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Value Chain Analysis of Hybrid Corn in Labuan District

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ABSTRACT

This study compares the observed marketing pathways, price spreads, farmers' price shares, and marketing cost ratios for hybrid corn in Labuan Toposo and Labuan Panimba, Donggala Regency, Indonesia. Data were obtained from 82 farmer interviews and linked marketing-actor observations in 2025. Transaction-level prices and costs were aggregated using quantity weights. Four channels were identified: local processors (6.10% of farmers), Gudang Talise (1.22%), PT Loan (6.10%), and middlemen supplying PT Japfa (86.59%). The first three direct channels showed a 100% farmers' price share at the observed buyer boundary. In the middleman channel, the volume-weighted farmer price was Rp4,553.79/kg versus Rp5,100/kg at PT Japfa, resulting in a gross spread of Rp546.21/kg and a farmers' share of 89.29%. After recorded marketing costs of Rp329.13/kg, the residual spread was Rp217.08/kg before other costs. Marketing cost ratios across channels 1–4 were 2.61%, 4.80%, 2.87%, and 6.45%, respectively. The results highlight the importance of both price distribution and who pays for logistics. Collective marketing, transparent grading, and alternative financing may improve market access, although downstream value added and welfare effects were not directly measured.

Keywords: value chain; hybrid corn; marketing channels; marketing efficiency

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1. Introduction

Corn is a strategic commodity ranked second after rice and has an important role in food security as well as being a raw material for animal feed [1]. The demand for corn continues to increase due to the development of the feed industry and agroindustry, so the availability and efficiency of its distribution system have become very important. Recent findings in corn marketing show that channel structure, margins, and farmers' share greatly determine farmers' welfare [2]. According to data from the Statistics Indonesia (BPS) [3], Labuan District in Donggala Regency is one of the main centers of hybrid corn production in Central Sulawesi, contributing significantly to the district's total output. Although corn production is quite abundant, this does not necessarily provide equal benefits to farmers. One of the problems faced is the lack of farmers' bargaining power in a sales system that is still dominated by intermediary traders.

In this study, the hybrid corn value chain is operationalized as the observed marketing pathways from farmers to their immediate buyers, assessed using buyer–farmer price margins, farmers' shares, and marketing cost ratios. This is a partial, transaction-level analysis rather than a comprehensive assessment of value added at every downstream processing and retail stage. The indicators distinguish price distribution from the costs required to move the commodity.

Other studies show that the longer the marketing chain, the more unequal the distribution of profits among actors. For example, Ardillah and Hasan [4] found that shorter marketing channels involving fewer intermediaries achieve better efficiency, because smaller marketing margins leave a larger portion of the price for farmers; conversely, efficiency decreases as the marketing channel becomes longer. A similar study by Damayanti and Hairunnas [5] shows that the hybrid corn value chain in Tenggarong District involves various actors such as farmers, collectors, wholesalers, feed companies, and final consumers. This pathway is very long, resulting in relatively lower income for farmers compared to traders, who obtain higher profits. This situation indicates that farmers have a weak bargaining position; therefore, improvements in institutional strengthening, price transparency, and policy support are needed to improve efficiency in the value chain. Research related to hybrid corn marketing consistently finds that shorter channels obtain a higher farmers' share and better efficiency values [6,7].

In addition, research on other agricultural commodities such as rice [8] and cocoa [9] also shows similar patterns, with the highest efficiency usually found in shorter and more transparent marketing channels. This shows that mapping marketing channels is very important in formulating strategies to improve efficiency. In Labuan District, data show that in February 2025, hybrid corn was harvested over an area of approximately 170.7 hectares, with an average yield of 5.3 tonnes per hectare [3,10]. This figure indicates that hybrid corn has great potential in the Labuan area. However, only a limited number of studies have examined the

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value added of hybrid corn in Central Sulawesi, particularly in Labuan District. Unlike the regency-level study by Rahayu *et al.* [2] in Sigi Regency, the present research documents sub-district-level marketing pathways that include a warehouse, a direct corporate buyer, local processors, and a middleman supplying PT Japfa. Its contribution is a channel-specific comparison of price shares and cost-bearing arrangements.

The research question is: how do the four observed marketing channels differ in their farmer–buyer price margins, farmers' shares, and marketing cost ratios, and what do these differences imply for marketing arrangements in the two sampled villages of Labuan District? The study aims to map the channels, compare the three indicators, and identify practical opportunities to improve farmers' net receipts without assuming that shorter channels always have lower distribution costs.

2. Materials and Method

The research was conducted in Labuan District, Donggala Regency, Central Sulawesi, Indonesia, from July to September 2025. The research location was purposively selected because Labuan District is one of the hybrid corn production centers in Central Sulawesi. The study focused on two villages, Labuan Toposo and Labuan Panimba, which were selected based on their involvement in hybrid corn production and marketing activities.

The study employed a descriptive quantitative approach to identify hybrid corn marketing channels and analyze marketing margins, farmers' shares, and marketing cost ratios. Both primary and secondary data were collected. Primary data were obtained through direct interviews with respondents using structured questionnaires, while secondary data were obtained from publications of BPS, the Agriculture Office of Donggala Regency, and the Agricultural Extension Center of Simou (BPP Simou).

Based on BPP Simou records (2025), the study population consisted of 1,137 hybrid corn farmers, comprising 600 farmers in Labuan Toposo and 537 farmers in Labuan Panimba. A total of 82 farmers were selected using purposive sampling during fieldwork. Respondents were selected based on their involvement in hybrid corn farming, experience in marketing their harvests, and ability to provide relevant information on selling prices, marketing channels, and associated marketing costs.

Other marketing actors, including middlemen, local processors, warehouse operators, and corporate buyers, were identified through snowball sampling. This approach was used to trace the movement of hybrid corn from farmers to subsequent buyers and identify the marketing channels operating in the study area.

Data analysis was conducted using descriptive quantitative methods. The marketing channels were mapped to describe the flow of hybrid corn from farmers to subsequent

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marketing institutions. Transaction prices and marketing costs were expressed in Indonesian rupiah per kilogram (Rp/kg). Where transaction-level observations differed, quantity-weighted averages were calculated using the recorded transaction volumes.

Marketing performance was analyzed using three indicators:

2.1. Marketing Margin (MP)

Marketing margin was calculated as the difference between the observed buyer reference price and the price received by farmers:

$$MP = P_b - P_f$$

Where:

MP = marketing margin (Rp/kg)

P_b = observed buyer reference price (Rp/kg)

P_f = price received by farmers (Rp/kg)

The calculated margin represents the price difference within the observed marketing channel and does not necessarily reflect the total margin up to the final consumer [11].

2.2. Farmers' Share (FS)

Farmers' share was calculated as the percentage of the observed buyer reference price received by farmers:

$$FS = (P_f / P_b) \times 100\%$$

Where:

FS = farmers' share (%)

P_f = price received by farmers (Rp/kg)

P_b = observed buyer reference price (Rp/kg)

A higher farmers' share indicates that farmers receive a larger proportion of the observed buyer reference price. However, this indicator does not independently measure farmers' net income or the overall profitability of the marketing channel [12].

2.3. Marketing Cost Ratio (MCR)

The marketing cost ratio was calculated by comparing total recorded marketing costs per kilogram with the observed buyer reference price:

$$MCR = (MC / P_b) \times 100\%$$

Where:

MCR = marketing cost ratio (%)

MC = recorded marketing costs (Rp/kg)

P_b = observed buyer reference price (Rp/kg)

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A lower marketing cost ratio indicates that a smaller proportion of the observed transaction value is allocated to marketing costs. This indicator was used to compare the relative cost intensity of the identified marketing channels [12].

The three indicators were analyzed comparatively to identify differences in marketing margins, farmers' shares, and marketing costs across the observed channels. Particular attention was given to the distribution of marketing costs among farmers and other marketing actors. Where marketing costs were borne directly by farmers, net receipts were calculated by deducting these costs from the farm transaction price.

The analysis was limited to the observed marketing transactions and buyer reference prices. Therefore, the findings describe the relative performance of the identified marketing channels rather than the profitability or value added of the entire downstream supply chain.

3. Results and Discussion

The analysis involved 82 hybrid corn farmers from Labuan Toposo and Labuan Panimba Villages in Labuan District, Donggala Regency. The findings identified four marketing channels with differences in market access, farm-gate prices, intermediary involvement, and the distribution of marketing costs among marketing actors. These differences were examined through marketing margins, farmers' shares, and marketing cost ratios to evaluate the relative performance of each channel. The analysis focused on observed marketing transactions between farmers and subsequent buyers.

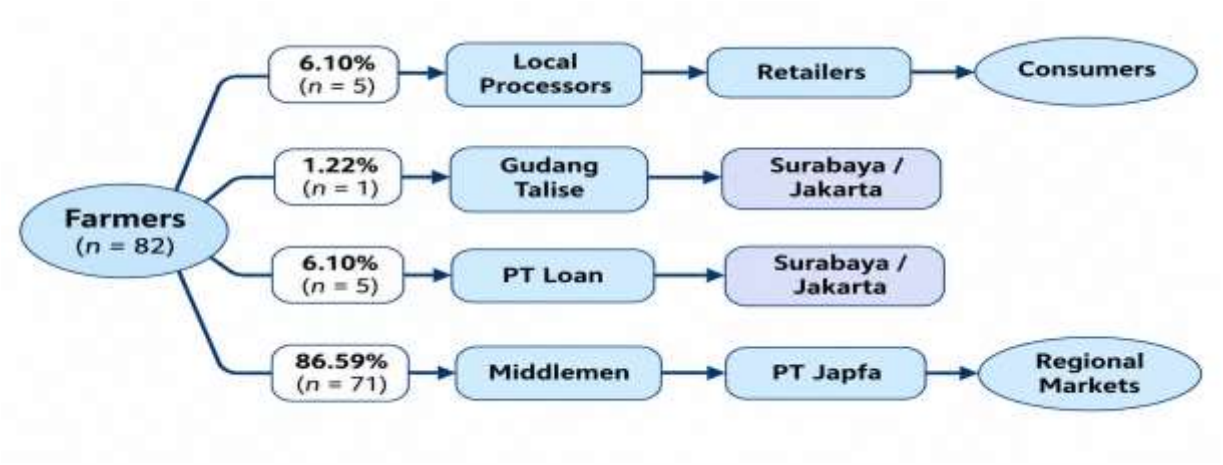
3.1. Hybrid Corn Marketing in Labuan District

Marketing is a series of processes aimed at creating, delivering, and providing value to customers, carried out in a way that provides mutual satisfaction between consumers and producers [13]. Hybrid corn marketing in Labuan District generally still focuses on local and regional markets. Farmers sell their agricultural products to collectors in the village or directly to wholesalers who come to the area. The selling price is generally determined by the moisture level of corn kernels and the market situation at harvest time. Corn with low moisture content is generally sold at a higher price because it is more durable and can reduce drying costs for buyers. Some of the harvest is also absorbed by feed mills in Central Sulawesi, becoming a promising market for farmers. However, dependence on collectors makes the farmers' bargaining position less favorable, especially during peak harvest, when prices tend to decline. This is in line with findings in Gorontalo, where dependence on middlemen suppresses prices at the farmer level and widens marketing margins [14]. Efforts to improve marketing through the formation of farmer groups continue to be encouraged, with the aim of strengthening distribution networks, maintaining price stability, and expanding market opportunities.

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3.2. Main Marketing Channels

The study identified four hybrid corn marketing channels involving local processors, Gudang Talise, PT Loan, and middlemen supplying PT Japfa. Each channel represents a different marketing arrangement between farmers and buyers, reflecting variations in market access and the involvement of marketing intermediaries. The marketing flow diagram illustrates the movement of hybrid corn from farmers to subsequent marketing institutions and destinations. However, the analysis of marketing margins, farmers' shares, and marketing cost ratios is limited to observed transactions, as selling prices at subsequent distribution stages were not available.



Source: Processed Primary Data, 2025

Figure 1. Flow Diagram of Hybrid Corn Value Chain in Labuan District

Figure 1 and Table 1 show that 71 of 82 farmers (86.59%) used middlemen supplying PT Japfa; five (6.10%) sold to local processors, five (6.10%) to PT Loan, and one (1.22%) to Gudang Talise. Middlemen reportedly facilitate immediate payment, credit, collection, and transport. The channel shares describe the sample and should not be generalized to all farmers in Labuan District.

3.3. Distribution Channels for Hybrid Corn

To analyze the distribution pattern of hybrid corn in Labuan District, observations were made on the various marketing channels through which hybrid corn flows from farmers to final consumers or processing industries. The results are presented in Table 1, which shows the proportion of respondents in each marketing channel.

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Table 1. Marketing Channels of Hybrid Corn in Labuan District

No	Channel	Number of Respondents	Percentage (%)
1	Farmer → Processor → Retailer → Consumer	5	6.10
2	Farmer → Gudang Talise → Distribution to Surabaya and Jakarta	1	1.22
3	Farmer → PT Loan → Distribution to Surabaya and Jakarta	5	6.10
4	Farmer → Middleman → PT Japfa → Distribution to Surabaya, Jakarta, Sumatra, and Kalimantan	71	86.59

Source: Processed Primary Data, 2025

Table 1 shows four main distribution channels in hybrid corn marketing in Labuan District.

Farmers, as the initial actors, distribute their harvest through processors, middlemen, Gudang Talise, PT Loan, and PT Japfa before it finally reaches end consumers. Farmers stand at the beginning of the chain, while final consumers are the endpoint of the entire distribution flow. This pattern shows that the hybrid corn value chain in Labuan District is still relatively simple but involves significant intermediaries.

The middleman pathway accounts for 71 of the 82 surveyed farmers (86.59%). The observed middlemen were aged approximately 40–45 years, with two to three years of trading experience, operating capital of approximately Rp3–18 million, and seasonal purchases of roughly 7–120 tonnes. They buy from farmers, organize transport, loading and packaging, and in some cases provide weighing or drying services. These functions and access to credit help explain their prominence despite a lower recorded farmer price. These descriptive ranges should not be interpreted as sample means or causal effects.

However, different findings by Akbar *et al.* [15] show that consignment-based marketing systems are not optimal, because farmers find it difficult to determine prices, making it harder to meet their living needs and continue farming activities. On the other hand, Gudang Talise (1.22%) and PT Loan (6.10%) offer better prices, although not all farmers have access to these markets. Corn marketed through Gudang Talise and PT Loan is distributed to Surabaya and Jakarta, whereas corn supplied to PT Japfa is distributed to Surabaya, Jakarta, Sumatra, and Kalimantan. A similar pattern of dominant local intermediaries and price differences among actors in hybrid corn marketing also occurs in Ciamis [6,16].

3.4. Marketing Margin and Farmers' Share

Marketing margins and farmers' shares were calculated based on observed transactions between farmers and their immediate buyers rather than final-consumer prices. Therefore, the absence of a price margin in direct marketing channels does not necessarily indicate the absence

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of marketing costs at subsequent distribution stages. Table 2 also presents farmers' net receipts after deducting marketing costs borne by farmers, as detailed in Table 3.

Table 2. Marketing Margin and Farmers' Share of Hybrid Corn in Labuan District

Channel	Farmer Price (Rp/kg)	First-Buyer Price (Rp/kg)	Marketing Margin (Rp/kg)	Farmers' Share (%)	Farmer Net Price (Rp/kg)
1	4,600.00	4,600.00	0.00	100.00	4,600.00
2	5,000.00	5,000.00	0.00	100.00	4,760.00
3	5,050.00	5,050.00	0.00	100.00	4,905.16
4	4,553.79	5,100.00	546.21	89.29	4,553.79

Source: Primary data, 2025.

In channel 1, farmers receive Rp4,600/kg from the local processor and the observed first-buyer price is also Rp4,600/kg, so the measured margin is zero and the farmers' share at this boundary is 100%. Because the processor bears the recorded Rp120/kg marketing cost, the farmer's net receipt remains Rp4,600/kg. These figures do not capture later retail margins or processing value added.

In marketing channel 2, farmers received a selling price of Rp5,000/kg and incurred marketing costs of Rp240/kg, resulting in an estimated net receipt of Rp4,760/kg. Meanwhile, in marketing channel 3, farmers received Rp5,050/kg, with an average marketing cost of Rp144.84/kg, resulting in a net receipt of Rp4,905.16/kg. Although both channels showed no price difference between farmers and their immediate buyers, marketing activities still involved costs borne by farmers. These findings indicate that farmers' net receipts are influenced not only by selling prices but also by the marketing costs associated with each channel.

Based on the transaction data of 71 farmers marketing their hybrid corn through middlemen supplying PT Japfa, the total recorded sales volume reached 369,265 kg. The volume-weighted average farm-gate price was Rp4,553.79/kg, compared with the recorded buyer price of Rp5,100/kg. This resulted in a gross marketing margin of Rp546.21/kg, with a farmers' share of 89.29%. The average marketing cost borne by intermediaries was Rp329.13/kg, resulting in an estimated margin after recorded marketing costs of Rp217.08/kg. These findings indicate that marketing intermediaries play an important role in facilitating corn distribution while incurring costs associated with marketing activities.

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3.5. Marketing Efficiency

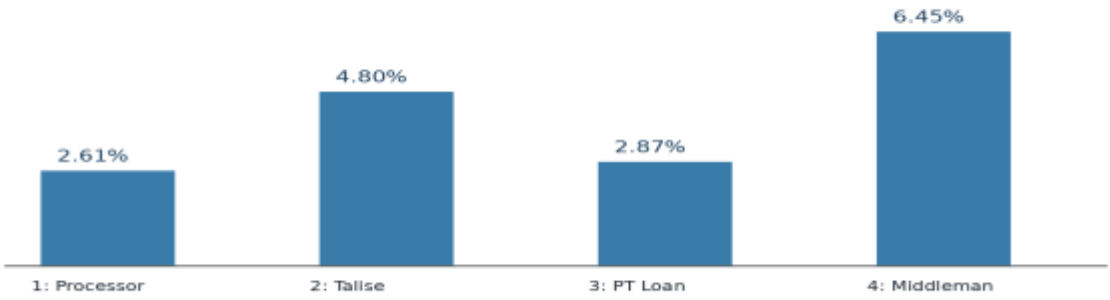
The marketing cost ratio measures recorded marketing expenditure relative to the observed first-buyer price. Lower percentages indicate lower recorded costs per rupiah of sales. The ratio does not measure overall welfare or establish absolute efficiency without a benchmark; here it is used only for comparison among the four observed channels [12].

Table 3. Marketing Costs and Marketing Cost Ratios of Hybrid Corn in Labuan District

Channel	Cost Bearer	Cost (Rp/kg)	Farmer Transaction Price (Rp/kg)	Selling Price (Rp/kg)	Marketing Cost Ratio (%)
1	Processor	120.00	4,600.00	4,600.00	2.61
2	Farmer	240.00	5,000.00	5,000.00	4.80
3	Farmer	144.84	5,050.00	5,050.00	2.87
4	Middleman	329.13	4,553.79	5,100.00	6.45

Source: Primary data, 2025.

Using quantity-weighted costs from the transaction worksheets, the marketing cost ratios are 2.61% (processor channel), 4.80% (Gudang Talise), 2.87% (PT Loan), and 6.45% (middlemen/PT Japfa).



Source: Primary data, 2025.

Figure 2. Marketing Cost Ratios by Hybrid Corn Marketing Channel in Labuan District

Figure 2 illustrates the volume-weighted marketing cost ratios across the four marketing channels, comprising 2.61% for local processors, 4.80% for Gudang Talise, 2.87% for PT Loan, and 6.45% for the middleman–PT Japfa channel. The middleman–PT Japfa channel exhibited the highest marketing cost ratio, reflecting relatively greater marketing expenditures compared with the observed transaction value. However, these costs were borne by the intermediaries

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rather than the farmers. The marketing cost ratios indicate the relative proportion of marketing expenditures to transaction prices and should not be interpreted as comprehensive measures of overall marketing efficiency.

Marketing costs in the middleman–PT Japfa channel included transportation, packaging, and handling expenses, which varied across transactions. The volume-weighted average marketing cost was Rp329.13/kg, resulting in an estimated margin after recorded marketing costs of Rp217.08/kg. This remaining margin should not be interpreted as the intermediaries' net profit, as other operating expenses and capital costs were not fully accounted for in the analysis.

4. Conclusion

Among the 82 surveyed hybrid corn farmers, 71 (86.59%) marketed their products through middlemen, five (6.10%) sold to local processors, five (6.10%) to PT Loan, and one (1.22%) to Gudang Talise. The first three marketing channels recorded a farmers' share of 100% at the observed buyer level, while the middleman–PT Japfa channel recorded a farmers' share of 89.29%. In the latter channel, the volume-weighted average farm-gate price was Rp4,553.79/kg, compared with the buyer price of Rp5,100/kg, resulting in a gross marketing margin of Rp546.21/kg. After deducting recorded marketing costs of Rp329.13/kg, the remaining margin was Rp217.08/kg. Marketing cost ratios across the four channels were 2.61%, 4.80%, 2.87%, and 6.45%, respectively. These findings indicate that marketing channels differ not only in the prices received by farmers but also in marketing costs and the services provided by intermediaries.

Improving hybrid corn marketing performance requires strengthening farmer groups, developing collective drying and transportation facilities, improving access to market information, and promoting transparent pricing based on product quality. Farmer-group marketing arrangements may also help farmers meet buyers' volume requirements and improve their bargaining position. Nevertheless, the services provided by middlemen, particularly product collection, transportation, and access to financing, should be considered when developing alternative marketing arrangements. The findings are limited to the sampled farmers in two villages of Labuan District and the observed marketing transactions. Further research involving broader marketing networks and downstream market prices is recommended to provide a more comprehensive assessment of hybrid corn marketing performance.

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