

Supply Chain Analysis of Cayenne Pepper (*Capsicum Frutescens* L.) in the Traditional Market Case Study of the Manonda Presidential Instruction Market in Palu City, Central Sulawesi Province

Yulianti Kalaba^{1*}, Muh Fahrudin Nurdin¹, and Chintia Kalarensi¹

¹Agribusiness Study Program, Faculty of Agriculture, Tadulako University, Central Sulawesi, Indonesia

Abstract. This study emphasizes whether the chili supply chain process achieves operational efficiency improvements, cost reductions, product availability, in meeting customer demand in a timely manner. The objective is to analyze the cayenne pepper supply chain and analyze the performance of the cayenne pepper supply chain at the Manonda Inpres Market, Palu City. Using the Purposive Sampling and Snowball Sampling approaches, a sample of 50 farmers, 12 collectors, 35 retailers, and 85 consumers was obtained. Based on the Food Supply Chain Network analysis, the cayenne pepper supply chain consists of two channels with interconnected product, financial, and information flow structures, where relationships between actors are built on trust and direct communication. The product flow system is from upstream (farmers) to downstream (consumers), the financial flow is from downstream to upstream, and the information flow is two-way. The main difference between the two channels is the presence of collector traders, who add a distribution stage but expand the supply range. Overall, the performance of the chili pepper supply chain is relatively efficient, as the farmer share of both channels is greater than 50%, and the efficiency value is less than 33%. However, the first channel is superior and more efficient, as it provides greater benefits for farmers and retailers.

1 Background

Horticultural commodities such as cayenne pepper need more attention because they play a role in various aspects, both social and economic aspects. The chili commodity is able to affect the inflation rate in various regions and nationally [1]. Chili peppers have a relatively fast harvest cycle and can be cultivated in different types of soil and climates, making them a very profitable commodity for farmers and industry players, for these reasons, so that chili peppers become a commodity that not only has a high selling value but also has great potential to increase farmers' income and the local economy of farmers.

* Corresponding author: yuliantigani610@gmail.com

Central Sulawesi, especially Palu City, is the largest trading center that trades various kinds of agricultural and non-agricultural products, one of the markets that is the center of trade in Palu City is the Traditional Market of Presidential Manonda of Palu City, with a building space of 17,194 m² and a land area of 49,886 m², the market is the biggest in Palu City, and the number of traders as many as 2,310 people. Chili is one type of vegetable that is traded in the market. The source of the supply of cayenne pepper that is traded is sourced from several areas in the Central Sulawesi Province area, namely Sigi Regency, Tojo Una-una Regency, Donggala Regency and Palu City. Data [2] shows that Tojo Una-una Regency has the largest amount of production from the three supply source areas, namely 65,921.20 quintals with a land area of 296.34 ha, Furthermore, Sigi Regency with a total production of 32,708.08 quintals with a land area of 523.91 ha kw, Palu City has a production volume of 6,975.10 quintals with a land area of 54.31 ha and Donggala Regency has a production of 3,442.00 with a land area of 61.01 ha. The existing production volume of cayenne pepper has a great influence and has the potential to strengthen the flow of supply to the market, especially during the Traditional Presidential Instruction Manonda. However, despite high production volumes, inefficient distribution due to infrastructure limitations can hinder the smooth delivery, cause delivery delays, and potentially degrade the quality of cayenne pepper. [2] High production volumes must be supported by a more efficient distribution system so that supplies can arrive on time and in good condition, avoiding price fluctuations that are detrimental to consumers and traders.

Price is a consideration for the demand for cayenne pepper itself. These prices describe the dynamics that occur throughout the year in the cayenne pepper supply chain, which includes various stages, from production at the farmer level, distribution by wholesalers or collectors, to finally reaching the end consumer in the traditional market. Changes in cayenne pepper prices are influenced by a number of factors in the supply chain, including supply availability, distribution costs, and frequently fluctuating market demand. The change in the price of cayenne pepper at the Manonda Presidential Instruction Traditional Market based on data [3] shows that there are price changes that occur throughout 2024. The lowest price of cayenne pepper was in November, which was at a price of Rp25,000 and the highest price of cayenne pepper in July reached a price of Rp65,000. This condition is caused by very bad weather, floods and high intensity of rainfall which results in broken chili trees and waterlogged chili trees so that they suffer crop failure and damage.

The conditions that occur above affect the frequency of supply. "Frequency in the cayenne pepper supply chain refers to the regulation and smooth flow of products, information, and finances to ensure timely and efficient supply". In the context of cayenne pepper distribution, this frequency is very important because it affects how the product moves from the farmer to the end consumer. Therefore, it is necessary to regulate the flow of products that involve shipping cayenne pepper from production areas to large markets, which is carried out regularly to ensure sustainable supply. Higher frequency of distribution, carried out in a scheduled and efficient manner, can reduce the risk of scarcity or accumulation of goods, thereby affecting price stability in the market [4] For this reason, the analysis of the cayenne pepper supply chain is very important, by analysing the supply chain, it can identify the critical points that cause inefficiency, be it in terms of cost, quality, or distribution speed. Problems that arise in the chili supply chain, if not addressed, can cause price instability that is detrimental to consumers and farmers, and can affect people's purchasing power. Analysing the chili supply chain is not only beneficial for decision-making in agricultural and distribution policies, but it is also critical for business actors and policymakers to create a more efficient and sustainable supply chain system. The objectives of this study are 1) analysing the supply chain of cayenne pepper and 2) Analysing the performance of chili pepper supply in the Traditional Market of Presidential Instruction Manonda.

2 Research Methods

2.1 Place and Time

This research was conducted in one of the traditional markets of the Manonda Presidential Instruction market located on Kunduri street, Balaroa Village, West Palu District, Palu City, Central Sulawesi. The location was determined deliberately (*Purposive*), taking into account that the location of the presidential market is the largest market in the city of Palu with 24-hour operating hours compared to other markets in the city of Palu [3] the Manonda Presidential Instruction market is also the main distribution center that reflects the interaction between farmers, traders and consumers, thus allowing for clear mapping of supply chain flows. The research period was carried out from February 2025 to April 2025.

2.2 Determination of Respondents

The determination of respondents was carried out to narrow the research area but still be able to represent the actual population in determining the conclusions of the study. The determination of respondents in this study was carried out using two sampling methods, namely *positive sampling* and *snowball sampling*, which were adjusted to the characteristics of the actors in the supply chain. Purposive sampling is based on certain criteria set by the researcher the goal is for the respondents to be completely in line with the needs of the research. Snowball sampling is carried out in a rolling manner like a snowball, where the initial responder provides information or recommendations for the next respondent that is relevant to be researched [5]. The sampling of farmers and traders, respondents obtained information from retailers, because their identities are difficult to know directly without referrals from other actors. From retailer information, the researcher traced farmers who were chili suppliers, and from farmers obtained information related to collector traders. As a starting point for data collection, retail traders were selected using *purposive sampling techniques* and a sample of 35 respondents was obtained, based on the criteria, namely traders who are on the main street of the market, because the strategic location and meetings between traders and consumers have the greatest attention, actively sell cayenne pepper in the market, and are willing to be respondents. From these retailers, information was obtained about farmers totaling 50 respondents and collector traders from 12 respondents who are partners or sources of cayenne pepper supply. Consumer respondents were determined by *purposive sampling*, obtained from a total of 85 respondents, who bought cayenne pepper, in addition to being selected based on the criteria of willingness to be interviewed. The selected respondents came from different locations and backgrounds, so they could reflect variations in farming practices. And in the last stage of sample collection, what if it has begun to experience saturation, where the information provided begins to repeat and no longer provides *new insights*.

2.3 Data Analysis Methods

This type of research is a type of qualitative descriptive analysis. Qualitative descriptive analysis is used to analyse supply chain mechanisms related to product flow, information and finance [5].

2.3.1 Supply Chain Analysis

Analysis of supply chain conditions using the Food Supply Chain Network (FSCN) model which is an evaluation related to the chili supply chain. The analysis was used to answer the chili supply chain in the traditional market of Inpres Manonda. The Food Supply Chain Networking (FSCN) chili supply chain model is analyzed using a supply chain development method that follows the Food Supply Chain Networking (FSCN) process framework by [6].

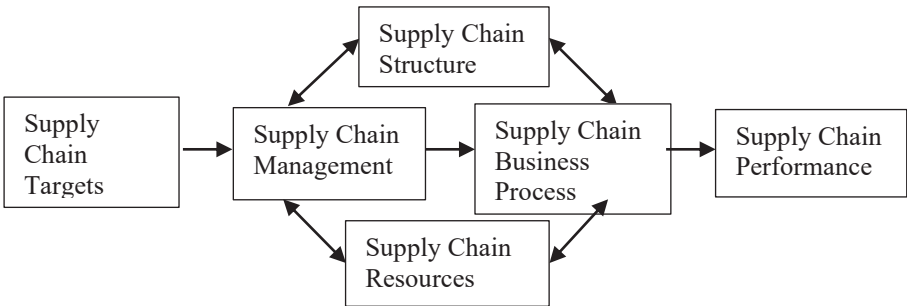


Figure 1. The descriptive analysis framework of the supply chain uses the *Food Supply Chain Networking* (FSCN) method [6].

Supply Chain Development Framework in the FSCN framework, there are lines connecting each element. A line of connection consists of a one-way and a two-way one. A one-way dash indicates that one element affects another. A two-way conjunction indicates that there is a mutually influencing relationship between the two. Supply chain management does not affect the target because the target is set first by a supply chain.

The application of management in the supply chain will affect the business processes that occur between the members of the supply chain and vice versa, the business processes that occur will also affect the management of how a supply chain will be implemented. The six elements in the FSCN Framework are a). Supply Chain Goals: Supply chain goals are seen from two parts, namely market goals “market segmentation efforts, who are consumers, what consumers want and need, and who are the main keys that determine the main goals of the supply chain”, and development goals are targets that the company wants to develop that are designed jointly by all the chain actors involved (can be in the form of the use of technology or other renewable means to be able to improve the performance of the supply chain). b). Supply chain management: describes how the coordination of activities and management structures that occur in the supply chain network. To achieve the goal, what is done is to utilize the resources owned to improve supply chain performance. The management activities carried out are the selection of the right partners, contract agreements, transaction systems, and supply chain collaboration, c) Supply Chain Structure: The analysis of the supply chain structure aims to select members who play an important role in the success of the supply chain that are in line with the objectives of the supply chain. The structure of the supply chain explains the two parts in the membership of the chain, namely the primary member and the secondary member, d) Supply Chain Resources: All members of the supply chain have a resource that can be used to support the development of their role in the supply chain. Supply chain resources describe the resources used by supply chain members as an effort to develop and improve supply chain performance, including physical, technological, human and capital resources used in the supply chain, e) Supply Chain Business Processes: Business processes in the supply chain include several important stages that are interconnected, ranging from the procurement of raw materials to the distribution of final products. The business process of the chain describes the activities and relationships that occur in the supply chain. This section explains the business relationship between supply chain members, distribution patterns

(products, capital, and information), brand identity assurance, the process of building trust and risk aspects f) Supply Chain Performance: An assessment of previous aspects that are then evaluated in the performance of the supply chain. Performance measurement is based on the assessment of supply chain performance by first assessing whether the current supply chain conditions are adequate or not.

2.3.2 Supply Chain Performance

Supply chain performance measurement is carried out using a marketing efficient approach because in the supply chain there are marketing activities that can reflect a level of efficiency of a supply chain. In this study, the analysis used marketing margin measurement, Farmer's share and marketing efficiency.

1. Marketing margins

Marketing margin is calculated based on the reduction of the selling price and purchase price of each marketing agency or the sum of the marketing costs incurred and the profits obtained by the marketing agency. Marketing margins can be formulated as follows:

$$M_i = P_{ji} - P_{bi} \quad M_i = C_i + \pi_i \tag{1}$$

$$P_{ji} - P_{bi} = C_i + \pi_i \tag{2}$$

$$\text{So the total marketing margin is : } MT = \sum M_i \tag{3}$$

Information :

- M_i = Margins at the level of marketing i.
- P_{ji} = Selling price of the i-i marketing agency
- P_{bi} = Purchase price of the marketing agency i-i
- C_i = Cost of marketing institutions at the first level

2. Farmer's Share

Farmer's Share is an indicator of marketing efficiency that is measured to find out whether the share received by farmers is in accordance with the price paid by the final consumer. Mathematically formulated as follows.

$$F_s = \frac{P_f}{P_r} \times 100\% \tag{4}$$

Information:

- F_s = Farmer' Share
- P_f = Prices at the farmer level
- P_r = The price paid by the end consumer

3 Results And Discussion

3.1 Respondent Characteristics

The description of the characteristics of the respondents amounted to 182 respondents, consisting of 50 respondent farmers, 12 respondents from collectors, 35 respondents from retailers and 85 consumer respondents, obtained the results that the average age of the respondents was in the range of productive age of 15-64 years. [7] The age of the workforce is enough to determine the success of doing a job, both physical and non-physical. In general, older workers have weak physical strength and limited ability to work, young workers should have strong physical abilities at work. In addition, age is often correlated with other factors such as experience, education level, and level of acceptance of innovation or change. For the

education level, most of the farmer respondents have the highest level of junior high school (SMP) education of 62%, the same as the collector trader respondents who have the highest level of junior high school education of 0.66%. In contrast to the education level of the retailer respondents, who have an education level that is at a higher level of education, namely Senior High School (SMA) of 0.52%. Similarly, the education level of consumer respondents was at the high school education level of 0.54%, but for the education level of consumer respondents varied from elementary school (SD) 0.09%, junior high school (SD) 0.18%, diploma 0.08% and bachelor by 0.11%. Kurniawan (2010), stated that farmers who have a low level of education are an obstacle in absorbing the level of adoption of technological innovations, while higher education tends to be faster in implementing useful and latest innovations compared to farmers with low education levels. A high level of education has more knowledge to improve its performance. This statement gives an idea that the level of education is very influential in running a business and decisions in choosing products and services. The number of family dependents provides an overview of household economic conditions that can affect consumption, expenditure and business patterns. For the number of family dependents, both farmer respondents, collector respondents, retailer respondents, and consumer respondents, have an average number of family dependents of 4-6 people.

3.2 Analysis of the Cayenne Pepper Supply Chain in the Traditional Market of the Manonda Presidential Instruction

Supply chain is a concept where regulations related to product flows, financial flows, and information flows. The implementation of the supply chain includes the introduction of supply chain members and with whom they are related, what process is carried out in each relationship between actors from the supply chain. The goal is to win the competition for the company and all members, including the end consumer.

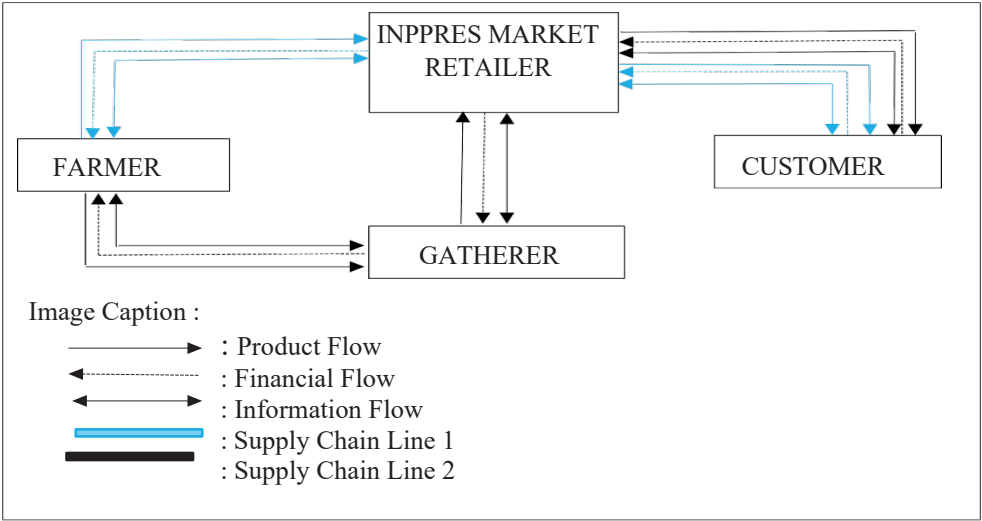


Figure 2. The structure of the cayenne pepper supply chain at the Traditional Market of Inpres Manonda.

Source : Primary Data After Processing, 2025

Figure 2 shows the relationship of involvement and the role of actors in the supply chain, namely, A) Cayenne Pepper Farmers, the raw material providers who produce cayenne

pepper and then sell it to collectors and retailers. To produce good quality chili peppers, respondent farmers try to maintain the quality of cayenne pepper seeds, starting from seed selection to harvest. B) Collector Traders, Collector traders are traders who collect cayenne pepper from one farmer to another, even from one village to another. The amount of cayenne pepper collected by collector traders from several farmers is 80-300 kg. The collector traders came from Palu, Sigi, Ampana and Donggala, which then distributed the cayenne pepper to several markets in Palu City, one of which was the Inpres Manonda Traditional Market. C) Retailers, retailers are actors who connect collectors and consumers, who play a role in the supply chain as marketing agents who buy cayenne peppers from collectors who are then sold to consumers at various outlets located in the Manonda Traditional Inpres market location. D) Consumers, consumers are the last chili supply chain to consume products which are then processed into various processed products made from cayenne pepper. All financing processes come from consumer payments for the cayenne pepper purchased. The parties related above form two distribution channels, namely Line I: farmers to retailers, then consumers, and line II: farmers, collectors, retailers, and then consumers. [8] mentioned that horizontal and vertical collaboration is a supply chain strategy that provides benefits in terms of meeting needs and expanding cooperation.

3.2.1 Supply Chain Flow Line I: Farmers – Traders Retailers – Consumers



Figure 3. Line I Cayenne pepper supply chain at the Manonda Presidential Traditional Market
Source : Primary Data After Processing, 2025

- Information:
- ▶ : Product Flow
 - ◀— : Financial Flow
 - ◀—▶ : Information Flow
1. Product Flow
- In Figure 3 shown by the red line, it explains how physical products move through various stages of distribution until they end up reaching consumers, according to Taghipour [9] called product flow. In Figure 3, it can be seen that the flow of products on line I starts with farmers as a provider of raw materials for cayenne pepper. The harvested cayenne pepper is directly packaged based on the number of orders from retailers that have previously been mutually agreed. The amount of chili that retailers buy from farmers is not in large quantities, but in small quantities with an average of 65kg. Chili is transported using rented vehicles and some use private vehicles in quantities adjusted to the capacity and needs of the daily market. Furthermore, retail traders sell consumers in the form of cayenne pepper per kilogram. Retail traders before selling to consumers conduct sorting with the intention of ensuring that the quality of the product is maintained and attractive to consumers.
2. Financial Flow
- Financial flows in the supply chain refer to the movement of money (cash flow) from one stage to another in the supply chain, from consumers to suppliers. Financial flows move from downstream to upstream as payment for products or services received [10][11] In Figure 3,

financial flows at the farmer level in line I in this study are farmers selling their chili directly to retail traders without going through other intermediaries. Farmers sell their chili at a price of Rp.39,000/kg to retailers. Chili payments made by retail traders to farmers are determined at any time on the basis of the price that occurs in the market and payments are made in cash with the retailer's personal capital. The price at the retailer level is IDR 48,000/kg which is sold to consumers.

3. Information Flow

The flow of information in line I takes place directly between farmers and retailers without going through intermediaries. Farmers provide information about crop yields, available chili volumes, and the selling price they expect. This information is conveyed verbally through direct communication, both when transactions take place in the garden and when delivery at the market. On the other hand, retail traders also convey feedback to farmers, such as changes, market demand, consumer tastes, and retail selling prices that apply in the market. Similarly, information between retailers and consumers occurs that the flow of information directly in the market takes place directly through interaction during buying and selling transactions. The information conveyed by retailers to consumers is the price of chili, the quality or freshness of the product, the origin of the product (production area), and the availability of stock. This information is conveyed orally when consumers come to stalls or stalls in the market. Meanwhile, consumers also provide feedback to traders regarding their preferences such as the level of spiciness of the chili, the desired size and colour. In addition, consumers also often ask or complain about prices that are too high, so that retailers can get an idea of consumers' purchasing power based on the price of cayenne pepper.

3.2.2 Supply Chain Flow Line II: Farmers – Collectors – Retailers – Consumers

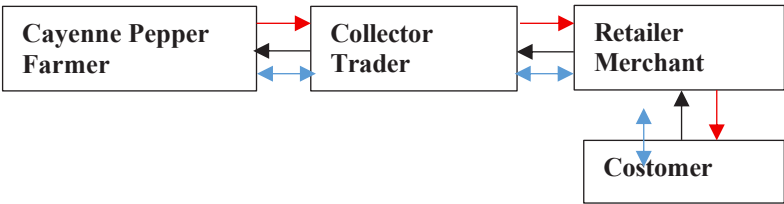


Figure 4. Line II Cayenne pepper supply chain at the Manonda Presidential Traditional Market

Source: Primary Data After Processing, 2025

Information:

- : Product Flow
- ← : Financial Flow
- ↔ : Information Flow

1. Product Flow

Explains that goods flow in a chain from upstream to downstream, i.e., from suppliers to consumers. In Figure 4, at the Manonda Inpres Traditional Market, goods flow from farmers to collectors, then to retailers, and finally to consumers. In the process of the product flow process of line II, farmers in the Ampana, Sigi and Parigi moutong Districts sell their cayenne pepper to collectors in each of these areas with the number of packaging in sacks of 20 - 100 kg/harvest. In the distribution process, collectors go directly to farmers. There is a cooperation agreement between the farmers and the collecting traders, but this agreement is informal and based on the principle of mutual trust between the two parties. The form of

agreement that occurs between the farmer and the first collector trader is related to the price, the agreed price applies at the time of harvest, taking into account the feasibility for the farmer so as not to suffer losses. The second deal is the payment system. The payment system is carried out in cash at the time of the transaction, but under certain conditions the collector gives the advance payment to the farmer. This system is known as *ijon*, where traders provide capital in advance with an agreement that the harvest will be sold back to the trader. After the cayenne pepper products are collected from farmers, the collectors then distribute them to retailers who operate in traditional markets such as the Inpres market and other local markets in Palu City. This distribution process is carried out daily or according to the market schedule, depending on the demand and availability of goods. Cayenne peppers sold to retail traders have generally been sorted by collectors to separate rotten, wilted, or damaged chili peppers. However, it is not uncommon for retailers to still receive products with mixed quality depending on the amount of supply and the price situation in the market. Distribution from collector traders to retailers is carried out using two-wheeled vehicles or pickup cars. Chili packaging is carried out in plastic sacks or woven bamboo which facilitates the loading and unloading process. In this study, there are several cases where retailers take chili themselves to the collection point if they have direct access or want to get a lower price. Furthermore, for the process of distributing retail traders to consumers, namely, retail traders in the market resell the chili in small quantities to the end consumer, both retail and in small batches, at prices adjusted based on demand conditions and the quality of goods.

2. Financial Flow

The financial flow in Line II in Figure 4 of the supply chain is in the form of payment money for products sold to its partners. The financial flow consists of the cost components as well as the profits received by each chain involved. Financial flows from downstream to upstream, the former occurring between consumers and retailers, then from retailers to collectors and the latter from collectors to farmers. The financial flow system at the farmer level in this study is that farmers sell their chili directly to collectors at a price of Rp36,000/kg with a cash payment system or it can be with a cash payment system in advance depending on the financial condition owned by the collector trader at the time of purchase. Payment of cayenne pepper made by the collecting trader to the farmer is determined at any time on the basis of the price that occurs in the market. For the collector trader, the selling price of cayenne pepper is IDR 36,875/kg plus a labour cost of IDR 1,900/kg which is sold to retail traders with a cash payment mechanism. Retail traders sell to consumers at a price of IDR 57,875/kg with cash payments.

3. Information Flow

Information flow is an important component in smoothing the flow of products and financial flows. The information conveyed through the communication process is carried out to maintain a sense of trust between each perpetrator. In Figure 4, it can be seen that the flow of information flows reciprocally from farmers to collectors, then from collectors to retailers, then finally from retailers to consumers and vice versa. At the farmer level with collector traders, information flows in the form of production amount and market price. Furthermore, information continues between traders and retailers regarding information on the availability of goods, types of chilies, delivery times and market prices. For the exchange of information from retailers to consumers regarding price, quality, and consumption needs that occur at the time of direct transactions.

3.3 Analysis of supply chain performance in the Traditional Market of Inpres Manonda

Supply chain performance is assessed to achieve the final goal, which is to maximize the value of all actors involved to achieve this performance, this research is assessed based on the level of efficiency with a marketing margin and farmer's share analysis approach. Table 1 shows that the use of marketing costs includes a number of burdens required in the sale of chili peppers from farmers, traders and ultimately to consumers. Table 1 shows the basis for calculating the value of marketing margin and farmer's share. The following is data on costs, profits, and price shares received by farmers for each cayenne pepper supply chain line.

Table 1. Cost, Profit, Percentage of Farmer Price (*Farmer's share*) In the Cayenne Pepper Supply Chain Route of the Traditional Market of Presidential Instruction Manonda in Palu City, 2025

Maketing Agencies	Supply Chain Lines	Supply Chain Pathway
	I	II
Farmer		
• Selling price	39.000	36.000
• Cost		
Transportation Costs	1.260	1.460
Collector		
• Purchase price		36.875
Marketing costs		
• Transpotation		2.312,5
• Sorting		812,5
• workforce		1.900
Retailers		
1. Purchase price	39.000	50.000
2. Marketing costs		
• Sorting	1.600	3.714,2
• Transportation	1.800	1.928,5
• Packaging	110	535,7
• workforce	-	1.428,5
Total marketing costs	3.510	7.606,9
• Selling price	48.600	57.857
• Margin	9.600	7.857
• Advantage	6.090	250,1
User		
1. Purchase price	48.600	57.857
Farmer price section (%)	8-,25%	62,22%

Source: Primary Data After Processing, 2025.

3.3.1 Percentage of the price received by farmers (Farmer's Share)

In the context of the agribusiness supply chain, economic performance indicators are very important to know the extent to which actors at each point of the chain derive value from product distribution activities. One of the indicators used in this study is *farmer's share*, which is the percentage of the final selling price received by farmers. *Farmer's share* helps identify the extent to which farmers as upstream actors benefit economically compared to other actors at the downstream level [12] This Indicator is used to determine how much of the final selling price is received by farmers as upstream parties in the supply chain. The higher the percentage, the greater the value enjoyed by farmers from the overall selling price of the product at the consumer level. Based on the data in Table 1, the farmer's share in row I is 80.25%, which is obtained from the selling price at the farmer level of IDR 39,000/kg

and the selling price at the retailer level of IDR 48,600/kg. The farmer's share in row II is 62.22%, obtained from the selling price at the farmer level of Rp36,000/kg and the selling price at the retailer level of Rp57,857/kg. This shows that the farmer's share in each row is efficient, because the farmer's share is above 50%. According to [9], What if in marketing activities it is found that the share of the price received by farmers is above 50%, then marketing is said to be efficient, and conversely if the share received by farmers is less than 50%, it means inefficient.

3.3.2 Margins

The difference between the price of cayenne pepper at the farmer level and the price of cayenne pepper at the consumer level is obtained from the marketing margin. The price difference is due to the long supply chain line and there are also distribution costs that must be borne by the supply chain institutions involved, these costs include labour costs, transportation costs, sorting costs, and other costs needed to add value to each institution involved and smooth the marketing process. Table 1 shows that the margin obtained from each supply chain actor can be explained as follows: Supply chain line I the distribution margin obtained by retailers is IDR 9,600/kg with the difference in selling price reduced by the purchase price. The distribution margin of the supply chain of line II of the collector traders is also obtained from the selling price minus the purchase price, which is Rp. 6,875/kg, as well as the retail traders on the line get a distribution margin of Rp. 7,875/kg from the difference in the selling price minus the purchase price, for that the total margin obtained from the two lines is Rp. 14,750/kg. Supply chain line I obtains a lower marketing margin than the supply chain distribution line margin II. This is because the marketing costs incurred on line II are higher than supply chain I due to the number of marketing institutions that participate in the chili supply chain process. [13] explained that the selection of the right supply chain distribution network will reduce quality degradation, efficient distribution planning and can ensure supply chain sustainability.

From the results of the *farmer's share analysis* and marketing margin analysis above, it shows the efficient category, even though line II is longer than the first line of the chain, meaning that all actors in the distribution system are able to manage costs, time, and product added value optimally from upstream to downstream and have provided benefits for all business actors involved in the cayenne pepper supply chain process at the Traditional Market Instruction of President Manonda. In addition, this study emphasizes that supply chain efficiency is not only looking at how much margin is obtained but how collaboration and coordination between supply chain actors can minimize waste, accelerate product flow, and increase economic value for each actor. [14] added that with good post-harvest handling and improvement of the distribution system, information will provide benefits and reduce losses that occur.

4 Conclusion

Based on these results, it can be concluded that there is a need to strengthen coordination and integration among supply chain actors, especially in maximizing the first channel, which has proven to be more efficient and provide greater benefits for farmers and retailers. Local governments and relevant institutions can play a role in improving the market information system so that prices, demand, and supply can be quickly and accurately known by all actors. In addition, increasing the capacity of farmers through cultivation and post-harvest training, as well as improving transportation access and distribution facilities, will help reduce costs and accelerate product flow. The existence of collector traders still needs to be managed so that they function as distributors without adding significant costs. With these measures,

system efficiency can continue to be improved, supply stability maintained, and added value for every supply chain actor increased.

References

1. Sudrajat, H., and Rachman, R., Pengaruh Permintaan dan Penawaran Cabai terhadap Harga Pasar dan Ketersediaan Pasokan di Indonesia.. *J. Ekon. Pertanian*, **34**, 2, 112–120 (2020).
2. A. P. Singh, R. Sing, R. Prasad, and A. Kumar, Supply Chain Optimization for Fresh Fruits and Vegetables: Barriers and Solutions. *Preprints.org*, Apr. (2025).
<https://doi.org/10.20944/preprints202504.0877.v1>
3. Dinas Perindustrian dan Perdagangan Kota Palu. (2018), Laporan Kinerja Disperindag Kota Palu Tahun 2018. Pemerintah Kota Palu, 2018.
4. Chopra, S., and Meindl, P., *Supply Chain Management: Strategy, Planning, and Operation* (6th ed.). (2016).
5. Sing Ajay, S and Masuku Micah, B, Sampling Techniques & Determination Of Sample Size In Applied Statistics Research: An Overview. *Int. J. Econ. Commer. Manag.*, **II**, 11, 1–22 (Nov. 2014).
6. Vorst, V. D., *Performance Measurement in Agrifood Supply Chain*. (Hollandsweeda.: Network, 2006).
7. E. M. Budiarti and et.al., Analisis Karakteristik Responden dalam Menggali Pengembangan Parents Asisted Learning Model (PALM) Terhadap Kemampuan Literasi Peserta Didik. *Indones. J. Educ. Manag.*, **4**, 2, 126–135 (2022).
<https://doi.org/10.52627/ijeam.v4i1.181>
8. J. C. P. Mesa ... +, L. Piedra-Muñoz, C. Giagnocavo Show less, and E. Galdeano-Gómez, Management Strategies and Collaborative Relationships in the Agrifood Supply Chain. Evidence from the Horticultural Sector in Spain. *Sustainability*, **13**, 749 (2020). <https://doi.org/10.3390/su13020749>
9. A. Taghipour, Sustainable Supply Chain Management Performance,” *Int. J. Innov. Manag. Technol.*, **11**, 6, 165–169 (2020). <https://doi.org/10.18178/ijimt.2020.11.6.897>
10. Elida, Septina, Azharuddin, and Sutrisnos, J., Darsono, The Current Condition Of Agro-Industrial Supply Chain Management Of Publicc Sago Product: A Case Survey Of Meranti Island Regency, Indonesia’, *J. IOP Conf. Ser. Earth Enviromental Sci.*, **905**, 1 (2021).
11. Lin Widya Nigsih, Ira Wahyuni, and Adlaida Malik, Analisis Rantai Pasok Cabai Merah di kota Jambi., *J. Agribisnis dan Kearifan Lokal*, **3**, 2 (2020).
12. Ruchira T., Gunarathna and Yapa Mahinda Bandara, Post Harvest Losses and the Role of Intermediaries in the Vegetable Supply Chain. *Inst. Electr. Electron. Eng.*, (Sep. 2020). <https://doi.org/10.1109/MERCon50084.2020.9185197>
13. T. I. Samun, S. Mahmud, M. E. Rahman, and Md. M. H. Ridoy, A Hybrid Distribution Network Model for Cost, Quality and Distribution Optimization in Perishable Goods Supply Chains. *Malaysian J. Sci. Adv. Technol.*, **5**, 1, 1–11 (Mar. 2025).
<https://doi.org/10.56532/mjsat.v5i1.462>
14. DMC Champathi, Reducing post-harvest losses in fruits and vegetables for ensuring food security – Case of Sri Lanka. *MOJ Food Process. Technol.*, **9**, 1, 7–16 (2021).
<https://doi.org/10.15406/mojfpt.2021.09.00255>