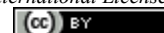


## Analysis of the Efficiency and Supply Chain Performance of Copra Using the FSCN Method and Sales Margin

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### ARTICLE HISTORY

Received: 28 April 26

Final Revision: 20 May 26

Accepted: 29 May 26

Online Publication: 30 June 26

### KEYWORDS

Copra Supply Chain, Marketing Efficiency, FSCN, Farmers' Share, Marketing Channels

### KATA KUNCI

Rantai Pasok Kopra, Efisiensi Pemasaran, FSCN, *Farmes's Share*, Saluran Pemasaran

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### DOI

10.37034/jems.v8i3.453

### ABSTRACT

This study aims to analyze the performance and efficiency of the copra supply chain in Ongka Malino Subdistrict, Parigi Moutong Regency. The analysis method used is the Food Supply Chain Network (FSCN) approach to examine the supply chain structure as well as the flow of products, information, and finances, combined with a marketing efficiency analysis through the calculation of marketing margins, farmers' share, and the profit-to-cost ratio. The results identified three marketing channels: Channel I (Farmer → Collector → Wholesaler → Distributor), Channel II (Farmer → Wholesaler → Distributor), and Channel III (Farmer → Distributor). The findings indicate that Channel III is the most efficient channel, with the highest farmer's share of 66.67% and the lowest total marketing margin of Rp6,000.00/kg. Conversely, Channel I has a farmer's share of 44.44%, which falls below the 50% efficiency standard, making it less efficient due to the length of the distribution chain. Although in Channel III farmers bear independent transportation costs of Rp800.00/kg, they still earn the highest profit of Rp9,500.00/kg. Simplifying the supply chain has proven to increase farmers' income and economic efficiency.

### ABSTRAK

Penelitian ini bertujuan untuk menganalisis kinerja dan efisiensi rantai pasok komoditas kopra di Kecamatan Ongka Malino, Kabupaten Parigi Moutong. Metode analisis yang digunakan adalah pendekatan *Food Supply Chain Network* (FSCN) untuk mengkaji struktur rantai pasok serta aliran produk, informasi, dan finansial, yang dipadukan dengan analisis efisiensi pemasaran melalui perhitungan margin pemasaran, *farmer's share*, dan rasio keuntungan terhadap biaya. Hasil penelitian mengidentifikasi tiga saluran pemasaran, yaitu Saluran I Petani → Pengepul → Pedagang Besar → Distributor, Saluran II Petani → Pedagang Besar → Distributor, dan Saluran III Petani → Distributor. Temuan menunjukkan bahwa Saluran III merupakan saluran paling efisien dengan nilai *farmer's share* tertinggi sebesar 66,67% dan total margin pemasaran terendah sebesar Rp6.000,00/kg. Sebaliknya, Saluran I memiliki nilai *farmer's share* sebesar 44,44% yang berada di bawah standar efisiensi 50%, sehingga tergolong kurang efisien akibat panjangnya rantai distribusi. Meskipun pada Saluran III petani menanggung biaya transportasi mandiri sebesar Rp800,00/kg, petani tetap memperoleh keuntungan tertinggi mencapai Rp9.500,00/kg. Penyederhanaan rantai pasok terbukti meningkatkan pendapatan petani dan efisiensi ekonomi.

### 1. Introduction

Central Sulawesi Province has significant potential in the agricultural sector, which serves as the primary source of livelihood for its people. This sector plays a vital role in supporting the regional economy through various cultivated commodities, such as rice, corn, cloves, cocoa, and coconuts. Among these commodities, coconuts hold significant economic value as they can be processed into copra, which serves as a key income source for farmers in several regions [1]. One region in Central Sulawesi with substantial potential for coconut commodity development is Parigi Moutong Regency, known for its relatively high levels of smallholder coconut production [2].

Ongka Malino Subdistrict in Parigi Moutong Regency is one of the major coconut production centers with great potential for copra processing. According to data from *Badan Pusat Statistik* (BPS) of Parigi Moutong Regency in 2024, the area of Ongka Malino Subdistrict is recorded at 380.24 km<sup>2</sup>, while Parigi Moutong Regency has a total area of smallholder coconut plantations of 29,399 hectares, which can be seen on Figure 1. Parigi Moutong Regency produces approximately 212 million coconuts per year, with the price of copra at the farmer level at only Rp8,000/kg; thus, despite its great potential, the economic value for the community remains relatively low. Based on an interview with a local farmer, the copra production process still relies on

sun-drying under direct sunlight, meaning the drying process takes a long time and the product quality is suboptimal. This aligns with the account of a copra trader in Malino Village, who noted that delayed drying hinders distribution to collectors and affects the smooth flow of market demand. This situation reflects a real

challenge in maintaining the performance and efficiency of the copra supply chain at the village level; delays in processing and distribution can disrupt the smooth flow of supply and reduce the product's competitiveness in the market [3].

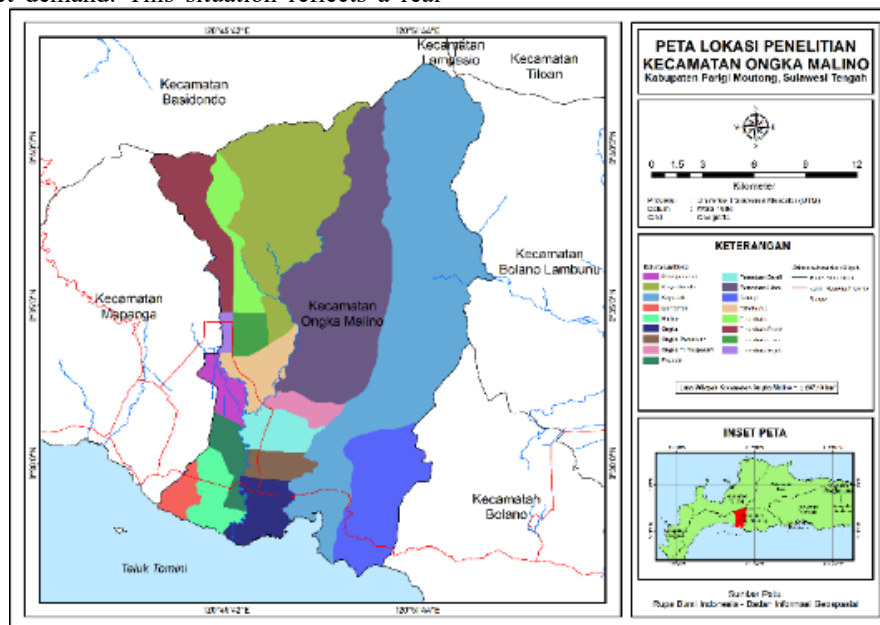


Figure 1. Map of Ongka Malino Subdistrict, Parigi Moutong Regency

The copra supply chain in Ongka Malino Subdistrict still faces various obstacles that affect the smoothness of distribution and efficiency levels. Based on an interview with Mr. Rony on September 19, 2025, copra is one of the leading commodities in Ongka Malino Subdistrict, Parigi Moutong Regency, playing a vital role in the local economy, particularly for coconut farmers. However, in practice, the copra supply chain still faces various challenges, such as inconsistent marketing channels because farmers sell copra through collectors, wholesalers, or directly to distributors, leading to price differences and varying profit margins among stakeholders. Additionally, farmers have relatively weak bargaining power due to limited access to price information, compounded by high distribution costs resulting from long marketing distances. The copra processing method, which still relies on traditional sun-drying, also results in inconsistent copra quality, affecting the selling price. These conditions indicate that the performance and efficiency of the copra supply chain in Ongka Malino Subdistrict are not yet optimal, necessitating an analysis to determine the efficiency levels, marketing margins, and farmers' share across all supply chain actors [4].

Indonesia has high potential for coconut production. Most Indonesians depend on the agricultural and plantation sectors for their livelihoods. The output of these two sectors has become one of the main pillars of the national economy. In its development, the agricultural product supply chain does not stop at the farmer but also involves processors or industries until the product finally reaches the consumer [5].

Coconuts are one of the most common crops, offering diverse benefits and high economic value. In Central Sulawesi, coconuts are a flagship commodity widely processed into copra [6]. The drying process is carried out using various methods such as sun drying, smoke drying, indirect drying, and vacuum drying [7]. However, high production levels do not necessarily guarantee improved farmer welfare. Supply chain performance is measured not only by the smooth flow of products but also by the ability to maintain added value through information coordination among stakeholders [8]. In practice, farmers still face various challenges that reflect production and distribution risks impacting their income [9].

Indonesia is a country rich in natural resources and holds a strategic geographical position between the Pacific and Indian Oceans. This makes it a tropical nation with abundant biological diversity. The agricultural sector plays a vital role in Indonesia's economy and can be a priority in national development. As a tropical country,

Supply chain management in copra processing has now become an essential component. The supply chain encompasses activities ranging from raw material procurement and processing to distribution to consumers. Supply chain efficiency is necessary to maintain material availability, accelerate distribution, and increase sales value [10]. Every element involved in

the supply chain system plays a vital role in supporting the company to produce products that are affordable, high-quality, and easily accessible to consumers. In particular, the roles of suppliers and retailers are crucial in ensuring the smooth operation of this process. Within the supply chain system, there are three main flows that must be managed effectively: the flow of goods, the flow of funds, and the flow of information, which can move from upstream to downstream or vice versa [11]. Supply chain management is currently still in its developmental stage. Many companies have not yet fully realized that effective supply chain management can improve performance and provide a competitive advantage. This concept differs from the traditional management approaches commonly applied in the past [12].

The implementation of supply chain management contributes to inventory cost efficiency, covering storage costs, ordering costs, and the risk of stockouts. Distribution efficiency can be achieved through the application of this concept, which is essentially not a new idea. Supply chain management emphasizes the integration of the flow of goods, from suppliers, manufacturers, and retailers, all the way to the end consumer [13]. Today, supply chain management has become a crucial aspect in the business world. This is because a company's success is not only determined by product quality but also by how resources are managed from raw materials through to the production of final products that can efficiently and timely meet market needs [14]. Supply chain performance can be understood as a reflection of the overall results of activities carried out by all parties within the marketing network to achieve strategic objectives, namely the fulfillment of end-consumer needs. Therefore, an approach is needed that can comprehensively describe the state of the supply chain, one of which is the Food Supply Chain Network (FSCN) approach, which emphasizes the analysis of network structure, product flow, and relationships among actors within the supply chain. Additionally, supply chain performance can be measured through marketing efficiency levels using marketing margin and farmer's share indicators, which reflect the distribution of profits among each marketing entity involved in the distribution flow [15].

Based on these facts, the objective of this study is to describe the performance of the copra supply chain in Ongka Malino Subdistrict, Parigi Moutong Regency, using the FSCN (*Food Supply Chain Network*) framework, which encompasses supply chain structure, the roles and relationships among actors, as well as the flow of products, information, and finances. Additionally, this study aims to analyze supply chain efficiency by calculating the marketing margins for each

actor, thereby determining the level of effectiveness and profits generated in the copra marketing process in the region.

## **2. Research Methodology**

### **2.1. Types and Sources of Data**

This study employs a qualitative descriptive method, with primary data consisting of qualitative data obtained through interviews, field observations, and documentation, thereby enabling a depiction of the actual conditions of the copra supply chain in the study area. The qualitative descriptive method is used to deeply understand phenomena based on conditions observed in the field [16]. Additionally, this study is supported by simple quantitative data in the form of relevant numerical figures, such as selling prices, marketing costs, marketing margins, the farmer's share, and the profit-to-cost ratio. This quantitative data serves as a supplement to strengthen the descriptive findings of the study.

The data sources in this study consist of primary and secondary data. Primary data was obtained directly from the field through interviews with farmers, collectors, traders, and other parties involved in the copra supply chain, as well as through observations of distribution and marketing activities. Primary data is data collected directly from primary sources to obtain information consistent with field conditions [17]. Meanwhile, secondary data was obtained from relevant agencies such as the Department of Agriculture and the *Badan Pusat Statistik* (BPS), as well as from supporting literature including books, journals, and relevant previous research reports serving as supplementary data for the study [10].

### **2.2. Data Analysis Techniques**

The data analysis techniques in this study employ two main approaches. First, an analysis based on the Food Supply Chain Network (FSCN) proposed by [18] to comprehensively analyze the structure and performance of the agricultural product supply chain. This approach is used to identify supply chain objectives, the network structure among actors, management and governance mechanisms, resource availability, as well as the business activities and processes occurring within the copra supply chain system. Second, marketing efficiency analysis is used to assess the level of marketing performance among each supply chain actor through the calculation of marketing margins, the farmer's share, and the profit-to-cost ratio, thereby determining the level of distribution efficiency and profit sharing within the copra marketing system [18].

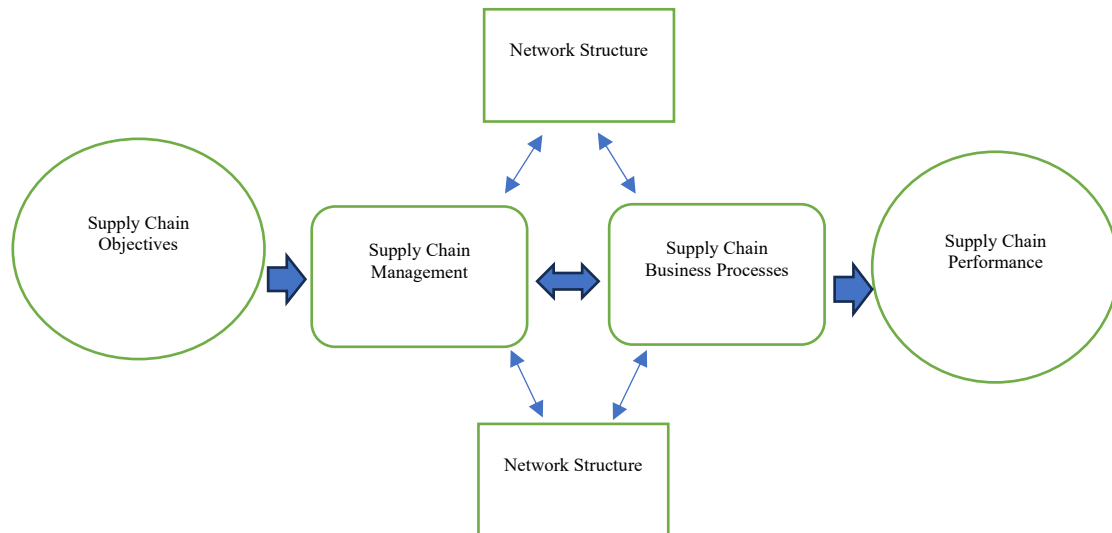


Figure 2. Descriptive Supply Chain Analysis Framework

### 2.2.1. Marketing Margin

The copra marketing margin is the difference between the price paid by consumers and the price received by copra farmers. Analysis of the copra marketing margin reflects marketing efficiency; however, simply looking at the size of the marketing margin alone is insufficient to conclude that the distribution channel is efficient. The process of moving goods/products from producers to consumers incurs costs; with marketing costs, the price of a product increases [19]. Mathematically, the marketing margin can be formulated as Equation (1). Formula for calculating the profit of each marketing channel can be seen on Equation (2), and formula for calculating total marketing margin on Equation (3).

$$M_i = P_{si} - P_{bi} \quad (1)$$

$$\pi_i = P_{si} - P_{bi} - C_i \quad (2)$$

$$MT = \sum M_i \quad (3)$$

The marketing margin of copra at the *i*-th institution ( $M_i$ ) is the difference between the selling price and the purchase price of copra at each marketing institution, expressed in rupiah per kilogram (Rp/kg). The selling price of copra at the *i*-th institution ( $P_{si}$ ) is the price set by a marketing institution when selling copra to the next institution in the marketing chain, expressed in Rp/kg. The purchase price of copra from the *i*-th institution ( $P_{bi}$ ) is the price paid by a marketing institution to obtain copra from the previous institution in the distribution chain, expressed in Rp/kg. The profit of marketing agency *i* ( $\pi_i$ ) is the difference between the marketing margin and the total costs incurred by the marketing institution in carrying out its functions, expressed in Rp/kg. The total copra marketing margin ( $MT$ ) represents the sum of all marketing margins across every institution involved in the distribution chain, expressed in Rp/kg. Marketing costs at the *i*-th agency ( $C_i$ ) refer to all expenses incurred by a marketing institution in the process of handling and distributing copra, expressed in

Rp/kg. The order of marketing institutions (*i*) indicates the sequential position of each institution within the marketing chain, ranging from the first to the *n*-th institution.

### 2.2.2. Farmer's Share

The Farmer's Share is a key indicator in the marketing analysis of agricultural products, as it reflects the proportion of the final product price that is actually received by farmers as the primary producers. This concept is used to assess farmers' welfare within the marketing chain by comparing the price received by farmers at the producer level with the price paid by consumers or market participants at subsequent levels. The higher the Farmer's Share value, the larger the portion of the price enjoyed by farmers, indicating that the established marketing channel tends to be more efficient and profitable for farmers. Conversely, a low Farmer's Share value may indicate price disparities or the dominance of marketing costs by intermediary institutions [20]. Farmer's Share value can be calculated using Equation (4).

$$FS = \frac{pf}{pr} \times 100\% \quad (4)$$

Farmer's Share (Fs) is the percentage of the price paid by the end consumer that is actually received by copra farmers, expressed in percent (%). The price of copra paid by the end consumer (Pr) is the final price at which copra is purchased at the last point of the marketing chain, expressed in Rp/kg. The price of copra at the farmer level (Pf) is the price received by farmers when selling their copra to the first marketing institution in the distribution chain, expressed in Rp/kg.

The criteria for determining the farmer's share are based on the percentage received. If the farmer's share is > 50%, the marketing channel is categorized as efficient. Conversely, if the value is < 50%, the marketing channel is deemed inefficient [21].

2.2.3. Revenue Cost Ratio

Revenue Cost Ratio or R/C Ratio is an indicator used to measure business efficiency by comparing total revenue with total costs incurred in the marketing or production process. This ratio indicates the extent of profit earned by business operators relative to the costs they incur [22]. This ration can be calculated using Equation (5).

- a. If  $R/C > 1$  → the business is profitable (efficient)
- b. If  $R/C = 1$  → the business is at the break-even point (neither profitable nor unprofitable)
- c. If  $R/C < 1$  → the business is operating at a loss (inefficient)

$$R/C = \frac{\pi_i}{C_i} \tag{5}$$

The profit-to-marketing-expense ratio (R/C) is the ratio between the profit earned and the total marketing costs incurred by a marketing institution in a given marketing channel *i*, used to measure the efficiency and feasibility of each institution within the distribution chain. The profit of marketing agency *i* ( $\pi_i$ ) is the difference between the marketing margin and the total costs incurred by the marketing institution in carrying out its functions, expressed in Rp/kg. Marketing costs of the *i*-th institution ( $C_i$ ) refer to all expenses incurred by a marketing institution in the process of handling and distributing copra, expressed in Rp/kg.

**3. Results and Discussion**

3.1. Analysis of the Food Supply Chain Network (FSCN)

3.1.1. Structure of the Copra Supply Chain

Marketing channels play a crucial role in distributing copra from producers to consumers quickly and efficiently. The smoothness of this distribution process is a key factor in ensuring the overall success of copra marketing [23]. In this process, copra distribution is not only carried out directly but also involves various intermediaries who play complementary roles and collaborate to ensure the product reaches consumers as needed. Therefore, a marketing channel can be understood as the flow of movement or distribution carried out by marketing institutions to channel copra from producers to end consumers [24].

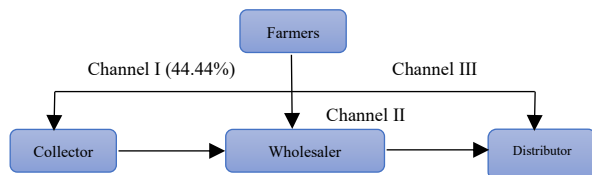


Figure 3. Copra Supply Chain Flow in Ongka Malino Subdistrict

The copra supply chain structure in Ongka Malino Subdistrict consists of three main channels, which can be seen on Figure 3. In the first channel, copra produced by farmers is sold to collectors, then distributed to

wholesalers and subsequently to distributors. The second channel indicates that some farmers choose to sell directly to wholesalers without going through collectors, while in the third channel, farmers sell copra directly to distributors. Differences in the length of these marketing channels imply differences in costs, margins, and the share of the price received by farmers. Research results show that the *Farmer's Share* in Channel I is 44.44%, in Channel II is 51.67%, and in Channel III is 66.67%, indicating that the shorter the marketing channel, the larger the proportion of the price received by farmers. Based on an interview with one farmer, Mr. Ria, on September 20, 2025, direct sales to wholesalers or distributors yield higher margins despite requiring higher transportation costs, whereas sales through collectors are considered more practical as they do not incur distribution costs, though they generate relatively lower profits.

3.1.2. Supply Chain Business Process

The business processes in the copra supply chain in Ongka Malino Subdistrict involve several key actors, ranging from farmers, collectors, wholesalers, to distributors, who interact with one another in product distribution activities. In the agricultural supply chain system, each actor plays an interrelated role in the flow of products, finances, and information [25].

a. Product Flow

The copra product flow begins with farmers who harvest coconuts and process them into dried copra through traditional sun-drying. Based on an interview with Mr. Nanda, a coconut farmer, the average harvest yield per farmer is 500 kg per harvest, depending on the area of land managed, which is estimated to be around 1 to 2 hectares per farmer. After that, the copra is sold to collectors at a price of around Rp 8,000/kg. The collectors then gather copra from various farmers and distribute it to wholesalers or distributors. Collectors ship approximately 13 tons of copra per month, with an estimated 3 tons per shipment and a total of about 4 shipments per month. On the other hand, distributors receive large supplies of copra, about 100 tons each month.

b. Financial Flow

From a financial perspective, farmers sell copra to collectors at a price of Rp 8,000/kg. Collectors sell the copra to wholesalers at a price of Rp 9,300/kg, and ultimately, distributors pay Rp 12,000/kg for the copra supply. The distributor then resells the product at a higher price, approximately Rp 18,000/kg, to the market or further processing industries. The collector bears the transportation costs for transporting copra from farmers to wholesalers or distributors, with vehicle maintenance costs amounting to around Rp 250,000 per month and monthly transportation costs of approximately Rp 200,000.

c. Information Flow

The flow of information within this supply chain is informal and limited. Farmers typically obtain market price information through word of mouth, whether from collectors, fellow farmers, or information circulating in local markets. Collectors and wholesalers communicate with farmers regarding desired product quality, such as copra moisture content, directly through face-to-face meetings or by phone. Farmers adjust the quality of their copra to meet the demands of collectors or distributors in order to secure a better price.

d. Challenges and Issues Faced

The main challenge faced by farmers is the frequently fluctuating prices, which depend on market conditions. Additionally, farmers who choose to sell copra to wholesalers or distributors must incur higher transportation costs, as they must ship the copra themselves to more distant locations. This places a financial burden on farmers, especially if the selling price is lower than the transportation costs. Meanwhile, if farmers sell to collectors—though more convenient since the collectors pick up the copra—the price received is lower, leaving farmers feeling they are not getting a commensurate profit.

e. Farmers' Bargaining Power

Farmers have relatively weak bargaining power in this supply chain. They are heavily reliant on middlemen as the primary intermediaries for selling their products. Although farmers could secure higher prices by selling directly to wholesalers or distributors, they face challenges related to transportation costs and limited access to information about better market prices. Consequently, most farmers choose to sell to middlemen, even at a lower profit margin, because it is more practical and avoids high transportation costs.

3.1.3. Supply Chain Resources

Resources within the copra supply chain in Ongka Malino Subdistrict involve various elements that support the smooth flow of the distribution process. Farmers, as the primary producers, rely on their coconut plantations to produce copra. Based on interviews with local farmers, their average harvest yields range from 300 to 500 kg per harvest, depending on the size of the land they manage. Farmers use traditional sun-drying methods to dry the copra, making them highly dependent on the weather. Another supporting resource is the collector, who gathers and distributes copra from farmers to wholesalers or distributors. Collectors typically transport around 13 tons of copra per month using vehicles that incur significant transportation costs, ranging from approximately Rp 200,000 to Rp 250,000 per month for vehicle maintenance.

Additionally, financial resources significantly impact the smooth operation of the supply chain. Farmers have

limited capital, so they tend to rely on collectors to carry out operational activities. Collectors, in turn, also require capital to purchase copra from farmers and cover distribution costs. Although farmers face limitations in accessing market information, they obtain information on market prices and the desired product quality through informal communication with collectors or fellow farmers. Based on interviews with local farmers, they revealed that direct sales to collectors are often more advantageous in terms of convenience, even though the price received is lower compared to selling directly to distributors.

3.1.4. Relationships Among Actors

Interactions among actors in the copra supply chain in Ongka Malino Subdistrict involve interdependent relationships between farmers, collectors, wholesalers, and distributors. Collectors determine the price offered to farmers based on the quality of the copra received and market conditions. Typically, collectors purchase copra at a lower price than the market rate if the quality is low, while if the copra quality is good, the offered price will be higher. In addition, collectors arrange for the shipment of copra to wholesalers or distributors, taking into account supply volume and market demand. Based on interviews with collectors, shipments are made on a scheduled basis, with an average of 13 tons of copra shipped per month, and product quality is a determining factor in the price received from wholesalers.

The primary factor influencing the relationship between collectors and wholesalers is the quality of the products received. Collectors maintain long-term relationships with wholesalers, built on trust and tradition. Both parties rely on the stability of supply and product quality to maintain a good relationship. High-quality copra ensures that wholesalers receive products that meet their standards, while collectors secure better prices from distributors. However, unstable prices and market fluctuations often pose challenges for farmers, as the prices offered by collectors are frequently lower, depending on market demand. Additionally, high transportation costs and late payments by collectors often act as barriers in the relationship between farmers and collectors, which impacts farmers' well-being.

3.1.5. Supply Chain Management

Coconut meat supply chain management in Ongka Malino Subdistrict involves careful coordination among farmers, collectors, wholesalers, and distributors to ensure the smooth flow of products from farmers to end consumers. Collectors play a crucial role in gathering coconut meat from farmers and organizing it for efficient distribution to wholesalers or distributors. Supply chain management is carried out by regulating supply based on market demand and ensuring product quality meets standards. Collectors and distributors need to monitor the quality of the copra received to ensure the product continues to meet market expectations, both in

terms of moisture content and drying quality. Additionally, they must manage delivery timelines to ensure supplies arrive on time and are not hindered by transportation or weather issues.

One of the challenges in copra supply chain management is the frequent and often unstable price fluctuations. To address this, collectors and wholesalers can establish price agreements with farmers for specific periods, thereby providing price certainty for farmers even when market prices fluctuate. On the other hand, managing transportation costs is a critical aspect of supply chain management, as high transportation costs can impact profit margins. Therefore, collectors and distributors often collaborate to find ways to reduce distribution costs, such as by selecting more efficient shipping routes or using more suitable vehicles to transport large quantities of copra. All of this aims to create a more efficient supply chain, ensuring products reach consumers at competitive prices while maintaining quality.

### 3.2. Supply Chain Performance

Supply chain performance is the result of all activities carried out by all actors in the supply chain to achieve marketing objectives, namely the satisfaction of the end consumer. The performance of the copra supply chain in Ongka Malino Subdistrict is measured by marketing efficiency, which reflects the distribution of profits earned by each marketing entity. Good marketing efficiency ensures that profits are fairly distributed among farmers, collectors, wholesalers, and distributors, while minimizing distribution and transportation costs.

#### 3.2.1. Distribution Channels of the Copra Supply Chain in Ongka Malino Subdistrict

The distribution process of production outputs is an integral part of the copra supply chain in Ongka Malino Subdistrict. This distribution process forms several channels connecting the institutions or links involved in the copra supply chain. The copra supply chain in Ongka Malino Subdistrict consists of several distribution channels for fresh copra, each with distinct characteristics and challenges. The existing distribution channels include:

- a. Channel one: Farmers → Collectors → Wholesalers → Distributors
- b. Channel two: Farmers → Wholesalers → Distributors
- c. Channel three: Farmers → Distributors

#### 3.2.2. Efficiency Levels in the Copra Supply Chain in Ongka Malino Subdistrict

One way to determine the success of a supply chain is by measuring the efficiency of each channel within that supply chain. The more efficient the marketing process, the better the results for all parties involved, allowing profits to be distributed equitably. In the context of the copra supply chain, efficiency can be measured using the marketing margin calculation approach. The marketing margin represents the difference between the price received by farmers and the price paid by the end consumer [26].

This study found that copra prices often fluctuate, making the determination of purchase and selling prices used to calculate the marketing margin for each channel crucial for assessing the efficiency of distribution. These price fluctuations pose a challenge that affects the income of farmers and other actors in the supply chain. Therefore, calculating the marketing margin in each channel will help understand the distribution of profits and the efficiency of distribution within the copra supply chain in Ongka Malino Subdistrict.

##### a. Marketing Channel I

Analysis of Channel I reveals that the marketing chain involves three intermediary institutions: Collectors, Wholesalers, and Distributors. As can be seen on Table 1, in this channel, farmers receive a selling price of Rp8,000.00/kg. By converting the climbing wage to Rp1,400.00/kg based on an average productivity of 5 kg of copra per tree, the total costs incurred by farmers amount to Rp1,700.00/kg, covering climbing, transportation, and splitting costs. This situation yields a net profit for farmers of Rp6,300.00/kg, with a profit-to-cost ratio of  $\pi/c_i$  reaching 3.70, indicating a very high level of farming efficiency. At the marketing institution level, the total margin generated is the highest among other channels, reaching Rp10,000.00/kg. The high margin is due to the significant marketing costs incurred by the large number of marketing institutions involved [27].

Collectors take a margin of Rp1,300.00/kg, followed by wholesalers at Rp2,700.00/kg, and the highest margin is taken by distributors at Rp6,000.00/kg. Although distributors have the largest margin, their profit-to-cost ratio reaches 13.46 due to the efficiency of shipping very large volumes. Overall, Channel I has a *Farmer's Share* of 44.44%. This value is below the 50% efficiency threshold, indicating that this marketing channel is not yet efficient from the farmers' perspective. These results align with the study by [28] on watermelon marketing in Bango Village, which also found a *Farmer's Share* of 44% in Channel I, classifying it as inefficient.

Table 1. Marketing margin, *farmer share*, and B/C ratio for Channel I in the copra supply chain in Ongka Malino Subdistrict, Parigi Moutong Regency

No	Marketing Institution	Value (Rp/kg)	Margin (M <sub>i</sub> )	Profit	Ratio ( $\pi_i/c_i$ )
1	Farmer			6,300.00	3.70
	Selling price ( $P_f$ )	8,000.00			
	Harvesting costs	1,400.00			
	Transportation cost	200.00			
	Splitting fee	100.00			
2	Collector		1,300.00	686.92	1.12
	Purchase price ( $P_{b1}$ )	8,000.00			
	Employee salaries (2)	332.31			
	Transportation costs	15.38			
	Car maintenance	19.23			
	Car depreciation	192.31			
	Depreciation of scales	5.13			
	Depreciation of building	32.05			
	Electricity & maintenance	16.67			
	Selling price ( $P_{s1}$ )	9,300.00			
3	Wholesaler		2,700.00	1,780.00	1.93
	Purchase price ( $P_{b2}$ )	9,300.00			
	Labor wages	660.00			
	Car maintenance & driver	60.00			
	Building maintenance	62.50			
	Scale depreciation	60.00			
	Vehicle Depreciation	125.00			
	Selling price ( $P_{s2}$ )	12,000.00			
4	Distributor		6,000.00	5,585.00	13.46
	Purchase price ( $P_{b3}$ )	12,000.00			
	Permanent employee salary	165.00			
	Packaging costs	200.00			
	Electricity & building maintenance	5.00			
	Building depreciation	45.00			
	Selling Price ( $P_f$ )	18,000.00			
	Total margin ( $MT$ )		10,000.00		
	Total marketing costs		1,028.08		
	Total profit		14,351.92		
	Farmer's Share ( $F_s$ )	44.44			

b. Marketing Channel II

Channel II demonstrates greater efficiency for farmers compared to the previous channel, as can be seen on Table 2. In this channel, farmers sell copra directly to Wholesalers at a price of Rp9,300.00/kg. With harvesting costs converted to Rp1,400.00/kg and additional transportation costs of Rp200.00/kg, farmers are able to earn a net profit of Rp7,400.00/kg. The level of economic efficiency at the farmer level is very high, reflected in the Value-Added Ratio ( $\pi_i/c_i$ ) of 3.89, meaning that every 1 rupiah of cost incurred by the farmer generates 3.89 rupiah in added value.

Looking at the marketing margin structure, the total margin generated in Channel II is Rp8,700.00/kg, distributed as follows: Wholesalers receive

Rp2,700.00/kg and Distributors receive Rp6,000.00/kg. Although Distributors have the largest margin, they recorded the highest profit ratio of 13.46 due to the large volume of operations they manage. Overall, the *Farmer's Share* in Channel II reached 51.67%. This figure indicates that with the reduced role of middlemen, farmers can enjoy a larger share of the price, making this channel efficient and profitable for producers in Ongka Malino Subdistrict. These results align with research on corn marketing in Monggupo Village, which showed that the *Farmer's Share* in marketing channel 2 reached 61.90%, indicating that the shorter the marketing channel, the higher the share of the price received by farmers [20].

Table 2. Marketing margin, *farmer share*, and B/C ratio of Channel II in the copra supply chain in Ongka Malino Subdistrict, Parigi Moutong Regency

No	Marketing Institution	Value (Rp/kg)	Margin ( $M_i$ )	Profit	Ratio ( $\pi i / c i$ )
1	Coconut farmers			7,400.00	3.89
	Selling price ( $P_f$ )	9,300.00			
	Harvesting costs	1,400.00			
	Transportation cost	200.00			
	Split cost	100.00			
	Transportation cost	200.00			
2	Wholesaler		2,700.00	1,780.00	1.93
	Purchase price ( $Pb_2$ )	9,300.00			
	Labor wages	660.00			
	Car maintenance & driver	60.00			
	Building maintenance	62.50			
	Scale depreciation	60.00			
	Vehicle Depreciation	125.00			
	Selling price ( $Ps_2$ )	12,000.00			
3	Distributor		6,000.00	5,585.00	13.46
	Purchase price ( $Pb_3$ )	12,000			
	Permanent employee salary	165.00			
	Packaging costs	200.00			
	Electricity & building maintenance	5.00			
	Building depreciation	45.00			
	Selling Price ( $P_n$ )	18,000.00			
	Total margin (MT)		8,700.00		
	Total marketing costs		1,335.00		
	Total profit		14,765.00		
	Farmer's Share ( $F_s$ )	51.67			

c. Marketing Channel III

Analysis of Channel III, which can be seen on Table 3, which connects farmers directly with distributors in Palu City, shows it to be the most efficient marketing channel. Farmers receive the highest price of Rp12,000.00/kg. Although farmers must bear the cost of inter-district transportation of Rp800.00/kg, the net profit remains maximized at Rp9,500.00/kg. The economic efficiency of farmers in this channel is indicated by the Profit-to-Cost Ratio ( $\pi i / c i$ ) of 3.80, indicating that this venture is highly profitable for producers. From a market structure perspective, the total marketing margin in Channel III is the lowest, at

Rp6,000.00/kg, all of which constitutes the Distributor's margin. The *Farmer's Share* in Channel III reaches 66.67%. This value exceeds the marketing efficiency standard of 50%, indicating that this marketing channel is classified as efficient. The high *Farmer's Share* in this channel is due to the shorter marketing chain, where farmers sell directly to distributors without going through collectors or wholesalers. This result differs from research on shallots, which showed a *Farmer's Share* in Channel II of only 37.82%, making it less efficient because the portion of the price received by farmers is relatively smaller due to the length of the marketing channel [29].

Table 3. Marketing margin, *farmer share*, and B/C ratio for Channel III in the copra supply chain in Ongka Malino Subdistrict, Parigi Moutong Regency

No	Marketing agency	Value (Rp/kg)	Margin ( $M_i$ )	Profit ( $\pi$ )	Ratio ( $\pi i / c i$ )
1	Coconut farmers			9,500.00	3.80
	Selling price ( $P_f$ )	12,000.00			
	Harvesting costs	1,400.00			
	Transportation cost	200.00			
	Splitting fee	100.00			
	Transportation costs (fuel + driver)	800.00			
2	Distributor		6,000.00	5,585.00	13.46
	Purchase price ( $Pb_3$ )	12,000.00			
	Employee salaries	165.00			
	Packaging costs	200.00			
	Electricity & maintenance	5.00			
	Building depreciation	45.00			
	Selling price ( $P_n$ )	18,000.00			
	Total margin (MT)		6,000		
	Total marketing costs		415.00		
	Total profit		15,085.00		
	Farmer's share ( $F_s$ )	66.67			

Based on field research results on Table 4, there is a significant difference in economic performance among the three copra marketing channels in Ongka Malino

Subdistrict. Channel III recorded the highest efficiency value, as indicated by the high price at the farmer level and a larger *Farmer's Share* compared to the other

channels. The high proportion of the price received by farmers in this channel is due to the elimination of intermediary institutions such as collectors and wholesalers, thereby reducing marketing margins. Although farmers incur higher transportation costs, this

is offset by higher profits. This condition indicates that the farmer's share has an inverse relationship with marketing margins; the lower the margin, the larger the share of the price received by farmers, making the marketing system more efficient [30].

Table 4. Summary of marketing efficiency values for each copra marketing channel

Marketing Channel	Farmer's Selling Price	Total marketing costs	Margin	Farmer's Share (%)	Ratio ( $\pi/c_i$ )
Channel I	8,000.00	1,028.08	10,000.00	44.44	13.96
Channel II	9,300.00	1,335.00	8,700.00	51.67	11.06
Channel III	12,000.00	415.00	6,000.00	66.67	36.35

The results of the study indicate that there are three copra marketing channels in Ongka Malino Subdistrict with varying economic performance. Channel I has the longest marketing chain and is therefore less efficient, as the large number of intermediaries involved results in a smaller share of the price received by farmers. Conversely, Channel III demonstrates the most optimal performance because it has a shorter marketing chain, thereby increasing the share of the price received by farmers and reducing marketing costs and margins. This indicates that simplifying the marketing chain plays a crucial role in enhancing the efficiency of the copra marketing system in the study area.

**4. Conclusion**

Based on the research findings regarding the efficiency and performance of the copra supply chain in Ongka Malino Subdistrict using the Food Supply Chain Network (FSCN) approach and marketing margin analysis, it can be concluded that there are three marketing channels with varying levels of performance and efficiency. Channel I has a Farmer's Share of 44.44%, making it relatively inefficient, while Channel III is the most efficient marketing channel with the highest Farmer's Share of 66.67% and the lowest total marketing margin of Rp6,000.00/kg. The research results indicate that the shorter the marketing chain, the larger the portion of the price received by farmers and the more efficient the resulting marketing system. This study is expected to provide academic benefits, namely as an additional reference in the development of supply chain management and marketing efficiency for agricultural commodities, particularly copra. Practically, the results of this study can serve as a basis for farmers in determining more profitable and efficient marketing channels, thereby increasing their income. Meanwhile, from a managerial perspective, this study can serve as a foundation for business actors and local governments in formulating more effective supply chain management and development strategies to improve marketing performance and farmers' welfare.

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