
Identification of Distribution Channels to Create Sustainable Vegetable Prices

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Abstract: The price of vegetables has a role as a contributor to the rate of inflation. Currently the number of vegetable production in Boyolali region can no longer meet the needs of local communities. The limited amount of vegetable production and the inhibition of the vegetable distribution channel creates a scarcity of vegetables that result in price increases. This study aims to identify the distribution channel and the formation of vegetable prices derived from Boyolali area. The method used in this research is quantitative and qualitative. Respondents from this study consisted of farmers, wholesalers, small trader and end consumers. The type of distribution channel prevailing in Boyolali area are traditional and modern distribution channels. Intermediate distribution channels play a greater role in determining vegetable prices. If farmers want to improve their economic condition, it needs innovation and creativity in the process of planting, harvesting, packaging and marketing vegetable products.

Keywords: distribution channels, vegetables, price.

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Introduction

Research on distribution channels is important and still needs to be developed and adapted to the latest conditions in an area (Frazier, 1999); (Mouritsen et al., 2003). The concept of supply chain becomes the basic framework in research on distribution channels. Many companies recognize that networking partnerships with stakeholders, suppliers and consumers plays an important role in creating competitive advantage (Gimenez & Ventura, 2005); (Asmeri et al., 2017); (Honggowati et al., 2017). The study of the distribution of commodity products and prices relates to the time span of shipments from producer to consumer, consumer buying intention, perception of quality and fairness of the price of the profit level of each intermediary supply chain distribution channel (Xia et al., 2004); (Chandrasekaran, 2010). The pricing and profitability set by each intermediate distribution channel is influenced by the level of demand at each intermediate level (Modak et al., 2016). Pricing is closely related to inflationary developments, macroeconomic stability, and commodity distribution aspects. Changes in commodity product prices contributed significantly to the level of Consumer

Price Index (Inamura et al., 2011). Chen et al. (2008) states that commodity prices can also have an indirect impact on the exchange rate of a country's money.

Research on horticulture value chains in developed countries is extremely rare although often the main determinant of competitiveness (Kayser et al., 2016). Groups of food and vegetables are the main components that can affect deflation. Inflation and deflation cannot be separated from the types of food and vegetable groups in areas where the majority of the population has livelihoods as vegetable farmers. The area of vegetables that is quite large in Indonesia is Boyolali. In February 2016, Boyolali experienced deflation of 0.09% (BPS, 2016). Consumption of cereals in Indonesia has decreased and has shifted to an increase in the amount of vegetable and fruit consumption. Public awareness of the importance of healthy lifestyle became one of the causes of increased consumption of vegetables. Total vegetable production in 2014 reached 11,918,571 tons, an increase of 3.12 compared to production in 2013 (Direktorat Jenderal Hortikultura, 2015). Some Indonesians have consumed 97.29 percent of the Indonesian population (BPS, 2016). Boyolali is one of vegetable producing area in Indonesia. The real condition of this vegetable-producing region has not been able to meet the needs of its own region. The amount of vegetable stocks decreased due to pest attacks and the transition of vegetable crops to tobacco plants. Vegetable farmers switch because the price of tobacco is relatively high.

Boyolali's vegetable needs are aided by the supply of Tawangmangu, Karanganyar and Ketep, Magelang. If the distribution of vegetables is hampered there will be a scarcity of vegetables that result in price increases. The presence of vegetable supply distribution channels has an impact on vegetable pricing. The price of vegetable commodities is set by the middlemen or merchants who distribute vegetables from producers. So that local farmers do not have bargaining power on the determination of vegetable prices. So, it is important to examine the distribution channels, marketing and vegetable price forming patterns.

The purposes of this research are to identify distribution channel and marketing and vegetable price formation pattern in Boyolali region, Central Java. The analytical framework used in this research is the supply chain management framework. The research design used in this research is the qualitative through survey and qualitative research through in-depth interview. Survey research design is used to analyze data on the cost structure, profitability and delivery times of each institution in the supply chain. Qualitative design uses in-depth interviews that analyze the behavior of intermediary institutions in the vegetable distribution channel. The population of this study are all parties involved in the vegetable supply chain, consisting of: farmers, wholesalers, wholesalers, modern and traditional retail traders, business consumers and end consumers in the region Boyolali.

Data collection using purposive random sampling method. Specific characteristics of respondents are farmers, middlemen, traders, distributors and business consumers with medium to large business scale. Determination of respondents as resource persons in in-depth interviews using snow ball sampling is one key respondent who can provide information about other key respondents in one supply chain path. The variable measured in this study is the selling price at each level of vegetable distribution channel.

The Supply Chain Management Framework (SCM) is a set of approaches used to integrate manufacturers/suppliers, entrepreneurs, warehouses and other storage areas. Such coordination is carried out to make distribution work efficiently. Products can be produced and distributed in the right amount efficiently, on time. The accuracy of this of this time will minimize costs and can meet customer needs appropriately (Simchi-Levi et al., 2003). Supply distribution chain as a form of industrial organization in which buyers and sellers are separated by time and geographic area, can add and accrue value progressively, as the product moves from one place to another (Hughes, 1994); (Handfield & Nichols, 1999).

The supply chain basically accommodates: 1) the physical movement/product from producer to consumer; 2) movement of funds/money transfer/payment, credit and working capital from consumer to producer; 3) technology dissemination between producer, packing and processor; 4) the movement of

ownership rights from producer to processing and finally to marketers; and 5) feedback flows on consumer demand information and preferences from retailers to producers. Supply chain management is the process of planning, designing and controlling the flow of information and materials in the supply chain to meet consumer needs in the most efficient way (Schroeder et al., 2002); (Zachariassen & van Liempd, 2010). The purpose of applying supply chain management is to improve work efficiency in the distribution flow of a product.

The supply chain management framework can provide information on business conditions in the vegetable distribution chain, in the form of goods availability data, storage and maintenance costs, transportation costs and others. The role and function of intermediary institutions in supply chain management can be identified so as to obtain information on profit sharing at each intermediate level. Keywords of supply chain performance is the efficiency ratio between the cost incurred by each agency in the supply chain with the time of profit and delivery (Vidalakis et al., 2011); (Wong & Wong, 2008).

The implementation of Supply Chain Management involves identifying the members of the supply chain that are interconnected with each other, what processes need to be associated with each core member and what type of incorporation is applied to each relationship process. This is done so that its objective to maximize competition and profit for the company and all its members, including the final consumer can be achieved. Supply chain members include all companies and organizations dealing with core companies either directly or indirectly through suppliers and customers from the point of origin to final consumption.

The main members of the distribution channel within the framework of Supply Chain Management are all companies or business unit strategies that actually carry out operational and managerial activities in business processes designed to get specific results for customers or markets. The secondary member consists of a company that provides resources, knowledge, utilities or assets to key members. The definition of the primary and secondary members, it can be understood that the origin of the supply chain is the point where there is no major supplier. All suppliers are secondary members, whereas the point of consumption is the point at which no major customers (Miranda & Tunggal, 2006); (Kusdiana & Gunardi, 2014).

Almost all Indonesians consume vegetables. Based on SUSENAS data (BPS, 2016), 97.29 percent of Indonesia's population consume vegetables. An increasing trend of vegetable consumption has made improvements in the health of Indonesians. There was a decrease in the number of people who complained sick from 2015 by 30.35% to 28.53%. The high demand for vegetables requires efforts to meet the needs of vegetables through agricultural intensification, distribution efficiency and proper pricing at each level of the distribution channel.

Every vegetable farmer uses different types of marketing/distribution channels. Many practices incorporation commercialization through regional wholesale and supermarket markets with booths in farmers' markets and direct marketing in agriculture. There are many small and medium producers as members of peasant organizations, collecting the amount of products supplied by individual farmers and selling them to processors, wholesalers or retailers (Kayser et al., 2016).

The research was conducted on members of vegetable distribution channel Boyolali, i.e. farmers, wholesalers, wholesalers and small traders. 1) Farmers (people who work with agriculture, 2) wholesalers/wholesalers (people whose job is to collect products from producers and then sold to merchants or end-consumers), 3) wholesalers (traders who sell in large quantities and making sales to other merchants (retailers) not final consumers), 4) small traders (traders who sell goods directly to end consumers and/or for own consumption).

The price of a commodity plays an important role in economic stabilization in developing countries. Indonesia's market structure in commodities and industries tends to include oligopoly types (Kurniati & Yanfitri, 2010). The type of oligopoly market structure has a risk that can lead to the process of price formation is no longer influenced by the mechanism of demand and supply. The pricing strategy is precisely influenced by

other aspects of cost structure, competition, communication strategy with consumers and general marketing strategy (Levy & Weitz, 2004). The oligopoly market structure can encourage benefit-sharing disparities between intermediary institutions and producers. Prices at the consumer level can be higher because of the difference in information. Ferreira & Ferreira (2010) show that oligopoly market structures can provide more benefits for those with information to better utilize the distribution channels.

Price is an important variable in product and commodity marketing strategy. Precision in pricing becomes the benchmark for a product's success. Price is also considered a quality representative of a product. Xu (2008) explains the price discrimination policy is not only influenced by the level of consumer income, but also the characteristics and behavior of consumers. Barsky & Kilian (2001) concluded that pricing can be used to predict consumer interest in making purchases.

Methods

This research applies quantitative survey design and qualitative in-depth interview. Survey research design is used to analyze data about cost structure, profitability and delivery time of each institution in supply chain or distribution path. Qualitative design uses in depth interview that is to analyze the behavior of intermediary institutions in the distribution channel/supply chain vegetables.

The population of this study are all institutions involved in the supply chain of vegetables, consisting of: farmers, collectors, wholesalers, modern and traditional retail traders, business consumers and end consumers in the region Boyolali. The sampling method used is a combination of purposive random sampling (Rahmawati et al., 2017). Specific characteristics of the research respondents are those who have livelihood as farmers, traders, distributors and business consumers with medium to large business scale. Determination of respondents as resource persons in-depth interview by using snow ball sampling. Resource persons in depth interviews are one key respondent providing information about other key respondents in one supply chain/distribution channel.

Results and Discussion

The survey was conducted during April 2017. In April it is the peak of the wet season so it is perfect for analyzing the vegetable supply chain. In the rainy season Boyolali farmers are very fond of growing vegetables because of they need more water. The types of vegetables studied were carrot, cabbage, tomato, curly chili, and onion. The five types of vegetables are a commodity that became an indicator of performance measurement in Boyolali in 2015. Increased production of five types of vegetables relative increased in 2011 to 2015. Vegetables horticulture productivity value in Boyolali regency is also relatively increased from 2011 to 2015. Complete data from Boyolali production and productivity can be seen in Figure 1 and 2.

The amount of vegetable horticulture production in Boyolali is relatively increasing. Red onion production increased from 22.791 quintals in 2013, 30.819 quintals in 2014 and 104.357 quintals in 2015. The amount of cabbage production fell by 2014 to 150.208 quintals to 97.487 quintals. This is because farmers are still using conventional cultivation methods. Chili produced by Boyolali farmers has increased since 2013 by 238.322 quintals, 292.042 quintals by 2014 and increased again to 319.363 quintals by 2015. This achievement is supported by the government program of the School of Excellence in Agricultural Practice (SL GAP) and the Chili Development Program of APBN 2015. Since 2011 the highest production amount in 2013 is 252.115 quintal, then decrease to 139.523 quintals and increase again in 2015 as much as 160.370 quintal.

The productivity of horticulture onion, chili and tomato vegetables is increasing every year. Cabbages and carrots have a slight decrease in productivity (Figure 2). This value could be one proof of the result of a

proper agricultural technology implementation program funded by the Revenue Budget, and Boyolali Regional Expenditure, the support of leading seeds and the interest of farmers toward the application of science is gained into factors affecting the decline in productivity of vegetable horticulture in Boyolali. Jones et al. (2017) stated that the problem of poverty is one of the priorities in the Sustainable Development Goals (The SDGs). Poor farmers need special attention in order that the purpose of the SDGs can be achieved. The role of government in the form of policy. The role of academics in the study and research on agricultural management need to be supplemented. However, there should be further research on the factors driving the production value and productivity of vegetables Boyolali.

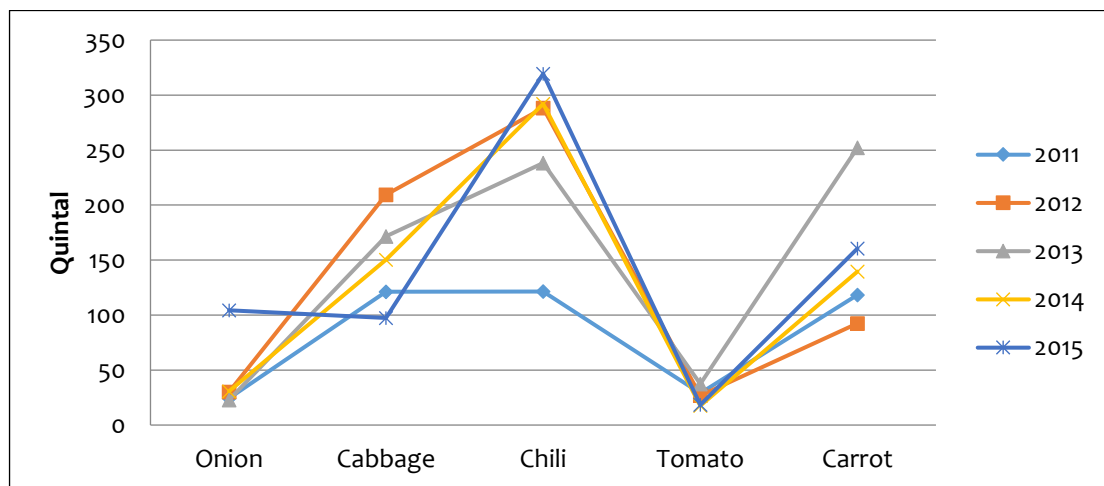


Figure 1 Production of Horticultural Vegetables in Boyolali
Source: Measurement Performance Boyolali, Central Java, 2015

The data collection process was conducted through surveys to farmers, collectors, wholesalers and small traders in the Boyolali region. The number of respondents from this study as many as 101 people. The composition of respondents consists of 30% of farmers, 28% of collectors, 12% of wholesalers, 31% of small traders. The form of business entity in Boyolali vegetable trade distribution channel is individual business. Most have no legal entity yet. Many farmers cultivate their farmlands independently. The farmers do not use the help of employees.

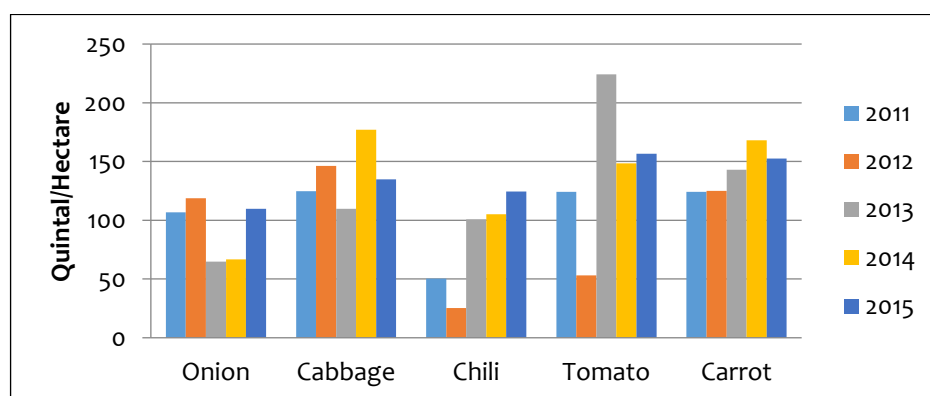


Figure 2 Productivity of Horticultural Vegetables in Boyolali
Source: Measurement Performance Boyolali, Central Java, 2015

Most farmers apply the method of planting that using mulch plastics. These plastics are used with the aim of reducing annoying plant pests. Some farmers apply wetland management in a modern way such as the tools used and how to cultivate them but also still many that invoke traditional farming methods. How to plant the farmers here using the system intercropping, while the type of plants also very varied. The real conditions of the farmers often make similar plantings simultaneously depending on what season is happening. So sometimes the availability of certain goods in the market abundant and not accommodated so that the price dropped drastically. This price reduction makes big losses by farmers. On the other hands makes the price of the type of plant that increased slightly even uncontrollable as the case of the price of chili in 2016 which reach Rp170,000/kg. The weakness of farmers is that they do not understand the needs of the market. So many farmers lose money when the harvest arrives. Another factor that is the biggest loss factor is pest attacks that sometimes make crop failures reach 100% and climate change is currently very difficult to predict.

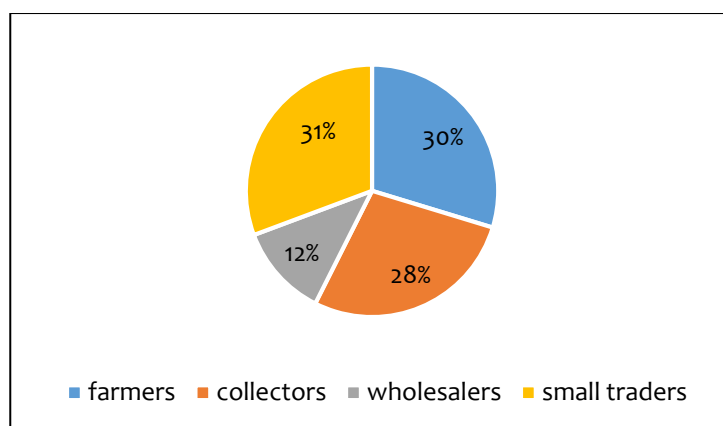


Figure 3 Description of Respondents

Source: data processed, 2017

Some villages in Boyolali that produce vegetables are the villages of Selo, Cepogo, Ampel and Musuk. Vegetables are produced to meet the needs of the people of Soloraya, Yogyakarta and Boyolali itself. Some middlemen from other regions also often come to get vegetable supplies from four villages in Boyolali, some of which are middlemen from Yogyakarta, Ambarawa and Semarang. In addition, the fulfillment of vegetable needs also met by farmers from the region of Karanganyar and Magelang. Types of vegetable distribution channels in Boyolali District are included in modern channel types, traditional channels and mixed distribution channels.

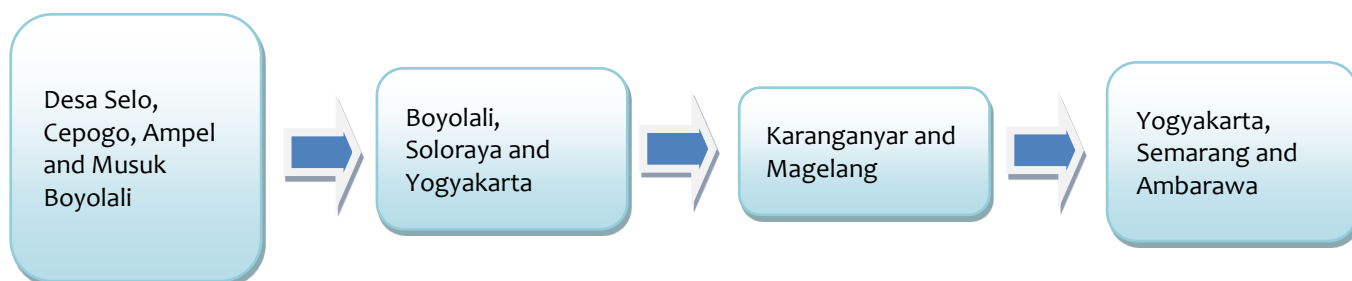


Figure 4 Vegetable Distribution Scheme of Boyolali, 2017

Modern channels are merchants that distribute vegetable products to modern markets such as supermarkets, supermarkets and other modern stores. In this channel the product must have the best quality. The price of the product can be 2-5 times the price in the traditional market. The products traded here have

received preferential treatment such as good packaging and good hygiene. Vegetables are offered on modern market must meet the standards of both size and quality. Suppliers vegetables must consider how packaging vegetables. The type of plastic used, the brand name on the label needs to be well designed. Consumer confidence in green products is increasing, especially the use of plastic in product packaging (Khoiruman & Haryanto, 2017).

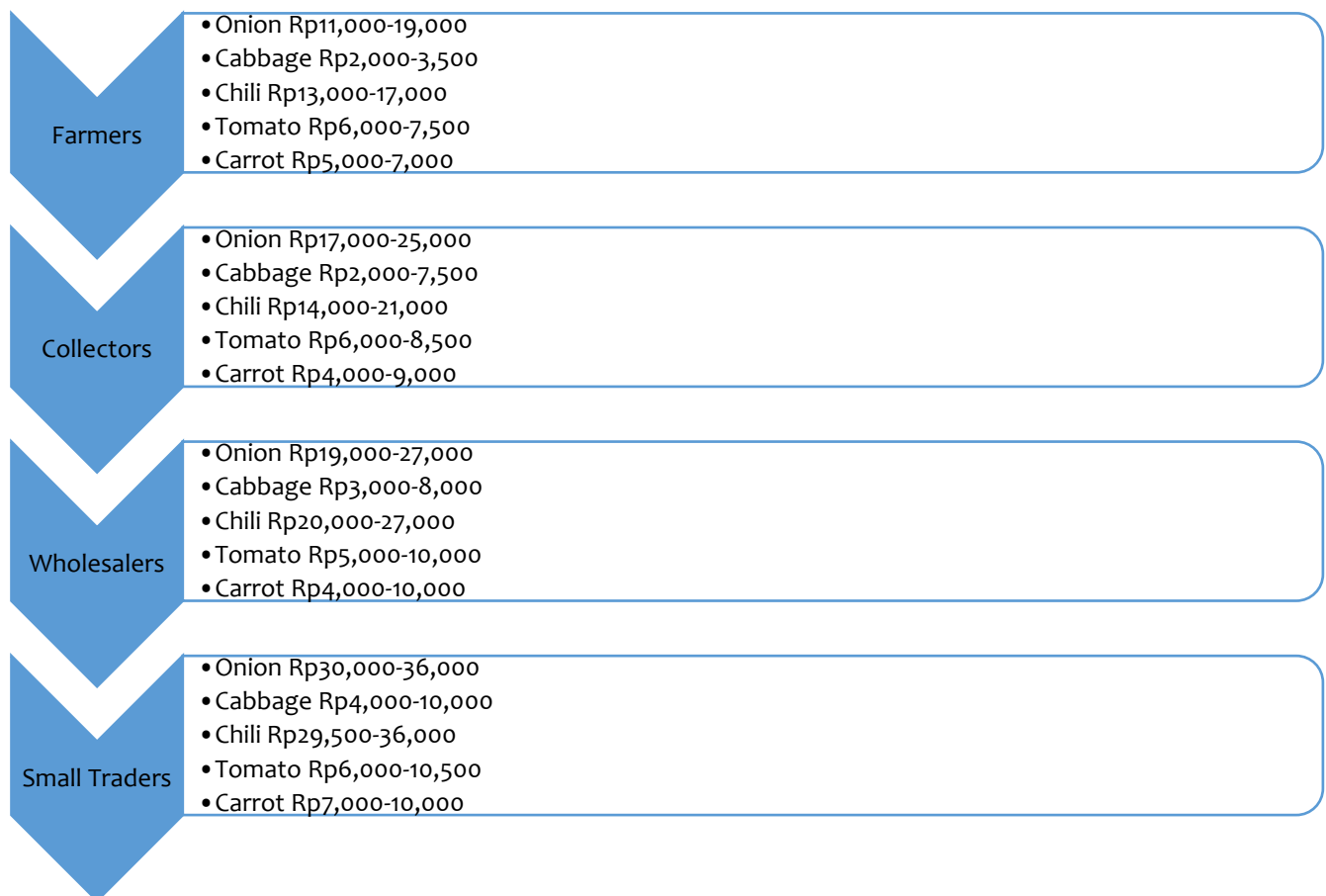


Figure 5 Vegetable Price Changes Flow Boyolali, 2017

Traditional channels are traders who are in traditional markets, in this channel vegetables that enter unlimited, all kinds of good quality vegetables. The prices that apply here are not as high as the modern market. Packing is also impressed as it is and not as good as a modern market that giving more attention in appearance and quality of good stuff.

Mixed channels, many middlemen or farmers are using this channel. Here the products that have good quality are separated and then sold to the modern market in hopes of getting more profit. While the goods with second quality channel to the traditional distribution channels are cheaper. At this level the price of vegetables is strongly influenced by the quality of vegetables, the amount of vegetable availability and the amount of vegetable demand itself. The design of the distribution center layout should be regarded as an intelligent decision system that includes the number of consumers, demand forecasting, product groups, product conservation conditions, warehousing, transportation management etc. (Demirtaş & Tuzkaya, 2012).

There are only two existing marketing channels (Acharya & Agarwal, 2010); (Roy & Poddar, 2015). The identified marketing channels are as follows:

- 1) Manufacturer → Wholesale → Retailer → Consumer
- 2) Manufacturer → Consumer

Farmers have no other option to preserve crop yields for the price of vegetable commodities in the future. Farmers' difficulties in shipping to distant markets. So, they depend on wholesalers. Some parts of the product are brought to the market for retail (Roy & Poddar, 2015). There are two ways to sell: 1) agricultural products are discharged from the gates of the farm itself through wholesalers and, 2) selling agricultural products through retail outlets in the local/nearest market. Sangeetha & Banumathy (2011), the marketing channels identified for tomatoes and brinjal are: Channel I Producer – Wholesaler Commission Agent – Retailer – Consumer Manufacturer Channel II – Commission Agent Wholesaler – Consumer Producer Channel III – Consumer. Boyolali vegetable distribution flow starts from vegetable production source from Selo, Cepogo, Ampel, and Musuk villages, sent by collectors then small and large traders to meet the needs of Boyolali, Soloraya, and Yogyakarta. But the supply of vegetables Boyolali still less so enter the collectors, wholesalers and small who bring the harvest from the area of Karanganyar and Magelang. Karanganyar and Magelang also send vegetables to Yogyakarta, Semarang and Ambarawa.

Table 1 Lowest and Highest Price of Boyolali Vegetable 2017

Distribution Channels	Price	Onion	Cabbage	Chili	Tomato	Carrot
Farmers	Lowest Price	11,000	2,000	13,000	6,000	5,000
	Highest Price	19,000	3,500	17,000	7,500	7,000
Collectors	Lowest Price	17,000	2,000	14,000	6,000	4,000
	Highest Price	25,000	7,500	21,000	8,500	9,500
Wholesaler	Lowest Price	19,000	3,000	20,000	5,000	4,000
	Highest Price	27,000	8,000	27,000	10,000	10,000
Small Traders	Lowest Price	30,000	4,000	29,500	5,500	7,000
	Highest Price	36,000	10,000	36,000	10,500	10,000

The average price of local farmers ranges from Rp11,000-19,000/kg for onion, Rp2,000-3,500/kg for cabbage, chili Rp13,000-17,000, tomatoes Rp6,000-7,500/kg and carrots Rp5,000-7,000/kg. The price is determined by the collector who directly takes the harvest from the farmers, while the farmers themselves cannot determine the selling price. To produce vegetables, they need the cost of seed procurement for 1 harvest period Rp3,535,308. The average cost of land preparation is Rp3,826,154. The cost of fertilizer in one harvest season is Rp2,252,308. The cost of drugs is Rp693,846 every harvest season. The collectors set prices according to the vegetable supply on the market that is at the time of harvest, the lowest price on average about Rp17,000/kg for onion, Rp2,000/kg for cabbage, chili per kilogram Rp14,000, tomatoes Rp6,000 and carrots Rp4,000/kg. While at the time of rare chilies in the market, collectors set the highest price to farmers Rp25,000/kg for onion, Rp7,500/kg for cabbage, chili per kilogram Rp21,000, tomatoes Rp8,500 and Rp9,500/kg carrots.

Wholesale traders charge according to the supply of vegetables on the market at harvest time, the lowest average price is about Rp19,000/kg for shallots, Rp3,000/kg for cabbage, chili per kilogram Rp20,000,

Rp5,000 tomatoes and Rp4,000/kg carrots. While at the time of rare vegetables on the market, collectors set the highest price to farmers Rp27,000/kg for shallots, Rp8,000/kg for cabbage, chili per kilogram Rp27,000, Rp10,000 tomatoes and Rp10,000/kg carrots. Small traders fix prices according to the supply of vegetables on the market at harvest time, the lowest average price around Rp30,000/kg for shallots, Rp4,000/kg for cabbage, chili per kilogram Rp29,500, Rp5,500 tomatoes and carrots Rp7,000/kg. While at the time of rare chilies on the market, collectors set the highest price to farmers Rp36,000/kg for onion, Rp10,000/kg for cabbage, chili per kilogram Rp36,000, Rp10,500 tomatoes and Rp10,000/kg carrots.

Conclusion

Farmers on the slopes of Mount Merapi and Merbabu living in the villages of Selo, Cepogo, Ampel, and Musuk became the source of sufficient vegetable production base for Boyolali area and became the main supplier of vegetables in Soloraya and Yogyakarta. Modern channels are traders who channel vegetables to modern markets such as supermarkets, supermarkets and other modern stores. In this channel, only goods that have the best quality and the price can be 2-5 times the price in traditional markets. Traditional channels are traders located in traditional markets, in this channel the goods are unlimited and all kinds of goods can enter with all the existing quality from best to worst mixed here. However, the prices that apply here are also not as high as the modern market. Mixed channels are widely used by middlemen or farmers. Here the goods that have good quality are separated and then sold to the modern market in hopes of getting higher profits. While the goods with the second quality go to the traditional distribution channels are cheaper. At this level the price of vegetables is strongly influenced by the quality of vegetables, the amount of vegetable availability and the amount of vegetable demand itself. To be able to increase farmer's income hence need support from government side, academics and surrounding community. In the next study could add the number of respondents, types of variables and other research areas. Suppose the government's role in controlling vegetable prices.

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