

Analysis of Vegetables Marketing Performance in Case of Habru District, North Wollo Zone, Ethiopia

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Abstract

This study was aimed to identifying the major market channels, and examining the market structure and performance of vegetable market in Habru district, North Wollo Zone, Ethiopia. Both primary and secondary data were used for the study. Multi stage random sample techniques used to select 147 vegetable producer households and purposive sampling of 53 vegetable traders were used to generate the primary data. The structure and performance analysis result indicated that four firm's concentration ratios (CR4) of onion and tomato traders in both Mersa and Woldia market indicates strongly oligopolistic vegetable market. Lack of capital is reported as the main barrier to entry particularly for collectors and wholesalers. Five different vegetable marketing channels are identified. Producers gross marketing margin is largest when they directly sell to consumers followed by when supplied directly to wholesaler and lowest when they supply through collectors. The study recommends the need to Enhance competition through promoting entrepreneur entry, facilitate farmers' cooperative for collective marketing, and buildup producers bargaining power through market-oriented extension service.

Keywords: Concentration ratio, Market performance, Margin

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1. INTRODUCTION

Ethiopia is one of the countries in Africa, which have huge potential for the development of different varieties of horticultural crops (EHDA, 2012). The country has favorable conditions for growing a wide range of fruits, vegetables, flowers and spices given the existence of diverse agro-climatic zones, long growing seasons, and availability of water for irrigation, including 122 billion cubic meters of surface water and 2.6 billion cubic meters of ground water. Horticulture creates in excess of 180 thousand of employment opportunities, out of which 85% are for women (EHPEA, 2013). Amhara region has ideal opportunities for horticultural industry development including abundant surface and ground water potentials, cheap labor force and increasing demand for horticultural produces both in the domestic and international markets (ANRS BoA, 2015).

In 2016/17 Meher season, about 468, 689.1 hectares of land is under vegetable and root crops with a total production of about 54.4 million Qt in Ethiopia. Fruit and vegetable production covered about 0.13% and 3.29% of the total area covered by cereal crops in Amhara region, respectively. The production of vegetable including root crops in North Wollo zone for 2016/17 meher season was 315,719.88Qt which produced by 234,435 smallholder farmers in 3,787.74 hectares (CSA, 2017).

Habru district where this study was conducted is one of naturally endowed area for vegetable production. In 2016/17 production year, about 7, 295 hectares were cultivated for vegetable and 872,500Qt of vegetables produced in the district. The total area under onion production were estimated to be 4,325.67 hectares with an average yield of 107.14Qt per hectare and estimated total production of 463,465.85Qt. The area under tomato production in the district were 1,340 hectares with a total production and productivity of 214,721Qt and 160.24Qt per hectare respectively (OHWARD, 2017). Even though the district has high potential in vegetable production and its economic role is huge, farmers are unlikely to extract the opportunity due to lack of market linkage, the nature of products and production.

Vegetable production in Ethiopia is increasing due to increased area allocation as well as increased yield per unit area. However, vegetable marketing is constrained by lack of market information, poor market linkages, low institutional support, lack of value chain development to ensure participation and benefit to the smallholders (Bezabih *et al.*, 2014). Vegetables provide the most intensive use of land resource where some farmers produce vegetables in three cycles within the same year (Bezabih, 2010). However, there are various problems confronted producers in the marketing of horticultural crops in Amhara region. The main problems producers face were low producers' price due to presence of illegal brokers who generate asymmetric information in favor of traders, excess production and supply of similar products at the same season, and absence of market linkage, which in turn

discouraged farmers to expand their production in the future (ANRS BoA, 2015).

Habru district is known by its irrigation potential and producing variety of vegetables and fruits for home consumption and market. Despite this production potential and being a source of income for a large proportion of rural households in the district, the perishable nature of product, intermediary malpractices, and unidentified market behavior and character altogether impede the potential gains that could have been attained (OHWARD, 2016). Even though, Mengesha (2015) conducted a study on marketing system analysis of vegetables and fruits in North Wollo zone, the author did not analyze the performance of vegetable market in Habru district. Therefore, this study attempted to fill the existing research and information gaps by identifying key vegetable marketing channels; investigating vegetable market structure and performance in Habru district.

2. RESEARCH METHEDODOLOGY

2.1. Description of the Study Area

The study was conducted in Habru district, which is located in North Wollo Administrative zone, Amhara National Regional State of Ethiopia. The district is bordered in the south by the Mille river, which separates North Wollo from South Wollo zone, on the west by Gubalafto Woreda, on the north by the Alawuha river, which separates Habru from Kobo Woreda and on the east by the Afar region. The district has 36 rural kebeles and 3 sub-urban kebele administrations, with a total area of 1,239.79 km² (1, 23979 ha). The town Mersa is the center of the district, which is 491 km Northeast of Addis Ababa and 30 km south of Woldia, capital of North Wollo zone (OHWARD, 2016).

According to SARC (2015), the mean annual maximum and minimum temperatures of the district is 28.5 °C and 15 °C, respectively. The pattern of rainfall is erratic with an annual average of 300mm but sometimes it ranges from 600-1200 mm. According to CSA (2013) population projection, in 2016/17 the district has a total projected population of 235,347, an increase of 22.1% over the 2007 census, of whom 118,088 are men and 117,259 women. The projected total urban residence was 37,659, which is 16% of the population in the district and an increase of 74.34% of urban population over 2007 population census (CSA, 2007; CSA, 2013).

Agriculture in the district is subsistence and the rural population exercise mixed farming combining cereal cultivation and livestock rearing with production of fruits and vegetables using irrigation and ground water-based drip irrigation (OHWARD, 2016).

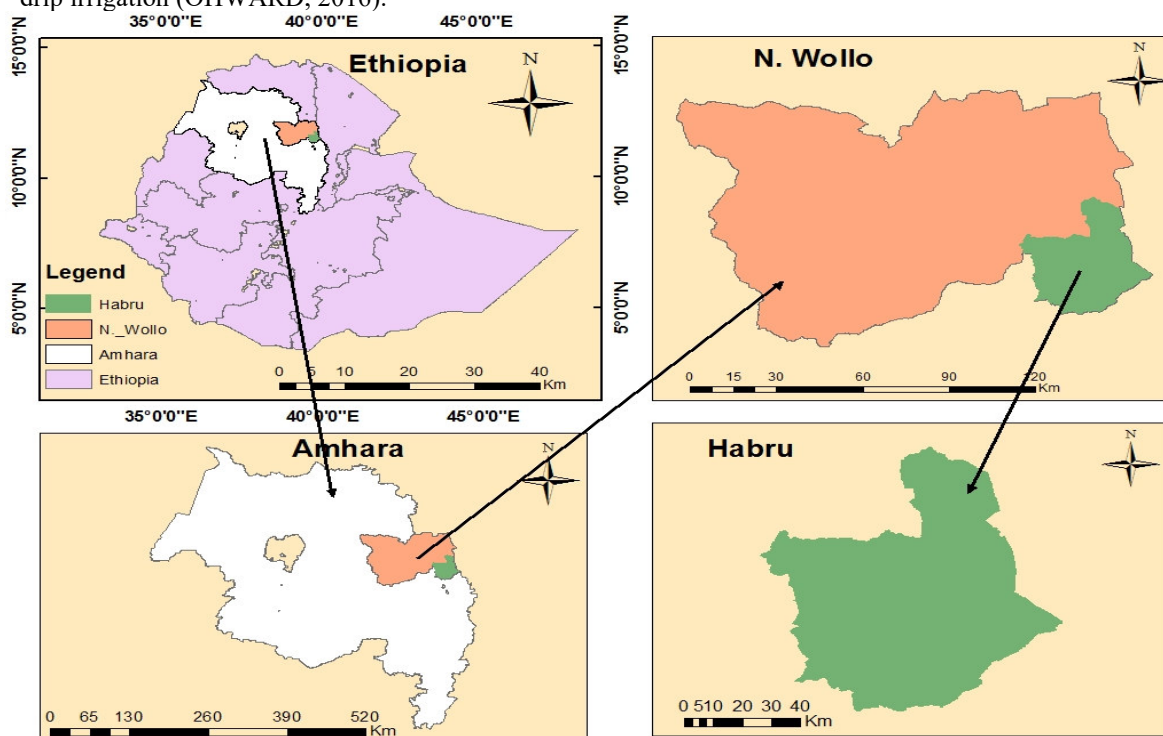


Figure 1: Geographical location map of Habru district
Source: GIS map (2017)

2.2. Types, Sources and Methods of Data Collection

In this study, both qualitative and quantitative cross-sectional data were collected from primary and secondary sources. Primary data were collected from vegetable producers and traders. Secondary data were collected from

different published and unpublished sources, such as Habru District Irrigation and Development Office, District Trade and Market Development Office, Woldia Trade and Market Development Office, CSA, OHWARD, SARC, published and unpublished reports, and bulletins.

2.3. Sampling Procedure and Sample Size

Multi-stage random sampling method was used to select vegetable (onion and tomato) producing kebeles and sample farm households. In the first stage, from 36 rural kebeles in the district 10 major vegetables (onion and/or tomato) producing kebeles were purposively selected. In the second stage, four kebeles were selected randomly from 10 onion and/or tomato producing kebeles. Finally, from the randomly selected kebeles, 147 sample households were selected randomly using Yamane sampling method from of 2,312 onion and/or tomato producers in randomly selected four kebeles.

In addition, 53 traders (5 wholesalers, 13 collectors and 35 retailers) were taken based on volume of transaction in order to include top largest firms in the analysis from three markets (Mersa, Wurgessa and Woldia) as these are markets where major district's onion and tomato products are marketed.

2.4. Methods of Data Analysis

The data collected from the farmers and traders was analyzed using descriptive statistics like percentages, mean, standard deviation, and frequencies to examine and describe demographic, socio-economic and institutional characteristics of respondents. In addition, market concentration ratio and margin analysis were used along with the qualitative description of barriers to entry and trader's strategy to analyze the structure, conduct and performance of vegetable market in the study area.

Concentration ratio: Concentration ratio was computed to determine whether there are few large firms that are dominating the market or there are many small firms. The concentration ratio was for each market calculated by the following formula:

$$CR = \sum_{i=0}^N S_i \quad (1)$$

Where, S_i represents market share of i^{th} trader and N is number of largest trades for which concentration ratio is going to be calculated. In this study, concentration ratio was calculated for each market (Mersa and Woldia). The concentration ratio for Wurgessa were not computed as the number of traders were small which in turn indicate oligopolistic structure. According to Kohls and Uhl (2002), a four largest firm's concentration ratio of 50% or more is an indication of a strongly oligopolistic market, while a concentration ratio of 33-50% indicate a weak oligopoly, and less than 33% shows the existence of un-concentrated market.

Marketing margin: The difference between the price received by farmers and that paid by consumers is a marketing margin, also called a price spread (Tomek and Kaiser, 2014). The residual margin after adjusting for average variable and fixed costs represents unit profits for the firm (Vercammen, 2011). Therefore, gross profit and marketing margins of traders, total gross marketing margin (TGMM) and producers' gross marketing margin (GMMp) are important measurements, which were used for analyzing performance of vegetable market in the district.

$$TGMM = \frac{(\text{Consumer Price} - \text{Producer Price}) * 100}{\text{Consumer Price}} \quad (2)$$

Producer's gross marketing margin (GMMp) which is the portion of the price paid by the consumer and received by the producer of the product.

The producer's margin is calculated as:

$$GMMp = \frac{(\text{Consumer Price} - \text{marketing margin}) * 100}{\text{Consumer Price}} \quad (3)$$

Where: GMMp is producer's share of end buyer's price.

The consumer price share of market intermediaries is calculated as:

$$MM_i = \frac{(\text{Selling Price} - \text{Buying Price}) * 100}{\text{Consumer Price}} \quad (4)$$

Where: MM_i = Marketing margin of i^{th} actor.

3. RESULTS AND DISCUSSION

3.1. Demographic and Socio-economic Characteristics of Traders

The demographic characteristics indicates that average age of traders were 41 years' old ranged from 23 to 62 years. Traders had a minimum of 2 years and a maximum of 18 years of experience in vegetable trading with mean trading experience of 8 years. The mean level of trader's education was 3 years with a minimum of zero and maximum of 8 years of schooling. The average family size of the traders was 4 persons and ranged from 1 to 6 persons.

Table 1. Demographic and socio-economic characteristics of traders (continuous)

Variable	Mean	Std. Dev.	Minimum	Maximum
Age	41.54	9.201	23	62
Family size	4.02	1.152	1	6
Education level	3.18	2.193	0	8
Trading experience	8.03	3.436	2	18

Source: Survey result (2017)

Table 2 shows that female traders in different sample markets mostly undertake onion and tomato trading, as the result indicated 54.72% of the respondent traders were female and the remaining 45.28% were male households. Out of the total male traders, 70.83% male traders were collectors and wholesalers. Regarding marital status of traders, 75.47% were married, 3.77% were divorced, 9.43% were windowed and 11.32% were single. The result further indicated that about 68% of traders' main occupation was vegetable trading and 26.42% of traders rely on farming which reveal that majority of vegetable traders livelihood depends on vegetable trading.

Table 2. Socio-demographic characteristics of vegetable traders by market (categories)

Variable	Category	Sample market				Total	
		Mersa	Wurgessa	Woldia	N	%	
Sex	Male	10(52.63)	2(28.57)	12(44.44)	24	45.28	
	Female	9(47.37)	5(71.43)	15 (55.56)	29	54.72	
Marital status	Single	2(10.5)	-	4(14.8)	6	11.32	
	Married	15(79)	6(85.7)	19(70.4)	40	75.47	
	Divorced	-	-	2(7.4)	2	3.77	
	Windowed	2(10.5)	1(14.3)	2(7.4)	5	9.43	
Type of business	Retailer	12(63.2)	5(71.43)	18(66.7)	35	66.04	
	Wholesaler	-	-	5(18.5)	5	9.43	
	Collector	7(36.8)	2(28.57)	4(14.8)	13	24.53	
Main occupation	Vegetable trading	9(47.4)	5(71.43)	22(81.5)	36	67.92	
	Farming	8(42.1)	2(28.57)	4(14.8)	14	26.42	
	Other	2(10.5)	-	1(3.7)	3	5.66	

Source: Survey result (2017)

3.2. Analysis of Structure, and Performance of Vegetable Markets

In this study, the structure of onion and tomato market was analyzed in terms of the degree of market concentration, barriers to entry (licensing procedure, lack of capital, education, and high prior control of farmers).

Market concentration ratio is one of the most commonly used measure as an indicator for the degree of competitiveness among vegetable traders. The CR calculated as a ratio of the total quantity of the products purchased by the four big traders to the total quantity of the products purchased in the marketing season. A high concentration ratio indicates a large degree of market concentration and raises concerns over firms abusing their market power, while a low concentration ratio indicates that firms have limited market power. Analysis of market concentration was conducted for Mersa and Woldia vegetable markets separately for onion and tomato traders.

Table 3. Vegetable traders' concentration ratio

Name of market	Concentration ratio (CR4) by product	
	Onion	Tomato
Woldia	53.70%	63.52%
Mersa	58.90%	57.80%

Source: Survey result (2017)

As indicated in Table 3, the result of Woldia market onion and tomato traders' concentration ratios of top four traders were found to be 53.70% and 63.52%, respectively. Moreover, Mersa market onion and tomato traders' concentration ratios were found to be 58.90% and 57.80%, respectively. Following the 'rule of thumb' suggested by Kohls and Uhl (2002), Woldia and Mersa vegetable markets found to be strongly oligopolistic in which four largest traders controlled more than 50% of onion and tomato purchased in the survey year. This indicate that few traders control large share of the marketed volume at the wholesale level which they could use to influence market prices to their advantage. This result is in line with the finding of Meron (2015) who found that concentration ratio for potato and cabbage market is oligopoly market. Furthermore, Dawit and Fitsum (2016) found that that the degree of market concentration in Meki and Atikilt Tera vegetable markets were strongly oligopolistic in nature. According to traders survey result, 47.2% of vegetable traders reported absence of any barriers to entry in vegetable marketing, while the other 39.6% of traders reported lack of working capital as a barrier to entry in vegetable trading. Out of the total wholesalers and collectors, 50% of respondents reported lack of working capitals as the

main barrier to entry due to the fact that large start-up capital is required for financing wholesaling and collecting trade operations, which were difficult for most potential entrants.

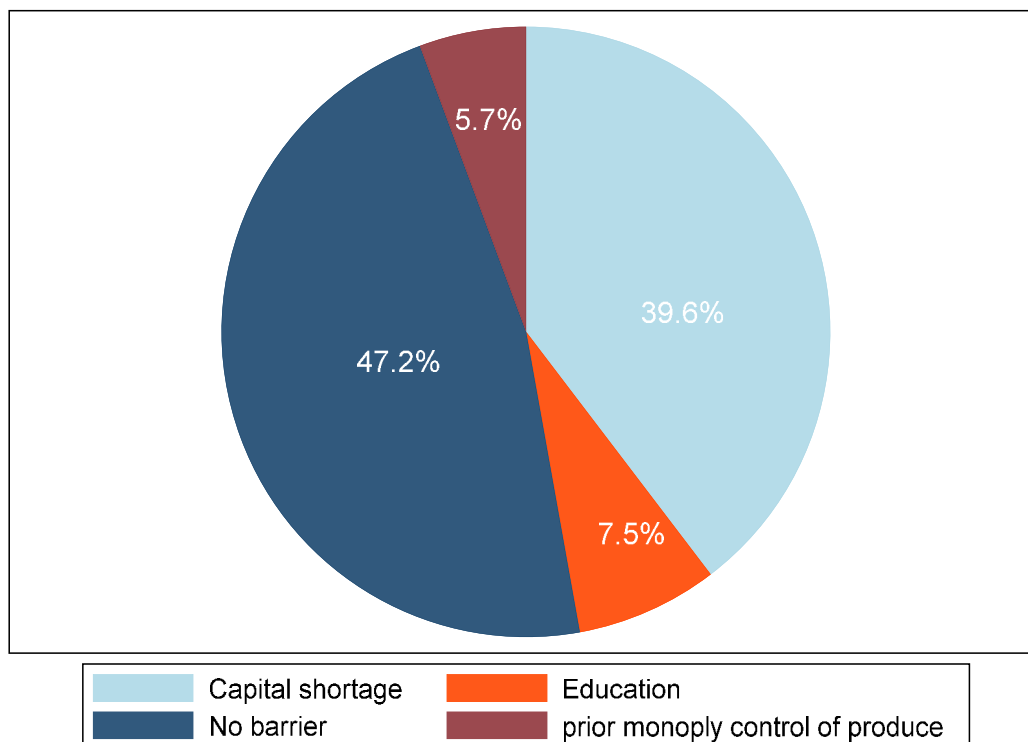


Figure 1. Barriers to entry in to vegetable market

Source: Survey result, 2017

Margin determination conducted parallel to channel analysis by taking the average sales prices of different participants (farmers, collectors, retailers and wholesalers) in the market chain. The analysis of marketing channels was intended to provide a systematic knowledge of the flow of goods from its point of production to final destination (ultimate consumers). The estimated sample respondent's volume of production of onion was about 3,220Qt, and tomato was 1,390.25Qt from which about 2,944Qt and 1,227.25Qt of onion and tomato were supplied to the market, respectively in the survey year. The intermediaries involved in both onion and tomato marketing of the study area are similar which result the channels and strategies for maximizing their profit would be similar in both onion and tomato marketing.

3.2. 1. Onion marketing channels and margin analysis

In this study, five main alternative channels were identified for onion marketing in the district from the point of production until the product reaches to the hands of consumer through different intermediaries with proportion of onion marketed as indicated in Figure 2. The survey result revealed that collectors and wholesalers were the dominants buyers of onion with percentage share of 45.8% and 42.7%, respectively in terms of volume of onion supplied by producers to the market. Regarding the product flow, from the total quantity of onion sold by sample producers the largest share 79.5% (2,343Qt) were marketed outside district and Woldia markets (Dessie, Alamata, Mekele) through collectors and wholesalers, and 20.5% (601Qt) were marketed through five channels to ultimate consumers in the district and Woldia markets. Out of the total quantity of onion supplied to ultimate consumers, 38.6% (232Qt) moved to consumers through channel V and 23.5% (141Qt) marketed through channel II.

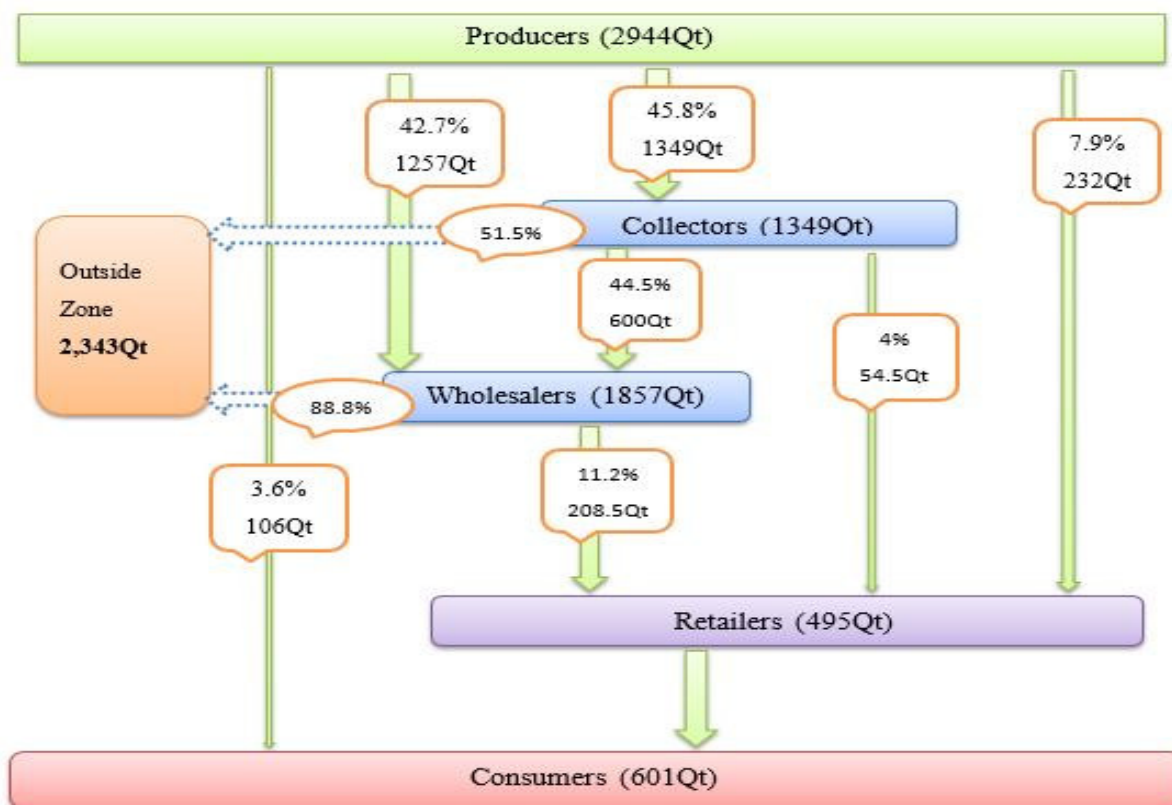


Figure 2. Onion market channel

Sources: Own sketch from survey result (2017)

Channel I. Producers → Consumers (106Qt)

Channel II. Producers → Wholesalers → Retailers → Consumers (141Qt)

Channel III. Producers → Collectors → Wholesalers → Retailer → Consumers (67.5Qt)

Channel IV. Producers → Collectors → Retailers → Consumers (54.5Qt)

Channel V. Producers → Retailers → Consumers (232Qt)

Table 4. Marketing margins per Qt of onion among major market actors

Market actors		Marketing channels				
Birr per Qt		I	II	III	IV	V
Producers	Selling price	835	889	833.5	833.5	875
	GMMp (%)	100%	72.3%	67.8%	67.8%	71.14%
Collectors	Purchase price	-	-	833.5	833.5	-
	Marketing cost	-	-	56.38	56.38	-
	Selling price	-	-	1010	980	-
	Gross profit	-	-	120.12	90.12	-
Wholesalers	GMMc (%)	-	-	14.35%	11.9%	-
	Purchase price	-	889	1010	-	-
	Marketing cost	-	79.4	41.8	-	-
	Selling price	-	1063.5	1063.5	-	-
Retailers	Gross profit	-	95.1	11.7	-	-
	GMMw (%)	-	14.2%	4.35%	-	-
	Purchase price	-	1063.5	1063.5	980	875
	Marketing cost	-	59.5	59.5	59.5	80.11
	Selling price	-	1230	1230	1230	1230
	Gross profit	-	107	107	190.5	274.89
GMMr (%)		-	13.5%	13.5%	20.3%	28.86%
TGMM		0	27.7%	32.2%	32.2%	28.86%

Sources: Own survey result (2017)

As indicated in Table 4, total gross marketing margin (TGMM) is highest in both channel III and IV (32.2%), and lowest in channel II (27.7%) followed by channel V (28.86%). The survey result showed that producer's share

(GMMp) is highest in channel I (100%) followed by channel II that was 72.3% from the total consumers' price. The gross marketing margin of producers were lowest in channel III and IV, which was 67.8%. From traders, retailers obtain maximum gross margin (GMMr), which is 28.86% of the consumers' price in channel V in which they are the only intermediary involved in the chain and take the entire traders margin and lowest in channel II and III that is 13.5%.

Regarding wholesalers, the maximum margin (GMMw) they obtain were in channel II (14.2%) when they buy directly from producers and the smallest margin were in channel III (4.35%) when they buy from collector due to involvement of many actors in the channel. Collectors obtain higher margin (GMMc) in channel III (14.35%) and the lower margin in channel IV (11.9%) as retailers offer lower price.

Profitability analysis only conducted for traders as obtaining data on producer's production and marketing costs to assess producers' profitability were difficult and unreliable on valuation of activity costs. As indicated in Table 17, the result showed that retailers attained the highest gross profit (274.89 ETB) when they buy directly from producers and in channel IV (190.5 ETB). Wholesalers attained the lowest gross profit (11.70 ETB) when they buy from collectors as the large number of intermediaries share the profit margin.

3.2.2. Tomato marketing channels and margin analysis

According to survey result, from the total volume of tomato sold by sample producers, the largest share 46.6% (572Qt) marketed through wholesalers, and 40.8% (500.25Qt) was through collectors, which were found to be dominant in terms of volume of tomato purchased. Moreover, the lower quantity of tomato accounted 9.6% (118.5Qt) and 3% (36.5Qt) marketed through retailers to consumers and directly to consumers, respectively. The largest proportion of tomato product accounted 78.5% marketed through collectors and wholesalers to outside district and Woldia markets (Dessie, Alamata, and Mekele) and the remaining 21.5% (264Qt) were marketed to ultimate consumers.

Channel I. Producers → Consumers (36.5Qt)

Channel II. Producers → Wholesalers → Retailers → Consumers (56Qt)

Channel III. Producers → Collectors → Wholesalers → Retailer → Consumers (23Qt)

Channel IV. Producers → Collectors → Retailers → Consumers (30Qt)

Channel V. Producers → Retailers → Consumers (118.5Qt)

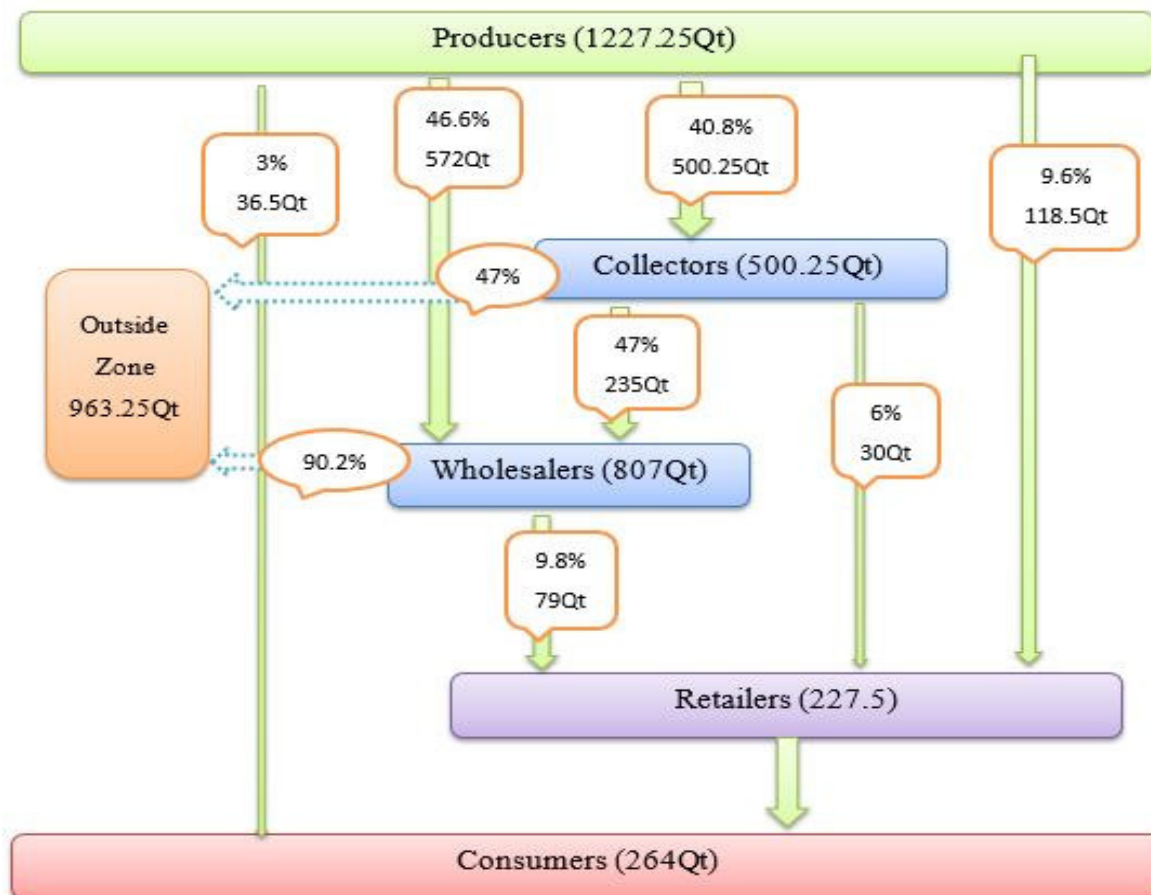


Figure 3 Tomato market channel
 Source: Own sketch from Survey result (2017)

Tomato marketing margins

Marketing margin analysis was used to identify margin gap among available market channels. As indicated in Table 18, the total gross marketing margin (TGMM) was highest in both channel III and IV (36.3%), and low in channel II (24.7%) and channel V (26.7%).

Table 5. Marketing margins per Qt of tomato among major market actors

Market actors	Birr per Qt	Marketing channels				
		I	II	III	IV	V
Producers	Selling price	1107.5	1130	956	956	1100
	GMMp (%)	100%	75.3%	63.7%	63.7%	73.3%
Collectors	Purchase price	-	-	956	956	-
	Marketing cost	-	-	79.54	79.54	-
	Selling price	-	-	1196	1228.5	-
	Gross profit	-	-	160.46	192.54	-
Wholesalers	GMMc (%)	-	-	16%	18.2%	-
	Purchase price	-	1130	1196	-	-
	Marketing cost	-	104.1	61.1	-	-
	Selling price	-	1312.5	1312.5	-	-
Retailers	Gross profit	-	78.4	55.4	-	-
	GMMw (%)	-	12.2%	7.8%	-	-
	Purchase price	-	1312.5	1312.5	1228.5	1100
	Marketing cost	-	69.29	69.29	69.29	93
	Selling price	-	1500	1500	1500	1500
	Gross profit	-	118.21	118.21	202.21	307
TGMM	GMMr (%)	-	12.5%	12.5%	18.1%	26.7%
		-	24.7%	36.3	36.3	26.7%

Source: Survey result (2017)

The survey result showed that producer's share (GMMp) is highest in channel I (100%) followed by channel II (75.3%) from the total consumers' price. Producers' gross marketing margin were lowest in channel III and IV, which was 63.7%. From traders, retailers' obtained the maximum gross marketing margin (GMMr), which is 26.7% of the consumers' price in channel V in which they are the only intermediary involved in the chain and take the entire traders margin, and the lowest margin was in channel II and III, which is 12.5%. Regarding wholesalers, the maximum margin (GMMw) they obtained were in channel II (12.2%) when they buy directly from producers at lower price. Wholesalers' gross marketing margin was lower in channel III (7.8%) when they buy from collector, which decreased the margin due to involvement of many actors in the channel. Collectors obtained the higher margin (GMMc) in channel IV (18.2%) and the lower margin in channel III (12.2%).

As indicated in Table 18, the result showed that retailers attained relatively highest gross profit when they buy directly from producers (307 ETB) and in channel IV (202.21 ETB) followed by collectors in channel IV (192.54 ETB). This might be due to retailers incur lowest marketing cost as they did not hire employees, rent store and incur lowest transport cost since they purchase either from market or nearby farms. Wholesalers attained the lowest gross profit (55.4 ETB) when they buy from collector as the large number of intermediaries share the profit margin.

4. CONCLUSION AND RECOMMENDATIONS

4.1. Conclusion

SCP approach was used to analyze the structure, conduct and performance of onion and tomato marketing. The structure of Woldia and Mersa vegetable market is oligopolistic nature with the concentration ratio of top four onion and tomato traders were more than 50%. Lack of capital were reported as a barrier to entry in vegetable trading particularly for collectors and wholesalers. The conduct of traders in price setting predominantly through negotiation based on supply force and cash on hand mode of payment. Traders mainly purchase from market and farm by offering better price and fair weighting to suppliers. The strategy of traders to attract buyer were through offering quality product.

There are five different vegetable market channels were identified and for each channel gross marketing margin and gross profits of actors were computed. The result showed that onion and tomato producer's market share was higher in channel I (100%) and channel II, but lower in channel III and IV while supply through collector outlet. The total gross marketing margin (TGMM) were largest in channel III and IV but lowest in channel II. The S-C-P result indicated the existence of concentrated vegetable market and prevalence of gross profit. It is generally believed that higher market concentration, which in turn causes high profit, implies a non-competitive behavior and thus vegetable market in Habru district found to have poor performance (inefficient).

4.2. Recommendations

Based on the empirical findings of the study, the following recommendations are proposed to be considered in the future intervention strategies of policy makers and developments actors that are aimed in promoting vegetables production and marketing.

A well-established legal framework for vegetable marketing is required to safeguard farmers, which would reduce farmer exploitation by traders. Strengthening marketing institutions to promote entrepreneurs in vegetable trading to enhance competitiveness that decrease the concentration and collusion of existing traders. Moreover, facilitating the establishment of farmer organization for collective marketing and support through market oriented extension programs to enable producers to develop effective marketing strategies and to negotiate more effectively with traders in order to raise the prices they receive for their produce.

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