

# Supply Chain Management In Chili Pepper Arming: A Case Study Of Samawa Farm In North Aceh

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## Abstract

Chili farming is a high-value horticultural activity that often faces price fluctuations and distribution inefficiencies, highlighting the importance of effective supply chain management. This study aims to analyze the supply chain structure of chili farming at Samawa Farm located in Reuleut Timur Village, Muara Batu District, North Aceh Regency. A descriptive qualitative approach was employed using purposive sampling, with the farm owner as the main respondent and additional supply chain actors identified through snowball sampling. Data were collected through interviews, field observations, and documentation. The results indicate that the chili supply chain consists of three main components: the upstream supply chain involving input suppliers, the internal supply chain covering cultivation activities, and the downstream supply chain involving wholesalers, retailers, and final consumers. Several marketing channel variations are applied to adjust to market conditions and production volume. However, longer supply chains tend to reduce the price share received by farmers. Therefore, strengthening coordination among supply chain actors and selecting more efficient marketing channels are essential to improve farmers' income and support the sustainability of chili farming.

## Keywords:

Agribusiness, Chili, farming, Marketing Supply chain Management.

## INTRODUCTION

Chili pepper farming is a strategically important horticultural activity in Indonesia because chili is deeply embedded in household food consumption and contributes meaningfully to rural livelihoods. In the Indonesian context, chili is not only an economically important agribusiness commodity but also a food item whose supply instability can affect price stability and regional inflation. FAO further notes that chili supply chains in Indonesia are predominantly supported by smallholder farmers and play an important role in maintaining food availability and accessibility. Nevertheless, price volatility remains a persistent socioeconomic challenge in the Indonesian chili value chain, exposing farmers and other actors to substantial production and marketing risks (Mariyono & Sumarno, 2015; FAO, 2024; Muflikh et al., 2021; Muflikh et al., 2024).

From a supply chain perspective, chili pepper farming requires the coordination of product, information, and financial flows from input procurement to final consumption. Previous studies show that the Indonesian chili value chain is long, complex, and involves multiple intermediaries, while many transactions are still governed primarily by market-based mechanisms in which price becomes the main coordinating instrument. Under such conditions, smallholder farmers often remain in a weak bargaining position and face unequal reward–risk distribution, particularly when marketing channels become longer and more fragmented. Evidence from farmer-led auctions in the Javanese chili market also suggests that shortening the chain alone does not automatically improve farmers' market inclusion; payment arrangements, risk-bearing capacity, and control over trading functions are equally decisive in shaping farmers' benefits from market participation (Muflikh et al., 2023; Untari & Vellema, 2023).

Despite these important contributions, the existing literature has paid greater attention to chain-wide governance, price volatility, and collective trading arrangements than to how supply chain management is enacted within a single smallholder-based farming enterprise on a day-to-day basis. Taken together, these studies suggest a limited understanding of how input sourcing, cultivation management, marketing choices, and actor coordination interact at the farm level to

shape distribution efficiency and the share of value received by farmers, especially in specific local contexts outside the better-studied chili networks in Java. This leaves an empirical gap for farm-level studies that examine supply chain structure and coordination in a more context-specific manner (Muflikh et al., 2021; Muflikh et al., 2023; Untari & Vellema, 2023; FAO, 2024).

In this context, the chili pepper enterprise managed by Mr. Rudi (Samawa Farm) in Reuleut Timur Village, Muara Batu Sub-district, North Aceh Regency, offers a relevant case for examining supply chain management at the farm level. The farm procures inputs from local agricultural stores and online suppliers, undertakes cultivation independently, and markets harvested chili through collectors and local retailers before the product reaches consumers. Accordingly, this study aims to analyze: (1) the supply chain structure of chili pepper farming at Samawa Farm; (2) the patterns of product, information, and financial flows among actors; and (3) the implications of existing marketing channels for distribution efficiency and farmers' share. By focusing on a smallholder farming enterprise in North Aceh, this study is expected to enrich the farm-level supply chain management literature and provide practical recommendations for improving coordination, efficiency, and sustainability in chili pepper farming.

## METHODS

This study employed a purposive sampling method, which is a sampling technique based on deliberate selection according to specific criteria relevant to the research objectives. This method was chosen because the study focuses on the analysis of supply chain management in chili pepper farming; therefore, the selected respondents were required to possess direct knowledge and experience related to these activities (Sugiyono, 2021).

The primary sample in this study was Samawa Farm, a chili pepper farming enterprise owned by Mr. Rudi in Reuleut Timur Village, Muara Batu Sub-district, North Aceh Regency. The selection of this research object was based on the consideration that Mr. Rudi is an active chili pepper farmer who is directly involved in the procurement of production inputs, cultivation processes, and the marketing of harvested products. Moreover, the farming operation represents the typical conditions of small-scale chili pepper farmers commonly found in the study area. To complement supply chain information, this study also involved other actors directly related to the farming enterprise, such as input suppliers and collectors. The selection of additional informants was conducted using a snowball sampling technique, based on recommendations from the primary respondent to obtain relevant and interconnected informants within the supply chain (Creswell, 2014).

The type of data used in this study was descriptive qualitative data, consisting of primary and secondary data. Primary data were obtained through direct interviews with Mr. Rudi as the owner and manager of Samawa Farm, as well as through field observations to directly examine cultivation activities and the marketing flow of chili pepper products (Renaldi et al., 2025). Secondary data were collected from scientific journals, relevant publications, and other references related to horticultural farming and chili pepper supply chain management to strengthen the analysis and provide a theoretical context for the field findings (Dewi & Andrian, 2023).

Data collection techniques included interviews, field observations, and documentation to support the analysis of supply chain management in chili pepper horticultural cultivation at Samawa Farm. Interviews were conducted with the owner and manager to obtain in-depth information regarding cultivation practices, procurement of production inputs, and marketing mechanisms. This approach allowed for systematic yet flexible data exploration, enabling the capture of decision-making dynamics and the roles of actors within the agricultural supply chain (Creswell & Poth, 2021). Field observations were used to directly observe cultivation

processes through to product distribution, as well as to verify interview data. In addition, documentation was carried out by collecting production records and sales information as supporting data. The combination of these data collection techniques is commonly applied in horticultural supply chain research, as it enhances the accuracy and validity of research findings (Wulansari et al., 2024).

Data analysis was conducted using a descriptive qualitative approach through three main stages: data reduction, data presentation, and conclusion drawing, following qualitative analysis procedures in agricultural supply chain studies. Data obtained from interviews, observations, and documentation were processed to identify patterns of product flow, information flow, and the roles of actors within the chili pepper supply chain, as well as to map relationships among stakeholders from farmers to final consumers. Mapping techniques of this kind are widely applied in horticultural supply chain research to understand distribution structures and supply efficiency, including product and information flows from upstream to downstream actors (Febriviyanto & Zuniana, 2023)

## RESULTS AND DISCUSSION

### Result

#### Supply chain structure and actor configuration

The findings show that the chili pepper supply chain at Samawa Farm involves five main actors: input suppliers, producers, wholesalers, retailers, and final consumers. In the upstream segment, seeds, fertilizers, and farming tools are sourced from local agricultural input stores and online shops. In the internal segment, cultivation is managed directly by the producer through land preparation, planting, crop maintenance, and harvesting. In the downstream segment, harvested chili peppers are distributed through several marketing outlets before reaching final consumers. These findings indicate that Samawa Farm operates not only as a production unit but also as the central node linking input procurement, on-farm production, and product distribution.



**Figure 1. Supply chain structure of chili pepper farming at Samawa Farm**

Figure 1 illustrates the overall supply chain flow, beginning with input suppliers and continuing through production, marketing, and final consumption. The figure confirms that the farm-level supply chain is organized as an interconnected sequence of upstream, internal, and downstream activities rather than as an isolated production process. The results further show that the downstream structure includes multiple marketing actors. Producers sell chili peppers either directly to consumers, to retailers, or to wholesalers who subsequently distribute the product to retailers and final markets. This multi-actor arrangement provides marketing flexibility, especially during harvest peaks and price fluctuations, but it also creates differences in bargaining conditions and value distribution across channels.



Figure 2. Marketing channels of chili pepper distribution at Samawa Farm.

Figure 2 shows the flow of chili peppers from producers to wholesalers, retailers, and consumers, confirming that Samawa Farm uses more than one outlet to market its harvest. This pattern suggests that channel selection is adaptive and depends on both production volume and local market conditions.

#### Variations in downstream marketing channels and farmer's share

The findings identify three main downstream marketing channel variations at Samawa Farm. The first is direct selling from producers to final consumers. The second involves retailers as intermediaries. The third consists of a longer channel in which wholesalers and retailers are both involved before the product reaches consumers. Among these three patterns, direct sales provide better price advantages for producers but can only be implemented on a limited scale. In contrast, longer channels enable faster absorption of large harvest volumes but reduce the share of the final price received by farmers.



Figure 3. Variations in downstream marketing channels at Samawa Farm.

Figure 3 clearly shows that the number of intermediaries increases as the channel becomes longer. The results therefore highlight the main empirical finding of this study: the longer the marketing channel, the smaller the farmer's share received by the producer. While longer channels improve

distribution capacity, especially under conditions of high output, they also weaken the producer's share in the final market value. Based on Table 4, the standard conformity value from producers to partners reached 100%, as did that from producers to business consumers, which was also 100%. These results indicate that all oyster mushroom products distributed through both channels have met the agreed quality standards, without any deviations or deterioration in quality. This is in line with research by Sari (2015), which found that the closer the average standard compliance value is to 100%, the better the supply chain performance.

**Farm-level supply chain management cycle**

The results also show that supply chain management at Samawa Farm operates through four main stages: planning, procurement, production, and distribution. At the planning stage, the producer assesses market demand, expected production, and price conditions. At the procurement stage, inputs such as seeds, fertilizers, and tools are sourced from local and online suppliers. At the production stage, chili cultivation is carried out in open fields from land preparation to harvest. At the distribution stage, harvested chili peppers are delivered through various marketing channels depending on market conditions and product availability.



**Figure 4. Supply chain management cycle at Samawa Farm.**

Figure 4 indicates that farm-level supply chain management is not limited to post-harvest marketing, but includes a continuous sequence of decisions from planning to product delivery. The results further reveal that the internal stage is the most vulnerable point in the chain because open-field chili cultivation is highly affected by rainfall, temperature fluctuations, pests, and diseases, all of which directly influence production stability and product quality.

**Lead Time**

Based on Table 4, supply chain performance in terms of lead time indicates that it takes only one day from the manufacturer to partners, while it takes two days from the manufacturer to business consumers. Both distribution channels are classified as superior. This condition reflects that PT. Mushiro Jaya Group has an efficient and responsive distribution system, enabling it to quickly fulfill customer demand, whether it be baglog for partners or oyster mushrooms for business consumers, as soon as the order process is completed. This finding is in line with Christopher's (2016) opinion, which states that a short lead time is a key indicator of operational efficiency in the supply chain and is directly related to a company's ability to respond quickly to changes in demand.

**Discussion**

The findings confirm that supply chain management in Samawa Farm should be understood as an integrated coordination system rather than merely a post-harvest distribution mechanism. The farm does not simply produce chili peppers, but also coordinates input procurement, cultivation, marketing, and distribution decisions under conditions of uncertainty. This interpretation strengthens the argument raised in the introduction that the main challenge in chili farming lies not only in cultivation practices, but also in supply chain management that has not yet been implemented effectively and in a coordinated manner (Talitha et al., 2025). It also aligns

with broader agricultural supply chain literature showing that agri-food supply chains are shaped by interdependent decisions related to perishability, logistics, market access, and coordination among actors (Khandelwal et al., 2021; Muflikh et al., 2021). In this sense, the Samawa Farm case contributes to the literature by showing how macro-level supply chain problems become visible in everyday farm-level decisions.

Another important implication of the findings is that the internal stage functions as the critical control point in the farm-level supply chain. Chili cultivation at Samawa Farm is highly exposed to rainfall variability, temperature changes, pests, and diseases, meaning that disruptions at the production stage directly affect both downstream distribution and the final economic return to farmers. This suggests that supply chain efficiency cannot be evaluated only through the number of marketing channels or the speed of product movement, but must also consider the farm's ability to maintain continuity of supply, product quality, and harvest timing. This interpretation is consistent with FAO's analysis of chili supply chains in Indonesia, which emphasizes the importance of post-harvest loss reduction, logistics efficiency, and coordination in horticultural chains dominated by smallholders (FAO, 2024). It is also supported by studies showing that commercialization barriers for smallholders are often rooted in weak market knowledge, poor organization, and limited coordination capacity rather than in production alone (Tuni et al., 2022).

The core empirical contribution of this study is the clear finding that longer marketing channels reduce the share of the final price retained by farmers. At Samawa Farm, direct selling offers better price advantages to producers, but only on a limited scale. By contrast, channels involving wholesalers and retailers can absorb larger harvest volumes more quickly, yet they also reduce the producer's bargaining position and lower the farmer's share. This finding is consistent with Renaldi et al. (2025), who found that shorter chili supply chain structures tend to generate lower marketing margins and higher farmer's share. It also supports previous research on the Indonesian chili value chain, which shows that long and complex chains are often governed mainly through market-based price coordination, with farmers occupying a weaker bargaining position (Muflikh et al., 2023). At the same time, evidence from other developing-country settings suggests that smallholders may still rely on traditional channels because these channels remain important entry points into modern value chains, even when they do not maximize value capture at farm level (Ørtenblad et al., 2023).

However, a more critical reading of the results suggests that shortening the marketing channel alone is not sufficient to improve farmer welfare. Although direct marketing can increase the price received by producers, it does not automatically resolve structural constraints related to working capital, risk-bearing capacity, market information, and control over trading functions. This is consistent with Untari and Vellema (2022), who show that farmer-led trading arrangements are not automatically inclusive, and with Mishra et al. (2024), who argue that collaboration in agricultural value chains improves market access and product quality only when enabling conditions such as institutional support and coordination mechanisms are present. In addition, Hidayati et al. (2021) emphasize that sustainable agrifood value chain transformation in developing countries requires not only better market linkages but also stronger governance and value-added distribution mechanisms. Therefore, the practical implication of this study is that improving Samawa Farm's supply chain should not focus solely on shortening the chain, but also on strengthening coordination among actors, improving access to market information, reducing internal production risk, and enhancing farmers' bargaining capacity. This makes the study more analytically robust because it moves beyond description and shows that supply chain efficiency at farm level should be judged not only by how fast the product reaches the market, but also by how much value remains at the producer level (Muflikh et al., 2024; Mishra et al., 2024).

## CONCLUSION

This study demonstrates that chili pepper supply chain management at Samawa Farm is characterized by the interaction of multiple actors across the upstream, internal, and downstream segments, including input suppliers, producers, wholesalers, retailers, and final consumers. The principal finding is that longer marketing channels, although effective in absorbing larger harvest volumes and providing distribution flexibility under fluctuating market conditions, directly reduce the share of the final price received by farmers. This indicates that supply chain performance should not be evaluated solely in terms of distribution efficiency, but also in relation to the extent to which value is retained at the producer level. The study further shows that the internal stage of the chain is a critical control point, as production performance is highly dependent on technical cultivation management and directly influences product quality, supply continuity, and downstream marketing outcomes. Accordingly, improving the sustainability and economic viability of chili pepper farming requires not only shorter and more efficient marketing channels, but also stronger coordination among supply chain actors, improved market information flows, and enhanced bargaining capacity for farmers. Overall, the findings underline that farm-level supply chain improvement is both a distributional and governance issue, rather than merely a matter of marketing arrangement.

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