

Supply Chain Optimization in Agribusiness Curly Chili (*Capsicum annum* L.) in Kendari City

Muh. Bintang Alfarizy¹, Surni², Abdi²

¹ Student of Agribusiness Study Program, Faculty of Agriculture, Halu Oleo University

² Lecturer at the Faculty of Agriculture, Halu Oleo University, Kendari,
Southeast Sulawesi, Indonesia

Corresponding Author: bintangalfarizy29@gmail.com

Abstract

This research aims to (1) determine the flow of goods, financial flow and information flow of curly chilies in Kendari City, (2) determine the marketing margin for curly chilies in Kendari City, (3) determine the efficiency of curly chili marketing channels in Kendari City. This research was conducted in Kendari City from January to April 2024. This research used descriptive analysis, marketing margin analysis, and marketing efficiency (Farmer's Share). The number of curly chili farmer respondents was 10 people using the census technique, collecting traders were 2 people and retailers were 8 people using the snowball sampling technique. Based on the research results, it shows that (1) Flow of goods, financial flow and information flow, namely: flow of production from farmers to collectors of 200 kg, collectors to retailers of 175 kg and retailers to consumers of 150 kg. The flow of money from collectors to farmers is IDR 5,800,000, retailers to collectors is IDR 5,925,000 and retailers to consumers is IDR 7,650,000, and the flow of information between farmers and collectors is 2 times, collectors and retailers are 2 times, retailers and consumers are carried out directly when a transaction is occurring or in progress (2) the marketing margin obtained for curly chilies at the collecting trader level is IDR 10,500 / kg and at the retailer level it is IDR 11,500 / kg. (3) The results of the analysis regarding the percentage of price share received by producers (farmer's share) for collecting traders is 74% and retail traders are 78. This shows that the curly chili marketing channel in Kendari City is running efficiently with a percentage of 76%.

Keywords: Flow of goods, Flow of money, Flow of information, Margin, Efficiency, and Curly Chili.

INTRODUCTION

The diversity of Indonesia's soil and climate is a great asset in producing various agricultural commodities in a sustainable manner both in terms of quality and quantity (Department of Agriculture, 2005). The horticulture subsector is very potential to be developed in Indonesia because of the diversity of agro-climate, land characteristics, and wide area distribution (Zulkarnain, 2010). Indonesia, which is located on the equator, benefits from the development of horticulture which contributes 1.5 percent of the total Gross Domestic Product (GDP) and has an added value per planting area reaching eight times that of food crops or 6.5 times that of plantation crops (BPS, 2015). Horticultural commodities, especially vegetables and fruits, play an important role in food balance and must always be available in sufficient quantities, good quality, safe for consumption, at affordable prices and accessible to all levels of society (Ministry of Agriculture, 2010). Horticulture is a potential commodity with high economic value and market demand, and in accordance with the Decree of the Minister of Agriculture No. 511/Kpts/PD310/9/2006, there are 323 types of commodities under the guidance of the Directorate General of Horticulture, consisting of 60 fruit commodities, 80 vegetables, 66 biopharmaca, and 117 ornamental plants. The Ministry of Agriculture also established the development of national horticultural priority commodities with MOA No. 76/Permentan/OT.140/12/2012 which gives intensive attention to chili, shallots, and oranges (Ministry of Agriculture, 2015).

According to Tsurayya and Kartika (2015), chili peppers (*Capsicum annum L.*) are one of the horticultural commodities that have high economic value, although chili peppers are needed in small quantities but are consumed daily by almost all residents in Indonesia.

Table 1 Harvested Area of Chili Crops in Kendari City (Ha), 2018-2022

Plant Type	Year				
	2018	2019	2020	2021	2022
Cayenne pepper	42	52	37	35	19
Curly chili	25	-	-	11	5

Source: BPS, Horticultural Agriculture Statistics SPH

Table 1 Harvested Area of Chili Crops in Kendari City (Ha), 2018-2022 fluctuates. The harvest area of curly chili in 2018-2022 has decreased. In 2019-2020 there was a vacuum in production, while in 2021 it amounted to 11 (ha) and in 2022 there was a decrease of 5 (ha).

Based on the Harvest Area of Chili Crops in Kendari City (Ha), 2018-2022. The curly chili commodity in 2022 amounted to 5 (Ha).

A supply chain is a system of relationships between upstream and downstream entities, including consumers and suppliers, in many processes and activities that produce value for the end customer (Setiawan, 2005). The curly chili supply chain in Kendari City involves a network of institutions that work together to distribute and channel curly chili from producers to consumers. Curly chili supply chain management aims to describe the structure, mechanism and institutional patterns applied in the supply of curly chili.

In agricultural supply chain management, activities start from nursery, production, marketing, to processing, with supervision of production and distribution of fresh commodities carried out by farmers. The produce is then purchased by intermediary traders, who work with wholesalers to ensure the supply of fresh produce is available in local markets and other regions. Logistics management plays an important role in modern retail, including inventory management, information systems, warehousing, and transportation (Indriani et al., 2019). Marketing margin is the difference between the price paid by consumers and the price received by producers, where the longer the marketing channel, the greater the marketing margin (Daniel, 2004). Supply chain efficiency can be seen from the marketing margin value and farmer's share value (Soka et al., 2017), as well as the marketing efficiency value of each channel in the supply chain (Kurniawan, 2014). Marketing efficiency is also determined by the performance of the institutions involved, where the more efficient the institution, the more efficient the marketing process and all parties will benefit (Puspitawati and Wardhani, 2013).

The following is the production data of chili pepper crops in Kendari City in the last 5 years:

Table 2 Crop Production of curly chili in kendari city based on BPS (2022)

Year	Production (tons)
2018	897
2019	1.203
2020	849
2021	1.021
2022	1.123

Source: BPS, Agricultural Horticulture Statistics SPH

Based on data from the Central Bureau of Statistics (BPS), curly chili production in Kendari



City has fluctuated in the last 5 years. In 2018, curly chili production reached 897 tons, then increased to 1,203 tons in 2019. However, curly chili production decreased again to 849 tons in 2020. In 2021, curly chili production increased again to 1,021 tons, and in 2022 it increased to 1,123 tons. The presumption experienced by Kendari City in the chili supply chain includes several problems, namely fluctuating production, where chili production is still seasonal and supply becomes unstable due to weather factors and plant diseases. In addition, the supply chain management that has not been optimized causes an imbalance between supply and demand and inefficiencies in distribution. Unintegrated information is also one of the factors causing the problem, resulting in delays in decision-making and inefficiencies in the production and distribution process.

Based on this background, in this study researchers will discuss the management of curly chili supply chain management in Kendari City related to the structure formed, mechanisms, and institutional patterns in the curly chili supply chain in Kendari City. The research is conducted through the supply chain pattern from *upstream* to downstream. The research will start from curly chili farmers and then the chain will continue to marketing institutions to the final consumers in Kendari City. The efficiency of the curly chili commodity supply chain in Kendari City will also be examined by researchers by looking at marketing margins, *farmer's share*, and marketing efficiency in each supply chain distribution channel.

METHOD

The population of this study were chili farmers, collecting traders, and retailers, the sample of this study amounted to 20 people, consisting of 10 chili farmers, 5 retailers, 5 collecting traders. Because the population is relatively small so that all populations are sampled, thus the determination of samples for farmers is determined using (*census sampling*). While determining the sample for marketing institutions using *Snowball Sampling*.

The types of data in this research are qualitative and quantitative which come from primary data and secondary data. The data collection technique in this study was carried out by interview method with the help of a list of questions arranged in the form of a questionnaire, observation technique by going down to see and observe directly, and technique by revealing certain cases. Data analysis in this study is qualitative and quantitative descriptive analysis in the form of;

1. Analysis of Supply Chain Member Characteristics
2. Supply Chain Distribution Mechanism Analysis



3. Analysis of Marketing Efficiency in the Supply Chain , in analyzing marketing efficiency in the supply chain using several equations, namely as follows:

a) **Supply Chain Distribution Margin , the marketing margin analysis in this study used the following formula (Surni, et al.2022):**

$$M = HK - HP$$

Description:

M : Marketing margin (Rp/Kg)

HK: Price at consumer level (Rp/Kg)

HP: Price at producer level (IDR/Kg)

b) **Marketing Efficiency in the Supply Chain , to determine marketing efficiency, the marketing efficiency formula is used (Surni, et al. 2022) as follows:**

$$FS = 1 - \frac{M}{Hjp} \times 100$$

Description:

FS: Farmer's Share (%)

M: Marketing margin (IDR/Kg)

Hjp : Trader's selling price (Rp/Kg)

If $FS \geq 50\%$ then the marketing channel is efficient.

$FS < 50\%$ Then the marketing channel is not efficient.

RESULTS AND DISCUSSION

Marketing Channel of Curly Chili

Based on the results of the study, it is known that the curly chili marketing channel consists of one channel, namely:

Farmers - Gatherers - Retailers - Consumers

Based on the results of the research, the marketing institutions involved in the curly chili marketing process in Kendari City are:

- Curly chili farmers are producers who plant, care for, and harvest curly chili plants.
- Collecting traders, are part of the marketing institutions that buy curly chilies, in this case curly chilies from producers who then take them to their place and resell them.
- Retailers are part of the marketing agency that buys curly chili, in this case curly chili, from intermediary traders and sells directly to consumers.

Sales Volume, Purchase Volume and Price of Curly Chili Peppers

Pradiani (2017) states that sales volume is the amount of goods or services sold in the

exchange process. The greater the number of sales generated by the company, the greater the possibility of profit to be generated.

**Table 3 Purchase Volume, Sales Volume, and Price of Curly Chilies
By Marketing Institution**

No	Institution	Purchase Volume (kg)	Purchase price (Rp/Kg)	Sales volume (Kg)	Selling Price (Rp/Kg)
1	Collector	150	29.000	150	39.500
2	Retailer	150	39.500	150	51.000

Source: Results of primary data processing

Based on Table 3, it shows that the purchase volume is carried out by collecting traders, retailers and for curly chili farmers selling to collecting traders.

Collecting traders usually go directly to farmers to buy chilies and then sell them to retailers. Retailers will sell chilies in the market, arrange them so that consumers can buy directly, or sell around so that consumers do not need to come to the market. This strategy aims to improve service quality to increase customer satisfaction, in accordance with the opinion of Ginting and Saputra (2015) which states that service quality greatly affects business growth. Collecting traders buy 200 kg of curly chili at a price of Rp29,000/kg and sell it to retailers weighing 150 kg at a price of Rp39,500/kg. Retailers then sell the chili to consumers at a price of Rp51,000/kg for the entire volume of 150 kg.

Marketing Margin, Cost, Profit, and Marketing Efficiency

The marketing of curly chilies is only one channel, starting from farmers selling their chilies to collecting traders and collecting traders selling their chilies to retailers then chilies purchased by collecting traders are sold to final consumers at higher prices so that there is a margin on curly chilies. Karmini (2020) states that tataniaga costs are costs incurred for the purposes of tataniaga goods and or services, tataniaga costs include packaging costs, transportation costs, drying costs, retribution costs and others.

Table 4 Costs, Margins, Profits, and Marketing Efficiency of Curly Chilies

Collecting Traders	Price (Rp/Kg)	FS%
Purchase Price	29.000	
Selling Price	39.500	

-Transportation	334	
-Value Added	467	
-Labor	1167	
-Risk	3.950	
Total Marketing Cost	5.918	
Marketing Margin	10.500	
Marketing Advantage	4.582	
Farmer's Share		74%
Retailer		
Purchase Price	39.500	
Selling Price	51.000	
-Transportation	334	
-Value Added	467	
-Labor	1167	
-Risk	5.100	
Total Marketing Cost	7.068	
Marketing Margin	11.500	
Marketing Advantage	4.432	
Farmer's Share		78%

Source: Primary data processing results

Based on Table. 4 shows that;

- Curly chili has varying marketing margins and profits. Marketing cost elements consisting of transportation of Rp334/kg, value-added costs of Rp467/kg, labor of Rp1167/kg, and risk costs for intermediary traders of Rp3,950/kg and retailers of Rp5,100/k.
- Curly chili with a purchase price at the farm level of Rp29,000 / kg and a selling price at the retailer level of Rp39,500 / kg, so the marketing margin is Rp10,500 / kg. Marketing costs amounted to IDR 5,918 / kg, resulting in a profit of IDR 4,582 / kg.
- Then curly chili with a purchase price at the intermediary level of Rp39,500 / kg and a selling price at the consumer level of Rp51,000 / kg, so that the marketing margin is Rp11,500 / kg. Marketing costs amounted to IDR 7,068 / kg, resulting in a profit of IDR 4,432 / kg.

d) Then for the percentage of the price received by the collector traders is 74% and the retailer traders are 78%. This shows that curly chili marketing for collectors and retailers runs efficiently because the percentage received is $> 50\%$. This is based on the criteria set out in the formula for calculating marketing efficiency, namely if the percentage of price received $\leq 50\%$ then the marketing of a product does not run efficiently, and if the percentage of price received $> 50\%$ then the marketing of a product runs efficiently.

Hasanuddin *et al* (2020) in his journal said that a marketing channel is said to be efficient if the marketing system is able to deliver results (products) from producers to consumers at the cheapest possible cost and is able to make a fair distribution to all parties involved in the production activities and marketing channels of these products. The following is the total profit obtained by curly chili traders.

Table 5 Total Profit Earned by Traders

No.	Institution	Sales Volume (Kg)	Profit (Rp/Kg)	Total Profit (IDR)
1	Collector	150	4.582	687.300
2	Retailer	150	4.432	664.800

Source: Primary data processing results

Based on Table 5, it shows that the total profit obtained by collecting traders where the sales volume is 150 Kg with a profit of Rp4,582/Kg obtained a total profit of Rp687,300 and retail traders where the sales volume is 150 Kg with a profit of Rp4,432/Kg obtained a total profit of Rp664,800. In line with the opinion of Muliani (2022) that the total marketing profit is obtained from the difference between the price paid to the first seller and the price paid by the last seller (margin) after deducting marketing costs.

The following is a solution to determine the level of marketing efficiency of Curly Chili in Kendari City. With Formula:

1. Collecting Traders

$$FS = 1 - \frac{M}{HE} 100\%$$

$$FS = 1 - \frac{10.500}{39.500} 100\%$$

$$FS = 1 - 0.26 \times 100\%$$

$$FS = 0.74 \times 100\%$$

$$FS = 74\%$$

2. Retailer

$$FS = 1 - \frac{M}{HE} 100\%$$

$$FS = 1 - \frac{11.500}{51.000} 100\%$$

$$FS = 1 - 0.22 \times 100\%$$

$$FS = 0.78 \times 100\%$$

$$FS = 78\%$$

Based on the above calculations of the *farmer share* formula, it can be seen that the marketing channels in Kendari City show the average *farmer share* value in curly chili marketing is efficient with an efficient marketing channel value of $76\% > 50\%$.

Supply Chain Distribution Mechanism

1. Goods Flow

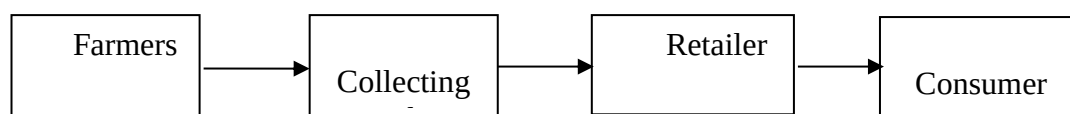


Figure 1 Flow of Goods in the Curly Chili Supply Chain in Kendari City

Figure 1 above presents the flow of goods in the curly chili supply chain in the city of Kendari, which researchers can describe as follows

- a) Farmers and Traders, curly chili farmers in Kendari distribute their harvest to traders. From an average harvest of 230 kg, farmers select good quality chilies of around 218 kg, while 10-15 kg are used for daily consumption. After separating the damaged chilies from those for consumption, the collecting traders will pick up around 200 kg of curly chilies for sale.
- b) The collecting traders with the retailers, the collecting traders store the curly chilies in the warehouse after collecting them from the farmers and do the sorting to get quality chilies. As some are damaged during storage, the amount of chili available becomes around 170-175 kg. In addition to selling to retailers, intermediary traders also serve direct buyers from around the house. The distribution to retailers during one month is divided into 35 kg in the first week, 60 kg in the second week, 25 kg in the third week, and 30 kg in the fourth week, with a total of 150 kg of chili sold to retailers.
- c) Retailers with Consumers, retailers act as the only link in the chain that sells curly chili peppers from intermediary traders to final consumers. Chili purchases are made in stages, namely 15 kg and 20 kg in the first week, 35 kg and 25 kg in the second week, 10 kg and 15 kg in the third week, and 17 kg and 13 kg in the fourth week, with a selling price of IDR 51,000/kg. Retailers bear the risk of fluctuating prices and the potential for unsold goods because chilies spoil easily. Nonetheless, the flow of products from

farmers to consumers runs smoothly thanks to the timeliness of deliveries and the quality and quantity of goods maintained by intermediary traders.

2. Financial Flow

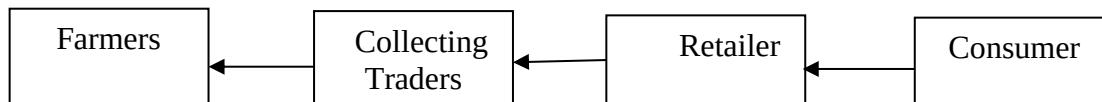


Figure 2 Financial Flow in the Curly Chili Supply Chain in Kendari City

In Figure 2 above, the financial flow in the curly chili supply chain can be described as follows;

- Consumers, the Financial flow that occurs is the purchase transaction of curly chili by consumers to retailers. This flow occurs directly at the place of purchase with a cash payment system at a market price of IDR 51,000 / kg.
- Retailers are traders who sell in the market. Retailers buy curly chilies delivered to the market from intermediary traders at a price of Rp39,500/kg, purchasing 35 kg of curly chilies in the first week with a purchase value of Rp1,382,500, in the second week 60 kg with a purchase value of Rp2,370,000, in the third week 25 kg with a purchase value of Rp987,500, and in the fourth week 30 kg and a purchase value of Rp1,185,000. Retailers sell directly to consumers at Rp51,000/kg with a purchase value in the first week of Rp1,785,000, in the second week Rp3,060,000, in the third week Rp1,275,000 and in the fourth week Rp1,530,000. Payment from retailers to intermediary traders is made in cash when making transactions at the market.
- Collecting traders purchase curly chilies from farmers in large quantities. The purchase of curly chilies in the amount of 150 kg with a purchase value of IDR 4,350,000, then sales in the first week of 35 kg with a sales value of IDR 1,382,500, in the second week IDR 2,370,000, in the third week IDR 987,500 and in the fourth week IDR 1,185,000.
- Farmers, the price of curly chili in Kendari City is Rp29,000/kg. Farmers sell quality goods and get a sales value of IDR 5,800,000. The price for curly chilies is adjusted to the good quality of the chilies and sold after the chilies are in place and ready to be transported. Payment from the intermediary traders is done in cash/non-cash.

3. Information Flow

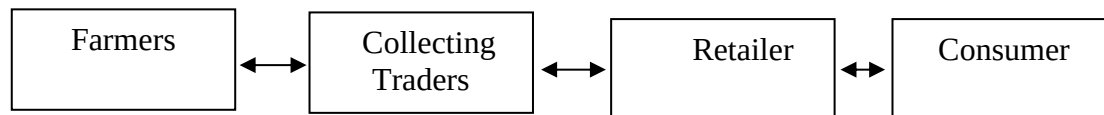


Figure 3 Information Flow in the Curly Chili Supply Chain in Kendari City

The following is an explanation of the information flow in the curly chili supply chain in Kendari city;

- a) Farmers with Collecting Traders, The flow of information in the curly chili supply chain between farmers and collecting traders is two-way. Farmers inform via telephone twice that the chili is ready to be harvested with a total of 200 kg, while the collecting traders provide information on the purchase price of IDR 29,000/kg. Communication is well integrated, done by phone and direct chili collection at the farmer's field.
- b) The flow of information between collecting traders and retailers is two-way. Collecting traders provide information about stock availability and selling times in the market, while retailers respond about the price and quantity of chili to be purchased as well as the unloading time. This communication is done over the phone twice: the first time to discuss the price per kilogram of curly chili, and the second time to discuss the amount of purchase and the time of delivery to the market.
- c) The flow of information between retailers and consumers involves the selling price of curly chili peppers of Rp51,000/kg, with interactions in the form of bargaining to determine the right price. This information exchange occurs directly during the transaction, creating active and reciprocal communication between supply chain actors. This openness in communication fosters mutual trust and maintains commitment in the well-established cooperation.

CONCLUSION

Based on the results of research on Supply Chain Optimization in Curly Chili Agribusiness in Kendari City, it is concluded that the flow of curly chili production from farmers to collecting traders is 200 kg of the amount produced. From collecting traders to retailers as much as 150 kg and from retailers to consumers as much as 150 kg. The flow of money is as much as IDR 5,800,000 from intermediary traders to producers from the amount of money in circulation, IDR 5,925,000 from retailers to intermediary traders and IDR 7,650,000 from consumers to retailers. The flow of

information that communicates with each other via wa/telephone 2 times between collecting traders to farmers, communication between collecting traders to retailers 2 times and communication between retailers to consumers is done directly when transactions are happening or taking place.

The marketing of curly chili commodities in Kendari City runs efficiently as indicated by the percentage of the price received by farmers and *farmer share of* 78% for retailers and 74% for collectors with a marketing margin of Rp10,500 / kg for collectors and Rp11,500 / kg for retailers.

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