Producers decide, what input to use, when to seed and harvest, how much to consume, and how much to sell, considering the available resource. They perform most of the value chain functions right from farm inputs preparation on their farms to post harvest handling and marketing. The major value chain functions that head cabbages producers perform include land preparation, growing/planting/, fertilization, protecting from weed, pest/disease, harvesting and post-harvest handling and marketing.

Rural collectors

Rural collectors are independent operators at primary markets who assemble and transport head cabbage from smallholder farmers, using pack animals and small trucks for sale to larger markets. The local traders play the key role as in the head cabbage value chain in area; their trading activities include buying and assembling, repacking, sorting, and selling to wholesalers typically transport on donkeys or cart to nearest town. Their major sales outlets are relatively rural collector. And most of these outlets own or rent storage but usually do not store for more than two or three days. These local traders collect head cabbage for wholesalers and wholesalers purchase from rural collectors by covering all cost and also additional fee for their services.

Brokers/middle men

Brokers in the districts have regular and temporary customers from major towns and cities across the country. Brokers facilitate transaction by convincing farmers to sale his head cabbage and facilitating the process of searching good quality and quantity head cabbage to wholesalers. The share of profit that goes to brokers varies from farmer to farmer and from trader to trader. The brokers sometimes go beyond facilitation of transaction and tend to set prices and make extra benefits from the process. A few wholesalers go straight to farmers' fields without using brokers to purchase the head cabbage products from the farmers where they negotiate prices. Brokers do not follow proper business conduct and as a result they constrain the marketing system more than they facilitate. In case the producer is not sold through broker, they forced to sell at the lower price because of perishability of the product. The broker travel to the rural areas and contact producers, they inspect the product quality, estimate output, set price and come back to communicating with wholesalers to purchase and transport. The farmers have no idea of the price paid by the wholesalers and only receive what has been bargained with the broker.

Wholesalers

Wholesalers are traders that buy head cabbage from rural collectors and also directly from farmers, usually those in surplus areas for resale in deficit, to larger market centers and retailers with better financial and information capacity. Wholesalers are the second major buyers of head cabbage as they buy at least a truck load of head cabbage at a time from farmers. They mostly purchase from farmers and local collectors. Wholesalers are traders that buy head cabbages from rural collectors and also directly from producer farmers of Kofele & Kore districts and sell to retailers and consumers at Kofele, Kore, Shashemene and Hawassa markets. Wholesalers buy head cabbage from producers through brokers who represent them in head cabbage buying activities. They have better storage, transport and communication access than other traders.

Retailers

Retailers are key actors in head cabbage value chain within and outside the study area. These are known for their limited capacity of purchasing and handling products and low financial and information capacity. They are the last link between producers and consumers. There are two types of retailers in the study area districts retailers and central retailers. Districts retailers are buying head cabbage either from farmers or wholesale traders. While central (urban) retailers in major cities mostly they buy from wholesalers and sell to urban consumers. The supermarket and shops are mainly in the major cities and commonly buy head cabbage from wholesalers. During the market visit, it was observed that retailers keep small amount of head cabbage. Consumers usually buy the product from retailers as they offer according to requirement and purchasing power of the buyers.

Consumers

Consumers are final purchasers of head cabbage products mostly from retailers for consumption purpose. Head cabbage consumers are individual households (rural and urban dwellers) hotels and institutions. The majority of sampled consumers preferred undamaged and clean head cabbage. Consumers think that if the chain becomes shorter and shorter the price of head cabbage will be reduced.

Enablers and facilitators

In a value chain, enablers include all chain-specific actors providing regular support services or representing the common interest of the value chain actors. The supporting function players for the head cabbage value chain are those who are not directly related to the head cabbage value chain but provide different supports to the value chain actors. The support functions include different services (e.g. credit), research and development, infrastructure, and information. Support service providers are essential for value chain development and include sector specific input and equipment providers, financial services, extension service, and market information access and dissemination, technology suppliers, advisory service, etc. In the study areas, there are many institutions supporting the head cabbage value chain in one way or another. The most common support providers are District Agriculture Office, District Trade and Market Development Office, Cooperatives, Oromia Micro Finance Institutions, and Private transporters. Some service providers extend services beyond one function and others are limited to a specific function.

3.4. Head cabbage market performance (Marketing Channels and Marketing Margin)

Head cabbage market performance was evaluated based on the level of marketing margins obtained and considering associated marketing costs for each key market channels. Accordingly, during the study time costs and purchase prices of the main chain actors', margins at farmers', collectors, wholesalers, urban retailers and consumers' level were analyzed.

Head cabbage marketing channel

Head cabbage market performance was evaluated based on the level of marketing margins obtained and considering associated marketing costs for each key market channels. Accordingly, during the study time costs and purchase prices of the main chain actors', margins at farmers', collectors, wholesalers, urban retailers and consumers' level were analyzed. Of total respondents farmers 65% sold head cabbage to wholesalers, 31.67% to retailers and 3.33% to collectors.

Marketing channel and marketing margins were used in the analysis of supply chain performance. Four parameters are necessary to measure the efficiency of a channel. These are quantity handled, producers share, total marketing margin, and rate of return. Out of these volumes handled, producers share and marketing margin were considered for all the head cabbage in this study. Consequently effectiveness is defined as the ability of the marketing channels to result to (or offer) proper service outputs or the right services in relation to consumer preferences. In essence therefore, identification of the marketing chain precedes its analysis. Marketing channels are defined as alternative routes of product flows from producers to consumers, (Kohls and Uhl, 1985). According to Adugna (2009), a marketing channel involves a series of intermediaries through which vegetables pass from producers to consumers. Five marketing channels of head cabbage are exhibited in the study areas. It was estimated that 6023 quintals of head cabbage were supplied to market by sampled farmers. Rural collectors and Wholesalers were the main receivers of head cabbage with percentage shares of 67.13% and 26.56%, respectively (Figure 2). The market channels identified during the survey were:

Channel I: Producer--->Consumer

Channel II: Producer--->Rural collector--->Wholesaler--->Central retailer--->Consumer

Channel III: Producer--->Wholesaler--->Consumer

Channel IV: Producer--->Wholesaler--->Central retailer--->Consumer

Channel V: Producer--->Wholesaler--->Processor--->Consumer

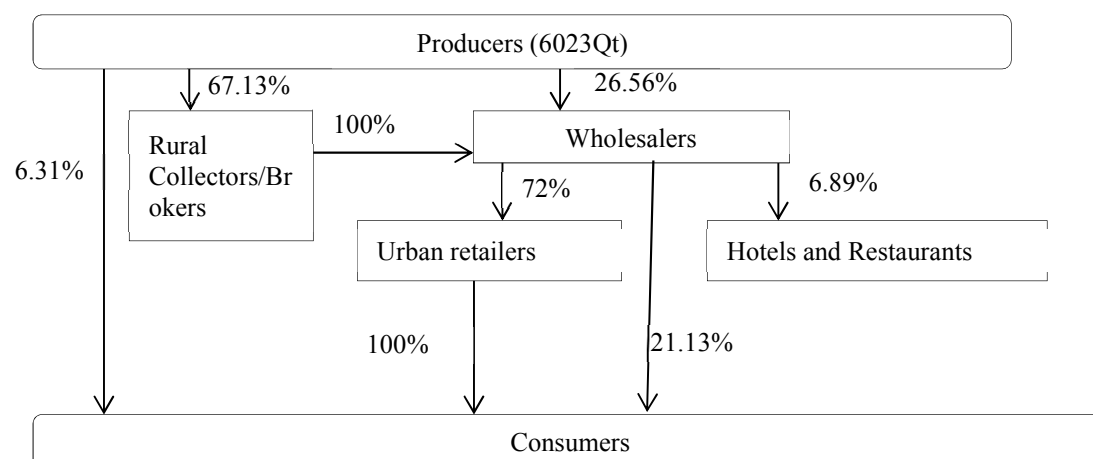


Figure 2: Head cabbage marketing chain in Kofele and Kore districts.
 Source: Survey Data (2014).

3.5. Head cabbage marketing channels and transportation mode

Head cabbage is highly perishable product and due to limited on-farm storage facilities farmers immediately sell after harvest. There are various participants in the head cabbage market chain namely: farmers, rural collector/brokers, wholesalers, retailers, processor (restaurants/hotel) and consumers as illustrated in Figure 2. Farmers form the first link in the head cabbage marketing supply chain. Some farmers sell their head cabbages to the consumers in the weekly village markets. However, the main channel through which farmers sell majority of their produce is through the rural collectors/brokers. Farmers also sell head cabbage directly to wholesalers. Rural collectors/brokers sell head cabbages directly to wholesalers mainly from Kofele, Kore and Shashemene towns. Brokers also play a facilitation role to link other market participants to each other especially to farmers. Wholesalers purchase head cabbages from farmers and rural collectors/brokers and then transport and sell to retailers, restaurants/hotels, and consumers at Kofele, Kore and Shashemene towns (Fig. 2). Consumers are the final link in the head cabbage market chain. They obtain raw head cabbage from farmers, wholesalers, and retailers. Table 6 shows the percentages of farmers who had access to the different transportation modes in both districts. The most common means of transport for head cabbage in both districts was their own donkey/horse cart (43.48%) followed by hired car (30.43%) and hired donkey/horse cart (21.74%).

Table 6: Head cabbage transportation modes

Variable	Over all sample (%)	
Mode of transportation	Own donkey/horse cart	43.48
	Hired donkey/Horse cart	21.74
	Hired car	30.43
	Transport by car	4.35

3.6. Head cabbage marketing constraints

Farmers and traders of head cabbage faced various challenges in head cabbage selling in the study areas (Table 7). Brokers' interference was most serious constraint followed by the perishability of the products and shortage of transportation that hinders farmers and traders at the time of sale. The problem of brokers could be due to the nature of the supply chain where middlemen determine the price the trader pays and other chain actors receive.

Table 7: Head cabbage marketing constraints

N ^o	Constraints	Farmers (%)	Constraints	Traders (%)
1.	Brokers interferences	36.67	Brokers set price	52.08
2.	Perishability of products	25.83	Lack of processing technology	6.25
3.	Shortage of transportation	20.83	lack of storage	4.17
4.	Shortage of buyers	9.17	Perishability of products	12.50
5.	Diseases, pests and insects problem	7.50	Shortage of transportation	10.42
6.			Financial Problem	8.33

3.7. Marketing margins of head cabbage

Tables 8 and 9, presents the buying and selling prices and marketing margins of different actors of head cabbage in each districts. In Kofele, average purchase price (P₁) was ETB 981/quintal while the average selling price (P₂)

was EBT 1356/quintal. In Kofele, head cabbage supplier farmers obtained the highest marketing margins by selling directly to consumers while the lowest is obtained from wholesalers (Table 8). The same is true for Kore district where head cabbage supplier farmers obtained the highest marketing margins by direct sell to consumers (Table 9). These differences in margins indicate that head cabbage market suitability varies across the districts which are in line with the findings of (Bonabana *et al*, 2013) . These variations mainly occur due to marketing channels through which head cabbage passes and price differences across the district. Head cabbage suppliers received the highest margins by selling head cabbage to consumers in both Kofele and Kore districts given the prevailing market prices. However, the volume of head cabbage supplied to rural collectors was high compare to wholesalers and consumers. The reason was due to shortage of transportation and high perishable nature of the products which needs immediate market.

Head cabbage supplier farmer's shares low marketing margins (9.79%) from wholesalers while high marketing margins (33.55%) from consumers in Kofele district. In Kore, the highest and lowest farmer's margin shares were from consumers and wholesalers respectively. In both districts, the higher volume of head cabbages sold to rural collectors and wholesalers brought lower margin while the lower volume of head cabbages sold to consumers received higher margin. This implies that head cabbage supplier farmers had received higher marketing shares (margins) when they supply their products to consumers and as the channel increases farmers share is reduced in the study area. This result may point to the need for improving farmer's supply of their products to consumers through strengthening their linkage and delivering timely and adequate market information in the study areas. Outsourcing bulk consumers may also provide the opportunity to uptake bulk production with reasonable price.

Table 8: Head cabbage marketing margins for producers in Kofele District

Actor	Q ₁	P ₁	P ₂	Q ₂	V ₁	V ₂	V ₂ -V ₁	GMM (%)
Rural collectors	2179	1630	2236	1839.59	3551770	4113323	561553	13.65
Wholesalers	1483	1083	1422	1252	1606089	1780350	174261	9.79
Consumers	63	230	410	53.19	14490	21806.7	7316.65	33.55
Average prices		981	1356					
Percentage loss	0.16							

Table 9: Head cabbage marketing margins for producers in Kore District

Actor	Q ₁	P ₁	P ₂	Q ₂	V ₁	V ₂	V ₂ -V ₁	GMM (%)
Rural collectors	1281	1114	1435	1099.82	1427034	1578242	151208	9.58
Wholesalers	434	416	530	372.62	180544	197487	16942.7	8.58
Consumers	563	485	630	483.37	273055	304523.70	31468.70	10.33
Average prices		671.67	865.00					
Percentage loss =	0.14							

Total gross marketing margin (TGMM) across complete distribution channel was 23.02% in both Kofele and Kore districts.

4. Conclusion and Recommendations

Head cabbage is a widely produced vegetable in Kofale and Kore district. Majority of head cabbage producer farmers were market oriented. Head cabbage productivity in both districts are lower than the national average. The major factors affecting head cabbage production in the study area are inadequate seed quality, pest and disease attack and lack of adequate input supply on time. Furthermore, broker interferences, lack of transportation and perishability of the products are the major bottlenecks. The market margins output shows that head cabbage producer farmers share more market margin when they sell directly to consumers compare to collectors and wholesalers in both districts.

Strengthening the linkage between producer farmers and consumers is better recommended to improve farmers' incentive. Intervention targets to improve farmers marketing margins through creating better head cabbage market channel for farmers by reducing brokers' market interferences is a good option required for the study areas. This intervention may encourage farmers to supply their products to market. Working with farmer's organization and frequent quarantine may solve input supply and seed related quality problems.

Acknowledgements

The interviewed farmers, traders and consumers receive deepest thanks to their honest and true interview. We are also thankful to enumerators for their commitment during data collection. We would also like to thank Oromia Agricultural Research Institute (OARI) for funding this research and Adami Tulu Agricultural Research Centre for execution of the study.

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