Vol 1 No 8 2024 || E-ISSN 2997-7258

The Journal of Academic Science

journal homepage:
https://thejoas.com/index.php/

Supply Chain Performance of Red Chili: From Farm to Market in Jambi, Indonesia

Ira Wahyuni
Faculty of Agriculture Universitas Jambi, Muaro Jambi, Provinsi Jambi, Indonesia
Email: irawahyunirikit@unja.ac.id

KEYWORDS
red chili supply chain, agricultural logistics, smallholder farmers, supply chain efficiency, jambi, indonesia

ABSTRACT
This study evaluates the performance of the red chili supply chain in Jambi, Indonesia, by employing qualitative methods, including literature review and library research. The research investigates critical factors affecting the supply chain, from farm-level production to market distribution, focusing on the dynamics of stakeholders, logistics, market access, and supply chain coordination. Findings reveal that inefficiencies persist due to limited infrastructure, poor coordination among actors, and fluctuating market demand. At the farm level, challenges such as price volatility and inadequate post-harvest handling reduce farmers' bargaining power and profitability. In the distribution phase, transportation bottlenecks and a lack of cold storage facilities result in significant product losses. Market-level analysis shows that smallholder farmers often rely on intermediaries, which reduces transparency and increases transaction costs. The study highlights the need for integrated supply chain management strategies, incorporating improved infrastructure, better coordination mechanisms, and policy interventions to enhance efficiency and equity. By synthesizing existing literature, the research contributes to understanding supply chain challenges and opportunities for red chili production and distribution in Jambi. These findings provide actionable insights for policymakers, practitioners, and stakeholders seeking to optimize agricultural supply chains in similar contexts.

1. INTRODUCTION

The red chili is one of Indonesia's most significant horticultural commodities, contributing to household incomes and national agricultural output. In Jambi Province, red chili production is a key livelihood for many smallholder farmers. However, the supply chain, from farm-level production to market distribution, faces persistent challenges, including post-harvest losses, inadequate infrastructure, and market inefficiencies (Sekhar & Thapa, 2021). These issues impede the growth potential of red chili agribusiness and necessitate a comprehensive evaluation of its supply chain performance.

Existing studies on agricultural supply chains have largely focused on staple crops such as rice and maize, leaving a research gap in horticultural commodities like red chili (Pasangka & Wahid, 2021). Moreover, while studies have addressed supply chain challenges at the national level, regional disparities in infrastructure, market access, and farmer coordination remain underexplored (Hu & Zhang, 2024). Jambi, as an emerging agricultural hub, provides a unique case for

examining supply chain dynamics specific to red chili.

This study is particularly urgent as inefficiencies in the supply chain directly impact farmers' incomes, market prices, and consumer affordability. The rising demand for red chili domestically and internationally underscores the importance of addressing these inefficiencies to enhance the competitiveness of Jambi's chili industry (Andelia et al., 2022). By identifying bottlenecks and proposing evidence-based interventions, this research contributes to food security and rural economic development.

Building on prior research, this study uniquely employs a qualitative approach, synthesizing literature and library research to provide a holistic understanding of the supply chain from production to market. The novelty lies in its focus on Jambi's localized supply chain dynamics, offering context-specific insights and recommendations.

The study aims to evaluate the performance of the red chili supply chain in Jambi and propose strategies for improving its efficiency and equity. The findings are expected to benefit policymakers, supply chain actors, and researchers by offering actionable insights and addressing critical gaps in the literature. By doing so, this research supports sustainable agricultural development and enhances the livelihoods of smallholder farmers in Jambi.

(Lestari et al., 2024) examined the supply chain of horticultural commodities in West Java, focusing on price volatility and its impact on farmer income. The study highlighted that fragmented supply chain coordination exacerbates price instability, reducing farmers' profitability. However, it did not consider the influence of regional logistics and infrastructure on supply chain efficiency.

(Rachmaniah et al., 2022) analyzed red chili distribution networks in Central Java, emphasizing post-harvest losses due to inadequate storage and transportation facilities. The research identified technical inefficiencies but did not explore the socio-economic factors influencing smallholder farmers' access to markets.

(Nugroho et al., 2022) investigated the role of intermediaries in the chili supply chain in East Java, finding that excessive reliance on middlemen increased transaction costs. While the study provided insights into the economic impact of intermediaries, it lacked a comprehensive analysis of alternative distribution strategies.

(Rohaeni et al., 2023) conducted a case study on the red chili supply chain in Sumatra, identifying policy gaps that hinder market integration. The research focused primarily on policy interventions but overlooked operational challenges, such as logistics and farmer collaboration.

(Prasetyo et al., 2023) explored sustainability practices in chili supply chains across Indonesia, revealing the importance of environmentally friendly practices. However, the study did not address specific challenges faced by farmers in different regions, particularly in less developed agricultural provinces like Jambi.

2. METHOD

This study adopts a qualitative research approach to explore the supply chain performance of red chili in Jambi, Indonesia, with an emphasis on understanding the dynamics from production to market

distribution. The qualitative design allows for a comprehensive examination of the contextual, social, and economic factors influencing the supply chain.

Type of Research
The research is descriptive-analytical, aiming to provide a detailed narrative of the supply chain's operational and socio-economic dimensions. It focuses on identifying inefficiencies, challenges, and opportunities for improvement within the supply chain.

Data Sources
The study relies on secondary data obtained from peer-reviewed journal articles, government reports, and statistical publications. Additionally, reports from relevant organizations, such as the Ministry of Agriculture and trade associations, are utilized. These sources provide insights into production trends, market dynamics, and policy frameworks impacting the supply chain.

Data Collection Techniques
Data collection is conducted using literature review and library research methods. Literature relevant to agricultural supply chains, with a focus on red chili, is systematically reviewed to identify patterns, bottlenecks, and best practices. Library research ensures access to credible academic sources and policy documents.

Data Analysis Methods
Data is analyzed using content analysis, wherein themes and patterns related to supply chain efficiency, farmer-market linkages, and infrastructure challenges are systematically identified. The analysis involves categorizing data into thematic groups, such as production inefficiencies, distribution challenges, and policy gaps, to derive actionable insights. Triangulation is employed to validate findings by cross-referencing multiple sources.

3. RESULT AND DISCUSSION

The analysis of the red chili supply chain in Jambi, Indonesia, reveals a complex network of interconnected actors and processes that face significant inefficiencies and challenges from production to market distribution(Negi & Anand, 2018). At the production level, smallholder farmers dominate the supply chain, relying on traditional farming practices with limited access to modern agricultural technologies and inputs(Asfaw et al., 2012). This results in inconsistent yield quality and quantity, which are further exacerbated by external factors such as weather variability and pest outbreaks. Additionally, farmers face difficulties in negotiating fair prices due to their dependence on intermediaries, who often dominate the pricing mechanisms in the absence of direct access to markets(Hemphill, 2008).

Transportation and logistics emerge as critical bottlenecks within the supply chain. Poor road infrastructure and inadequate transportation facilities lead to significant delays and post-harvest losses(Dos Santos et al., 2020). The lack of cold storage further compounds these issues, especially given the perishable nature of red chili(Jalgaonkar et al., 2024). As a result, a considerable portion of the produce deteriorates before reaching the market, reducing the overall profitability for farmers and inflating costs for consumers(Sexton, 2013).

At the market level, the dominance of intermediaries in distribution channels limits transparency and increases transaction costs. Smallholder farmers often rely on local traders

or brokers, who act as intermediaries between producers and larger market players. While this arrangement facilitates market access for farmers, it also diminishes their bargaining power and reduces their share of the final retail price(Matsui, 2022). Furthermore, price volatility in the red chili market, driven by seasonal fluctuations and inconsistent supply, adversely affects both producers and consumers.

Policy interventions have been limited in addressing these structural issues effectively. Existing agricultural policies focus primarily on increasing production without adequately addressing post-harvest management, logistics, or market integration. The lack of coordinated efforts among stakeholders further hampers the development of a streamlined and efficient supply chain(Mangla et al., 2018).

The discussion underscores the need for a holistic approach to supply chain management, integrating improvements in infrastructure, logistics, and farmer-market linkages. Establishing farmer cooperatives or partnerships with agribusiness firms could enhance collective bargaining power and improve access to resources. Investments in cold storage facilities and transportation infrastructure are essential to reduce losses and maintain product quality(Verghese et al., 2015). Additionally, implementing policies that promote direct farmer-market interactions, such as digital platforms for trading, could increase transparency and ensure fair pricing. By addressing these challenges, the red chili supply chain in Jambi has the potential to significantly improve efficiency, equity, and sustainability, benefiting all stakeholders involved(Bal et al., 2013).

Overview of Red Chili Supply Chain in Jambi

The red chili supply chain in Jambi consists of multiple actors, including smallholder farmers, intermediaries, wholesalers, retailers, and consumers. The production process begins at the farm level, where most farmers lack access to modern agricultural technology and rely on traditional methods. This reliance limits productivity and results in inconsistent yields. Intermediaries play a pivotal role in transporting products from farms to markets, often exploiting smallholders by dictating prices. Wholesalers and retailers distribute red chili to urban and rural consumers, but inefficiencies in the supply chain increase final costs to consumers. This fragmented system lacks transparency and coordination among actors, leading to inefficiencies.

Production Challenges at the Farm Level

Farm-level challenges significantly impact the overall supply chain. Smallholder farmers in Jambi face issues such as low-quality seeds, limited access to fertilizers, and poor irrigation infrastructure. These constraints result in low productivity and reduce the quality of harvested chili. Price volatility is another major issue, as farmers lack bargaining power and are often forced to sell their produce at low prices during harvest gluts. Additionally, inadequate post-harvest handling, such as improper drying and sorting techniques, leads to product losses. Without adequate support from agricultural extension services, farmers struggle to adopt practices that could improve productivity and quality.

Post-Harvest Handling and Storage

Post-harvest handling is a critical stage where significant losses occur. The lack of appropriate storage facilities in Jambi exacerbates product spoilage, particularly during peak production seasons. Farmers and intermediaries often

transport red chili in bulk without adequate packaging, leading to physical damage. The absence of cold storage facilities further limits the ability to extend shelf life, forcing rapid sales at suboptimal prices. These inefficiencies increase waste and reduce the economic value of the chili supply chain(Bustos & Moors, 2018).

Transportation and Logistics Bottlenecks

Transportation inefficiencies are a major obstacle in Jambi's red chili supply chain. Poor road infrastructure and inadequate transportation options delay the movement of goods from farms to markets. Long transit times result in product degradation, particularly in the absence of temperature-controlled transport. Additionally, high transportation costs disproportionately affect smallholders, who often bear these expenses. These logistical challenges reduce the competitiveness of Jambi's chili in regional and national markets, limiting opportunities for market expansion.

Role of Intermediaries and Market Dynamics

Intermediaries dominate the red chili supply chain in Jambi, acting as key linkages between farmers and end markets. While they provide essential services, such as credit and market access, their practices often result in inefficiencies and inequities. Farmers rely heavily on intermediaries due to a lack of direct access to markets, which reduces their bargaining power. This dependency leads to unfair pricing practices and high transaction costs. Moreover, intermediaries frequently prioritize short-term profits over long-term sustainability, further destabilizing the supply chain.

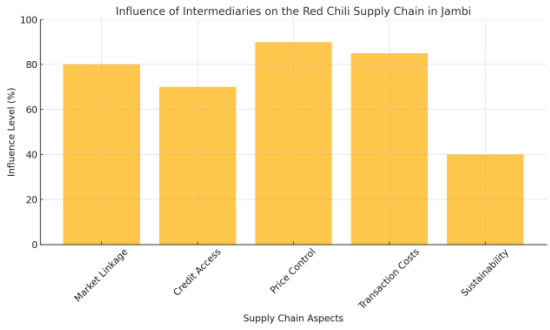

Figure 1. Grafik influence of intermediaries on different aspects of the red chili supply chain in Jambi

Figure Description:

The bar chart illustrates the influence of intermediaries on different aspects of the red chili supply chain in Jambi. Intermediaries dominate key areas such as market linkage (80%) and credit access (70%), providing essential services that connect farmers to markets and finance. However, their control over pricing (90%) and contribution to high transaction costs (85%) highlights inefficiencies and inequities in the supply chain. Notably, their minimal engagement in sustainable practices (40%) underlines the focus on short-term profits over long-term stability. This heavy reliance on intermediaries results in reduced farmer bargaining power and destabilizes the supply chain.

Policy and Institutional Gaps

Government policies and institutional support for the red chili supply chain in Jambi remain insufficient. While national agricultural policies emphasize productivity and competitiveness, implementation at the regional level is weak. Farmers report limited access to subsidized inputs, credit schemes, and training programs designed to improve agricultural practices. Additionally, the lack of coordination between agricultural, trade, and infrastructure

development agencies hinders the creation of an integrated supply chain strategy. Addressing these policy and institutional gaps is critical for improving efficiency and equity in the supply chain.

Opportunities for Supply Chain Integration

There is significant potential for integrating Jambi's red chili supply chain through targeted interventions. Establishing farmer cooperatives can strengthen smallholder bargaining power and reduce reliance on intermediaries. Investments in infrastructure, such as cold storage and improved transportation networks, can minimize post-harvest losses and enhance market access. Digital platforms that connect farmers directly with buyers have also shown promise in reducing transaction costs and increasing transparency. These strategies can promote a more efficient and equitable supply chain.

Implications for Economic and Social Sustainability

Improving the red chili supply chain in Jambi has broader implications for economic and social sustainability. Enhancing supply chain efficiency can increase farmer incomes and stabilize market prices, benefiting both producers and consumers. Moreover, sustainable practices, such as environmentally friendly farming and waste reduction, can strengthen resilience against climate change. By addressing the challenges in the supply chain, stakeholders can contribute to rural development, food security, and poverty alleviation in Jambi.

Each of these aspects highlights the interconnected challenges and opportunities within the red chili supply chain. By addressing these issues comprehensively, the supply chain can evolve into a more efficient, sustainable, and equitable system.

4. CONCLUSION

The performance of the red chili supply chain in Jambi, Indonesia, is hindered by inefficiencies at multiple levels, including farm-level production, post-harvest handling, transportation, and market dynamics. Smallholder farmers face challenges such as low productivity, inadequate access to modern farming inputs, and price volatility, while the lack of proper storage and transportation infrastructure exacerbates product losses. Intermediaries play a significant yet often inequitable role, contributing to reduced transparency and high transaction costs. Policy and institutional gaps further limit the effectiveness of interventions aimed at improving supply chain efficiency. To address these issues, a more integrated approach is necessary, including investments in infrastructure, the establishment of farmer cooperatives, and the adoption of digital technologies to connect farmers directly with markets. These measures can enhance the efficiency, equity, and sustainability of the red chili supply chain, benefiting both producers and consumers while contributing to the broader economic development of Jambi Province.

5. REFERENCES

Andelia, S. R., Wardani, F., Novriana, Z., Adriani, D., Yanuarti, A., & Saputra, D. (2022). Development Strategy of Farming. *7th Sriwijaya Economics, Accounting, and Business Conference (SEABC 2021)*, 128–135.

Asfaw, S., Shiferaw, B., Simtowe, F., & Lipper, L. (2012). Impact of modern agricultural technologies on smallholder welfare:

Evidence from Tanzania and Ethiopia. *Food Policy*, *37*(3), 283–295.

Bal, M., Bryde, D., Fearon, D., & Ochieng, E. (2013). Stakeholder engagement: Achieving sustainability in the construction sector. *Sustainability*, *5*(2), 695–710.

Bustos, C. A., & Moors, E. H. M. (2018). Reducing post-harvest food losses through innovative collaboration: Insights from the Colombian and Mexican avocado supply chains. *Journal of Cleaner Production*, *199*, 1020–1034.

Dos Santos, S. F., Cardoso, R. de C. V., Borges, Í. M. P., e Almeida, A. C., Andrade, E. S., Ferreira, I. O., & do Carmo Ramos, L. (2020). Post-harvest losses of fruits and vegetables in supply centers in Salvador, Brazil: Analysis of determinants, volumes and reduction strategies. *Waste Management*, *101*, 161–170.

Hemphill, C. S. (2008). Network neutrality and the false promise of zero-price regulation. *Yale J. on Reg.*, *25*, 135.

Hu, Z., & Zhang, Q. F. (2024). Alternative agrifood systems and the economic sustainability of farmers' cooperatives: The Chinese experience. *Sustainable Development*.

Jalgaonkar, K., Mahawar, M. K., Girijal, S., & Hp, G. (2024). Post-harvest profile, processing and value addition of dried red chillies (Capsicum annum L.). *Journal of Food Science and Technology*, *61*(2), 201–219.

Lestari, E. P., Prajanti, S. D. W., Adzim, F., Mubarok, F., & Hakim, A. R. (2024). Assessing Production and Marketing Efficiency of Organic Horticultural Commodities: A Stochastic Frontier Analysis. *Economies*, *12*(4).

Mangla, S. K., Luthra, S., Mishra, N., Singh, A., Rana, N. P., Dora, M., & Dwivedi, Y. (2018). Barriers to effective circular supply chain management in a developing country context. *Production Planning & Control*, *29*(6), 551–569.

Matsui, K. (2022). Should a retailer bargain over a wholesale price with a manufacturer using a dual-channel supply chain? *European Journal of Operational Research*, *300*(3), 1050–1066.

Negi, S., & Anand, N. (2018). Factors leading to supply chain inefficiency in agribusiness: evidence from Asia's largest wholesale market. *International Journal of Value Chain Management*, *9*(3), 257–288.

Nugroho, H. Y. S. H., Nurfatriani, F., Indrajaya, Y., Yuwati, T. W., Ekawati, S., Salminah, M., Gunawan, H., Subarudi, S., Sallata, M. K., & Allo, M. K. (2022). Mainstreaming ecosystem services from Indonesia's remaining forests. *Sustainability*, *14*(19), 12124.

Pasangka, B., & Wahid, A. (2021). Genetic Engineering of Local Cayenne Pepper (Capsicum frustescens L.): Through Breeding with Multigamma Irradiation Methods to Obtain Superior Offspring. *Journal of Agricultural Science*, *13*(12), 81–90.

Prasetyo, T., Arianti, F. D., Jauhari, S., Setiani, C., Cempaka, I. G., Pertiwi, M. D., Wulanjari, M. E., Jatuningtyas, R. K., Purwaningsih, H., & Basuki, S. (2023). Inclusive rice seed business: Performance and sustainability. *Open Agriculture*, *8*(1), 20220236.

Rachmaniah, M., Suroso, A. I., Syukur, M., & Hermadi, I. (2022). Supply and demand model for a chili enterprise system using a simultaneous equations system. *Economies*, *10*(12), 312.

Rohaeni, E. S., Santoso, A. D., Ariningsih, E., Widaningsih, N., Hutahaean, L., Priyanto, D., Ilham, N., Suharyon, S., Herdis, H., & Widiawati, Y. (2023). Analysing the sustainability of swamp buffalo (Bubalus bubalis carabauesis) farming as a protein source and germplasm. *Open Agriculture*, *8*(1), 20220224.

Sekhar, C. S. C., & Thapa, N. (2021). *Agricultural Market Imperfections And Farm Profitability In India*. Institute of Economic Growth, University of Delhi.

Sexton, R. J. (2013). Market power, misconceptions, and modern agricultural markets. *American Journal of Agricultural Economics*, *95*(2), 209–219.

Verghese, K., Lewis, H., Lockrey, S., & Williams, H. (2015). Packaging's role in minimizing food loss and waste across the supply chain. *Packaging Technology and Science*, *28*(7), 603–620.