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Production of Tomato (*Solanum lycopersicum* L.) and Marketing Chain Analysis in Buton District Southeast Sulawesi, Indonesia

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This study aims to determine the tomato marketing chain, the amount of margin in each marketing chain, and the efficiency of tomato marketing in each marketing chain in Buton District. Data was collected in January-July 2019 using the survey method, 104 farmers were selected as samples using the simple random sampling method from a population of 296 tomato farmers and 6 traders were selected using the snowball sampling technique that made the number of samples was 110 respondents. Data collected in this study are primary data and secondary data. Primary data was gained from observation and direct interviews using a list of questions, while secondary data was obtained from the literature from certain related offices. The analysis reveals that the tomato marketing channel in Buton Regency consists of two channels, namely: Channel I (Farmer → Collector Trader → Retailer Trader → Consumer), Channel II (Farmer → Retailer Trader → Consumer). The total marketing margin of tomatoes in channel I and II is IDR. 2.000/kg and 1.500/kg respectively. The price share received by producers/farmers (farmer's share) in channel I is 77.77% while channel II is 83.33%. Thus, marketing channel II is more efficient than marketing channel I.

Keywords: production, efficiency, marketing chain, tomato

INTRODUCTION

Indonesia is an agrarian country. It can be shown from a large number of residents who live and work in the agricultural sector. In addition, this sector has contributed much to the Indonesian economic development. The current development goal is to increase yields and product quality in order to promote equity, and rural economic growth which in turn will provide opportunities for the community welfare especially rural community (Elisa et al. 2016). Haris et al (2017) stated that the agricultural sector has improved both the quality and quantity of agricultural products and encouraged local economic growth.

Agricultural development can be interpreted as a process aimed at increasing agricultural production as consumer needs while increasing farm income and productivity by adding capital and skills. The agricultural sub-sector that is very potential to be further developed is the horticulture subsector, especially vegetable and fruit crops. Community's needs for nutritious will always increase proportionately (Reski et al. 2017). Horticulture farming is one of the agricultural sub-

sectors that have great potential to be developed and is quite promising for improving the economy of farmers and the region. Tomato is one of the horticultural crops that is needed, and one of the food products that are widely used in various forms of processed food and drinks. Moreover, the content of vitamins in tomatoes is needed for health.

Buton Regency is one of the regions in Southeast Sulawesi Province that produces horticultural crops, especially tomatoes. Tomato production in Buton Regency from 2013 to 2017 was quite fluctuated. Over the past five years, the average tomato production in Buton Regency was 6.020 quintals with productivity of 52.814 quintals ha-1. Data about Tomato in Buton Regency in 2017 can be seen in Table 1.

Tomato marketing activities in Buton District currently have a long and inefficient chain. The longer the marketing chain, the more inefficient the marketing system is. It is because more costs are incurred, thus increasing the price of products received by end consumers. According to all of the data and information shown, the researchers are interested to study the tomato marketing process in Buton District. This study aims to determine the tomato marketing channels, margins and marketing efficiency of tomatoes in each marketing channel.

Table 1. Harvest Area, Production and Productivity of Tomatoes in District of Buton Regency 2017

No.	Regions	Harvest Area	Production	Productivity
		(ha)	(Quintal)	(Quintal ha^{-1})
1.	Lasalimu	20	475	23.75
2.	Lasalimu Selatan	10	98	9.80
3.	Siotampina	25	929	37.16
4.	Pasarwajo	5	158	31.60
5.	Wolowa	-	-	-
6.	Wabula	-	-	-
7.	Kapontori	111	3.141	28.29
	Buton	**171**	**4.801**	**130.60**

Source: BPS Southeast Sulawesi, 2018

MATERIALS AND METHODS

Study Area and Considered of Research Area

This research was carried out in Buton Regency, precisely in the Kapontori District which was chosen purposively. It is considered that around 71.12% of tomato producers were in the district. This research took place during January-June 2019. There are three (3) villages with the widest agricultural land and active farmer, namely Wakuli (37 farmers), Bukit Asri (35 farmers) and villages Waondo Wolio (32 farmers). Thus, a total of 104 farmers are sampled from a population of 296 tomato farmers.

Data Collection

The research sample in each village was carried out using Simple Random Sampling techniques. The sample is then added for traders as many as 6 respondents by the snowball sampling technique. Data collected in this study are primary data and secondary data. Primary data collection is gained from direct observation and interviews with farmers and traders by a list of questions. Secondary data is obtained from the literature, journals, and data from the relevant sources. Marketing efficiency is measured based on the market effectiveness of farmer's share (Bahari, 2017) which formula as follows:

$$FS = \frac{Hj}{He} \times 100\%$$

Notes:
Fs = Farmer's share
Hj = Product price (IDR/kg)
He = Final consumer price (IDR/kg)
With the criteria: - Ep>50% means an efficient marketing system
- Ep<50% means the marketing system is not efficient

RESULTS ANDDISCUSSION

Marketing Channel

Analysis of marketing channels is very important, because, through this analysis, purchase price, selling price and marketing costs can be known by each marketing agency which then the cost and efficiency analysis of tomatoes can be calculated. As stated by Soekartawi (2002), marketing channels are distribution channels through a product from producers to consumers. The results showed that the tomato marketing channel in Buton Regency consisted of two marketing channels, namely: (1) Farmer Traders, Traders, Retailers, Consumer Retailers, (2) farmers traders, consumer retailers. To make it easier to see the tomato marketing channel in Buton

Regency, it can be seen in the scheme of the tomato marketing channel as shown in Figure 1.

In Channel I, farmers sell the harvest to collectors at a price of IDR 7.000/kg. The collector traders buy directly from farmers and then traders sell them back to retailers at price of IDR 8.000/kg. The retailers then sell to consumers in the market at a price of IDR 9.000/kg. In Channel II, farmers sell directly to retailers at a price of IDR 7.500/kg before the tomato arrives in the end customers at IDR 9.000/kg. In marketing channels, products should be reached by the consumers effectively and efficiently. It is because consumers want fresh tomato products. The tomato products will decay during the long storage process and finally affect the price and farmer's income. Sales volumes and prices in Channel I was shown in Table 2.

Based on the sales volume and the prevailing price in channel I, the collecting traders get more profit with the sales volume of IDR 291.700/kg and the purchase price is from farmers IDR 7.000/ kg, then sell at the price is IDR 8.000/kg, this is because the collecting traders buy tomato directly from farmers. Data related to sales volume, buying price and selling price in channel II is shown in Table 3.

Figure 1. Scheme of tomato marketing patterns in Buton District

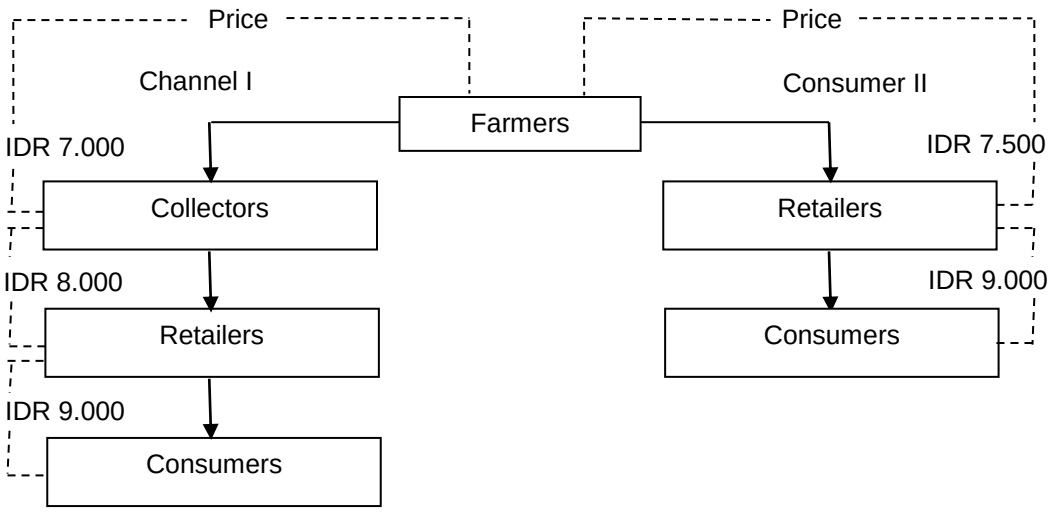

Table 2. Sales Volume and Prices applicable to Marketing Channel I in Buton Regency in 2019

No.	Channel	Sales volume (IDR/year)	Purchase Price (IDR/kg)	Selling price (IDR/kg)
1.	Farmers	291.700	-	7.000
2.	Traders/Collectors	291.700	7.000	8.000
3.	Retailers	291.700	8.000	9.000
4.	Consumer	-	9.000	

Source: Primary Data, 2019

Table 3. Sales Volume and Prices applicable to Marketing Channel II in Buton Regency in 2019

No.	Channel	Sales volume (kg/year)	Purchase Price (IDR/kg)	Selling price (IDR/kg)
1.	Farmers	30.660	-	7.500
3.	Retailers	30.660	7.500	9.000
4.	Consumer	-	9.000	-

Source: Primary Data, 2019.

In channel II, the flow of goods from farmers to consumers is short relatively short this is because retailers buy tomatoes directly from farmers. As a result, there are no collectors involved in this channel. The sales volume and the prevailing prices in channel II are shown in Table 3. The retailer sales volume is greater than the farmers. It is because the collecting traders are not directly involved in channel II, thus benefiting retailers.

Marketing Costs

In tomato marketing in Buton Regency, it covers several expenses, which are carried out for implementation relating to the sale of tomatoes from farmers as well as from traders to consumers. Each marketing channel requires certain costs including labor wages, wooden crates, taxes, and transportation. Data on the marketing costs of tomatoes in Buton Regency can be seen in Table 4.

Marketing costs in channel I is greater than marketing costs in Channel II. The marketing cost of channel I at the level of collectors are IDR 320.000 and at the level of retailers are IDR 85.000, so that the total marketing on channel I are IDR 405.000. This is consistent with Annisa et al. (2018) that the amount of marketing costs is caused by the long-distance marketing channel between producers and consumers. Marketing costs in channel II at the retailer's level are IDR. 55.000 without the involvement of collecting traders. However, marketing channel II farmers spent a marketing fee of IDR 120.000 because farmers went directly to traditional markets in the District of Kapontori and the City of Baubau. Thus, the total cost of tomato's marketing was IDR 175.000 and it is so expensive. According American Economic Association (2020) that transportation is the most expensive link in the marketing chain from the time the product leaves the farm till it reaches the retailer's hands.

Marketing Margins

Calculating marketing margins on channel I can be seen from the following formula:

a. Collectors
   M = Hp – Hb
   = IDR 8.000/kg – IDR 7.000/kg
   = IDR 1.000/kg
b. Retailers
   M =Hp – Hb
   = IDR 9.000/kg – IDR 8.000/kg
   = IDR 1.000/kg
c. Total Margin
   MT= M1 + M2
   = IDR 1.000/kg + IDR 1.000/kg
   = IDR 2.000/kg

The margin of tomatoes marketing were expected to provide proportional benefits for farmers in accordance with the costs, risks, sacrifices, and services they support. Data on tomato marketing margins in channel I in Buton Regency are shown in Table 5.

Table 4. Tomato Marketing Costs in Marketing Channels I and II in Buton Regency in 2019

No.	Description of Cost	**Marketing Channel I (IDR)**		
		Farmers	**Collectors**	**Retailers**
1.	Labor wage	-	20.000	20.000
2.	Wooden crate	-	100.000	30.000
3.	Tax	-	-	35.000
4.	Transportation	-	200.000	-
	Sub Total		320.000	85.000
	Total	**405.000**		
No.	Description of Cost	**Marketing Channel II (IDR)**		
		Farmers	**Retailers**	
1.	Labor wage	-	20.000	
2.	Wooden crate	70.000		
3.	Tax	-	35.000	
4.	Transportation	50.000		
	Sub Total	120.000	55.000	
	Total	**175.000**		

Source: Primary Data, 2019

Table 5. The Margin of Tomato Marketing in Marketing Channel I in Buton District in 2019

No.	Cost List	Marketing Channel I (IDR)		
		Price (IDR/kg)	**Cost (IDR/kg)**	**Margin (IDR/kg)**
1.	Tomato selling price in farmers	7.000		
2.	Collectors			
	a. Purchase cost	7.000		
	b. Order cost			
	- Employee wage		20.000	
	- Wooden Box		100.000	
	- Tax		-	
	- Transportation		200.000	
	Total Cost		**320.000**	
	c. Selling price	8.000		1.000
	Benefit		**680.00**	
3.	Retailers			
	a. Purchase price	8.000		
	b. Order price			
	- Employee wage		20.000	
	- Wooden Box		30.000	
	- Tax		35.000	
	- Transportation		-	
	Total Cost		**85.000**	
	c. Selling price	9.000		1.000
	Benefit		**915.00**	
	Margin Total		**$M_1 + M_2$**	**1.595.00**

Source: Primary Data, 2019.

Marketing margin shows that in channel I, the selling or buying price of the collecting trader is IDR 7.000/kg while the selling price of the collecting trader is IDR 8.000/kg. The marketing margin received at the level of collecting traders is IDR 1.000/kg marketing costs at the level of the collecting trader are IDR 320.000/kg. Therefore, the profit obtained by the trader is IDR 680.00/kg. Moreover, the retailer's purchase price is IDR 8.000/kg and the retailer's sales price is IDR 9.000/kg, so that the marketing margin obtained by retailers is IDR 1.000/kg. Marketing costs at the retailer's level are IDR 85.000/kg. Thus, the profit level of the retailer is IDR 915.000/kg. Total margin from farmers to consumers in channel I is IDR 1.595.00/kg.

Based on the results of research on marketing channel I, the sales profit at the producer (farmer) level is IDR 7.000/kg and the price of tomatoes at the consumer level is IDR 9.000/kg. Mathematically, can be formulated as follows:

$$\text{FS} = \frac{\text{IDR } 7.000}{\text{IDR. } 9000} \text{ x } 100\%$$

=77.77%

In marketing channel II, the sales profit at the producer (farmer) level is higher than channel I which reaches IDR 7,500/kg and the price of tomatoes at the consumer level is IDR 9.000/kg this by the following formula:

$$\text{FS} = \frac{\text{IDR } 7.500}{\text{IDR. } 9000} \text{ x } 100\%$$

=83.33%

The share of prices received by farmers of tomatoes in marketing channel I was 77.77% while in marketing channel II it was 88.33%. This indicates that the position of farmers on channel I always in a weak condition compared to marketing channel II. It is because channel II does not involve collectors. Tomato farmers do not have more expertise in managing the market situation and also do not have capital. As a result, they are not able to influence the market. This is in accordance with research conducted by Wulandari et al. (2018) which states that the low share price received by farmers is because of the low price determined by the collecting traders. Collecting traders tend to hen seen from the price received by producer farmers, the tomato marketing channel in Buton Regency, both marketing channel I and channel II, are already efficient with a percentage of farmer's share is more than 50%.

Table 6. Tomato Marketing Margins in Marketing Channel II in Buton District in 2019

No.	Cost List	Marketing Channel II (IDR)		
		Price (IDR/kg)	Cost (IDR/kg)	Margin (IDR/kg)
1.	Tomato selling price in farmers	7.500		
	a. Purchase cost			
	b. Marketing cost			
	- Wooden box	70.000		
	- Transportation	50.000		
2.	Retailers			
	a. Purchase price	7.500		
	b. Order price			
	-Employee wage		20.000	
	-Wooden Box		-	
	-Tax		35.000	
	-Transportation		-	
	Total Cost		**55.000**	
	c.Selling price	9.000		1.500
	Benefit	**945.00**		

Source: Primary Data, 2019

But marketing channel II is more efficient because the percentage of the price received by farmers is greater compared to marketing channel I. This is caused by the comparison of the total marketing costs incurred on marketing channel II which is smaller than marketing channel I. Besides, the selling price received by farmers in channel II is higher than channel I. According Mango et al. (2018), that value chain analysis has gained considerable importance inrecent years because of the need to assess the key sources of cost efficiency or the lack of it alongthe value-chain of the commodity in order to come up with appropriate policy interventions aimedat raising overall value-chain efficiency.

CONCLUSION

In conclusion, the tomato marketing channel in Buton Regency consists of two channels, namely: Channel I (Farmer → Collector Trader → Retailer Trader Consumer), Channel II (Farmer → Retailer Trader → Consumer). The total marketing margin of tomatoes in Channel I is IDR. 2.000/kg and channel II is IDR. 1.500/kg. Furthermore, the farmer's share in channel I is 77.77%, while in channel II is 83.33%. It indicates that marketing channel II is more efficient than marketing Channel I. The implication is that farmers need to be more encouraged to use channel I in marketing the tomato production.

CONFLICT OF INTEREST

The authors declared that present study was performed in absence of any conflict of interest.

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AUTHOR CONTRIBUTIONS

La Ode Geo designed and performed the experiments and also wrote the manuscript. Halim was reviewed the manuscript. Wa Ode Rachmasari Ariani analyzed and interpreted the data. Gusmin Sarif Amane was collected the data. All authors read and approved the final version.

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