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Coffee Supply Chain in West Sumatra: A Systematic Literature Review

Hendra Saputra[1]*, Imelda Yunita[2], Rozalia[1], Emil Salim[3]
[1]Department of Agro-industrial Technology, Faculty of Agricultural Technology, Universitas Andalas, Indonesia
[2]Agro-industrial Study Program, Department of Agricultural Technology, Faculty of Agriculture, Universitas Riau, Indonesia
[3]Graduate School of Engineering, Gifu University, Japan
*Corresponding author, e-mail: hendra.saputra@ae.unand.ac.id

Abstract—This systematic literature review explores the coffee supply chain in West Sumatra, a region renowned for its strong agricultural heritage and substantial coffee production. The study aims to synthesize previous research and identify key factors influencing the supply chain stages—production, processing, marketing, and distribution. Using a structured methodology based on systematic review protocols, this research integrates findings from various academic sources to provide a comprehensive understanding of the topic. The reviewed literature reveals both challenges and opportunities within the West Sumatran coffee supply chain. Major challenges include post-harvest quality management, limited market access, and low adoption of sustainable practices, all of which affect competitiveness. The findings highlight the importance of effective governance and stakeholder collaboration in improving operational efficiency and market adaptability. Additionally, technological innovation and digital marketing are recognized as crucial in transforming the supply chain, supporting smallholder farmers, and expanding market reach. Overall, this review underscores the complexity and significance of West Sumatra's coffee supply chain, emphasizing the need for integrated, sustainable, and innovative strategies to strengthen resilience and global competitiveness.

Keywords: Coffee, Supply chain, Systematic literature review

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1. Introduction

The coffee supply chain in West Sumatra is an intricate web connecting farmers, producers, distributors, and consumers. Understanding this chain is crucial, as coffee is a significant economic driver in the region, deeply rooted in both cultural and agricultural practices. This systematic literature review examines the evolution, challenges, and opportunities within the coffee supply chain in West Sumatra, drawing on a variety of academic contributions that illuminate this multifaceted industry.

Recent research indicates a transformative trend among coffee businesses in Padang, highlighting their transition from unplanned to sustainable enterprises. Factors such as prioritizing quality and employing technology have been instrumental in fostering these changes, underscoring the importance of sustainable practices in the coffee sector [1]. The significance of sustainable practices cannot be overstated, especially given the increasing demand for ethically sourced products in international markets, which underscores the need for the coffee supply chain in West Sumatra to align with global sustainability standards [2].

Moreover, the local coffee production landscape is heavily influenced by biological factors, particularly post-harvest issues such as fungal infections that impact Arabica coffee beans in the region [3]. This aspect reveals the vulnerabilities faced by farmers and the broader supply chain, necessitating robust post-harvest management strategies to maintain quality and meet market demands.

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Additionally, research into the specific marketing channels utilized in regions like Solok City has provided insights into the complexities of coffee distribution, emphasizing the need for effective communication and collaboration among various stakeholders, including farmers, collectors, and wholesalers [4]. This analysis illustrates how discrepancies in outcomes often lead to inefficiencies throughout the supply chain, impacting profitability for smallholder farmers.

Digital marketing's role in the coffee supply chain cannot be overlooked, especially during periods of disruption such as the COVID-19 pandemic. The shift towards online platforms has introduced new challenges and opportunities for local coffee producers, requiring adaptation to rapidly changing consumer behaviors and market conditions [2]. Moreover, the governance of the coffee value chain is crucial in enhancing efficiency and reducing costs, as highlighted in studies assessing value chain governance frameworks [5].

Agricultural practices in West Sumatra, particularly the integration of agroforestry systems for coffee cultivation, have emerged as critical to sustainable development goals [6]. This highlights the dual role of coffee not only as an economic asset but also as a strategic component in regional environmental stability. As a result, the growth of the coffee supply chain in West Sumatra is not merely a matter of economic expansion but is also intricately linked to social welfare and ecological sustainability.

The systematic review of the coffee supply chain in West Sumatra reveals an ecosystem characterized by dynamic shifts driven by sustainability, technological adoption, and the resilience of local producers. By integrating various perspectives from multiple studies, this review aims to provide a comprehensive overview of the coffee industry's present conditions and future opportunities within this vibrant region.

2. Method

This systematic literature review employs a structured approach to analyze existing research relating to the coffee supply chain in West Sumatra. The methodology entailed several key steps: defining the research scope, literature search, selection criteria, data extraction, and synthesis of findings. This approach ensures a comprehensive and unbiased assessment of the available literature, allowing for the identification of patterns, gaps, and emerging themes within the field. Each stage was conducted systematically to enhance the reliability and validity of the review results, ensuring that the conclusions drawn are based on credible and relevant sources.

2.1 Defining the Research Scope

The coffee supply chain is an integrated system encompassing all stages from production at the farm level to the final product received by consumers. Within this system, each actor such as farmers, collectors, processors, exporters, and market players plays a vital role in maintaining the continuity of material, information, and economic value flows. A comprehensive understanding of the coffee supply chain is essential to improve efficiency, quality, and competitiveness of coffee commodities, particularly in producing regions such as West Sumatra.

The research was framed to understand the multifaceted aspects of the coffee supply chain, covering production, processing, marketing, and sustainability challenges. Special emphasis was placed on identifying factors influencing the quality of coffee, post-harvest management practices, and the marketing channels utilized by farmers and local businesses in West Sumatra.

2.2 Literature Search

The literature search process was conducted systematically to ensure that all references used were directly relevant to the topic of the coffee supply chain in West Sumatra. The search procedure included the identification of primary sources, screening based on publication year and document type, and evaluation of the quality and credibility of the journals reviewed. In addition, each selected article

was analyzed based on its research focus, methodology, and contribution to the understanding of production, processing, marketing, and sustainability within coffee supply chain.

A comprehensive literature search was conducted using several academic databases such as Scopus, Google Scholar, and institutional repositories through Publish or Perish. Relevant keywords included "coffee supply chain", "West Sumatra coffee", "post-harvest quality", "coffee marketing channels", and "sustainable coffee practices". The search was limited to peer-reviewed articles published in English or Indonesian between 2010 and 2024 to ensure the inclusion of recent and relevant research. Some search results were abstract-mapped using Vos Viewer.

2.3 Selection Criteria

Peer-reviewed articles specifically addressing aspects of the coffee supply chain in Indonesia or comparative studies from similar contexts. Studies focus on post-harvest processing, quality assessment, marketing channels, and supply chain governance. Exclusion criteria included works that are not empirical studies, non-peer-reviewed articles, and studies that lack specific relevance to the coffee supply chain context in West Sumatra.

2.4 Data Synthesis of Findings

The selected articles (approximately 30 studies meeting the criteria) were reviewed in detail to extract key information related to methodologies, findings, and discussions. Data from the selected studies were synthesized qualitatively to provide a coherent overview of the coffee supply chain in West Sumatra. The synthesis culminated in identifying gaps in the literature and the need for future research directions focusing on specific challenges, such as climate change impacts on coffee production and emerging market trends for specialty coffee

3. Result and Discussion

The Systematic Literature Review (SLR) is a research method carried out in a structured and organized way to collect and review previous studies related to a specific research question. The systematic literature review conducted on the coffee supply chain in West Sumatra reveals a complex network of interactions among various stakeholders, alongside the numerous challenges facing the industry. These findings underscore critical themes that can influence the viability and sustainability of coffee production in the region. To obtain a more comprehensive understanding of the direction and interconnection of research topics, a mapping of the Sumatran coffee supply chain research network was conducted. This mapping aims to identify the realitionships among themes, dominant keywords, and emerging research trends based on the analyzed literature. The resulting visualization provides on overview of the academic focuses. Figure 1 presents the Sumatran Coffee Supply Chain Research Area Network generated using VOSviewer.

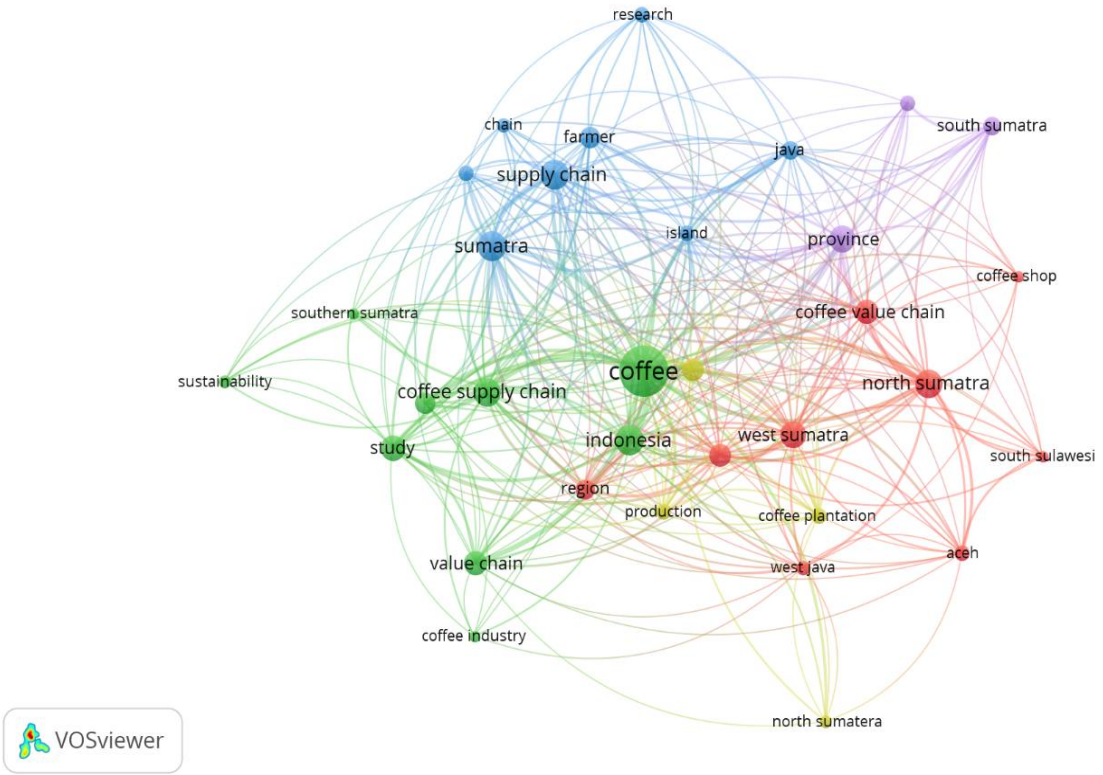


Figure 1. Sumatran coffee supply chain research area network

The coffee supply chain research network in Sumatra shows several keywords: coffee industry, West Sumatra, South Sumatra, Lampung, supply chain, production, sustainability, farmers, Java, coffee plantations, Aceh. This shows that coffee supply chain studies still need to be carried out and development.

3.1 Supply Chain Structure and Dynamics

The analyzed literature highlights that the coffee supply chain in West Sumatra includes multiple actors: farmers, collectors, processors, traders, and retailers. Effective coordination among these groups is vital for improving overall supply chain efficiency. The importance of aligning operations within the supply chain to address inefficiencies is emphasized in various studies, which assert that mapping product, information, and financial flows within supply chains can significantly enhance understanding and facilitate improvement strategies [1], [7], [8], [9].

3.2 Critical Quality and Sustainability Issues

A pervasive issue identified is the challenge of maintaining coffee quality, particularly post-harvest quality, affected by fungal infections such as Aspergillus spp. This concern is corroborated by research documenting the prevalence of such infections in Arabica coffee beans in West Sumatra [2], [3], [10]. The implications of these quality issues are profound, as they not only diminish marketability but also threaten the sustainability of production practices. Furthermore, investment in training and technology to support sustainable practices is crucial for long-term economic benefits in agriculture [11], [12], [13], [14], [15], [16].

3.3 Marketing Channels and Market Access

The literature indicates that effective marketing is crucial for improving the revenue of coffee producers. analyze marketing channels in Solok City, suggesting that better access to markets and awareness of consumer preferences are paramount for improving farmers' profitability. These findings resonate with studies focusing on the value of market orientation and the role of consumer trends in shaping production strategies. Aligning production with consumer preferences can lead to enhanced firm performance within the coffee industry [5], [17], [18], [19], [20].

3.4 The Role of Technology in Transformation

Technological advancements serve as a pivotal factor in transforming the coffee supply chain. The increasing shift towards digital marketing, especially during crises like the COVID-19 pandemic, is significant for accessing broader markets [6]. The adoption of innovative processing methods and digital platforms can provide farmers with an essential advantage. Embracing new technologies and business models is crucial for maintaining competitiveness in evolving markets, as discussed in the literature on innovation across various sectors [21], [22], [23].

3.5 Future Research Directions

The comprehensive review indicates several gaps conducive to further exploration. For instance, the need for empirical studies focusing on local knowledge and traditional practices in coffee cultivation can enrich current understanding. Understanding local wisdom can supplement sustainable agricultural practices and foster more resilient supply chains [24]. Additionally, investigating the impact of climate change and varying environmental factors on coffee quality and productivity remains a pressing area for future research [21], [25], [26], [27].

One significant area that has received limited attention is the role of local knowledge and traditional practices in coffee cultivation. Empirical studies that emphasize the values of local wisdom have the potential to enrich the current understanding of coffee farming systems. Integrating local knowledge with sustainable agricultural principles can offer a more holistic approach, thereby strengthing the economic and social resilience of stakeholders within the coffee supply chain.

In addition, the impact of climate change and environmental variability on coffee quality and productivity remains a critical issue requiring deeper investigation. Research in this area will provide clearer insights into how production systems adapt to dynamic climatic conditions. Consequently, future studies are expected to contribute to the development of effective mitigation and adaptation strategies to ensure the sustainability of coffee production across producing regions, including West Sumatera.

4. Conclusion

This systematic literature review highlights the intricate dynamics of the coffee supply chain in West Sumatra, underscoring key challenges and opportunities that exist within this critical agricultural sector. The findings reveal that while coffee remains an economically vital crop for the region, addressing critical issues related to quality, sustainability, and market access is imperative for enhancing the resilience and competitiveness of local producers.The supply chain structure comprises multiple stakeholders, each playing a crucial role in determining the overall efficacy of the chain. Collaboration and effective governance among these actors are essential for optimizing product flow, information exchange, and financial management. Moreover, the prevalence of post-harvest challenges, particularly quality degradation due to fungal infections, necessitates the implementation of stringent quality control measures and sustainable agricultural practices.

Enhancing the coffee supply chain in West Sumatra will require a multifaceted approach focused on stakeholder collaboration, quality improvement, and leveraging technological innovations. With strategic interventions based on the insights from this review, the coffee industry in West Sumatra has the potential not only to sustain its economic contributions but also to thrive in an increasingly competitive global market.

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References

[1] H. A. Riswanto, M. Maruf, and S. Syafrizal, "Sustainable Evolution: Investigating the Factors Contributing to the Transformation of Coffee Businesses From Unplanned to Well-Planned, Sustainable Enterprises in Padang," *JMKSP (Jurnal Manaj. Kepemimp. Dan Supervisi Pendidikan)*, vol. 9, no. 1, pp. 711–730, 2024, doi: 10.31851/jmksp.v9i1.15193.

[2] M. Kurniawan, K. Normasyhuri, and E. Pujianti, "Transformation of Digital Marketing the Coffee Production in COVID-19 Pandemic : Islamic Economic Paradigm," *Al-Falah J. Islam. Econ.*, vol. 8, no. 1, p. 31, 2023, doi: 10.29240/alfalah.v8i1.5618.

[3] M. Martinius, A. Fauzi, and Z. Resti, "Post-Harvest Fungal Infection in Arabica Coffee Beans (Coffea Arabica Linnaeus) in the Coffee Center of West Sumatra Province, Indonesia," *JPT J. Prot. Tanam. (Journal Plant Prot.*, vol. 6, no. 2, p. 1, 2022, doi: 10.25077/jpt.6.2.1-10.2022.

[4] N. Azzahra, V. I. Mutiara, and R. Hariance, "Comparative Assessment of Robusta Coffee Marketing Channels in Solok City, West Sumatra," *J. Agribus. Community Empower.*, vol. 7, no. 2, pp. 71–80, 2024, doi: 10.32530/jace.v7i2.780.

[5] A. Suryana, H. Harianto, Y. Syaukat, and H. Harmini, "The Value Chain Governance of Robusta Coffee in Bogor Regency," *J. Manaj. Dan Agribisnis*, 2023, doi: 10.17358/jma.20.2.175.

[6] D. Kusumaningrum, A. Risyad, J. A. Siagian, K. Melinda, and M. Tisyadana, "The Potency of Coffee Plants in Agroforestry System in Baringin Village, Agam Regency, West Sumatra to Support Social Forestry Program and Its Contribution to Mitigate Climate Change," *Iop Conf. Ser. Earth Environ. Sci.*, vol. 1315, no. 1, p. 12017, 2024, doi: 10.1088/1755-1315/1315/1/012017.

[7] M. Irjayanti and A. M. Azis, "How Well Is the Coffee Business Supply Chain Performing in West Java?," *Holistica – J. Bus. Public Adm.*, vol. 14, no. 1, pp. 173–185, 2023, doi: 10.2478/hjbpa-2023-0010.

[8] A. Adane and W. Bewket, "Effects of Quality Coffee Production on Smallholders' Adaptation to Climate Change in Yirgacheffe, Southern Ethiopia," *Int. J. Clim. Chang. Strateg. Manag.*, vol. 13, no. 4/5, pp. 511–528, 2021, doi: 10.1108/ijccsm-01-2021-0002.

[9] H. V Nguyễn, T. Lan, T. T. T. Pham, and B. Do, "Supply Chain Coordination in Sustainable Agribusiness Development: An Investigation From Coffee Exporters," *J. Agribus. Dev. Emerg. Econ.*, vol. 14, no. 4, pp. 657–675, 2023, doi: 10.1108/jadee-09-2022-0201.

[10] H. Martínez, S. A. L. de Andrade, R. H. S. Santos, J. L. C. Baptistella, and P. Mazzafera, "Agronomic Practices Toward Coffee Sustainability. A Review," *Sci. Agric.*, vol. 81, 2024, doi: 10.1590/1678-992x-2022-0277.

[11] K. Fadhiela and S. Safrika, "Dampak Supply Chain Dalam Menghubungkan Inovasi Dan Kinerja Bisnis Kedai Kopi Di Kabupaten Aceh Barat," *Jia (Jurnal Ilm. Agribisnis) J. Agribisnis Dan Ilmu Sos. Ekon. Pertan.*, vol. 8, no. 5, pp. 411–423, 2023, doi: 10.37149/jia.v8i5.827.

[12] O. Nurcholis, G. A. Nugroho, R. M. Y. A. P. Nugroho, C. Prayogo, and S. Kurniawan, "Trees and Soil Management Impacts on Soil Nutrient and Coffee Production in Coffee-Based Agroforestry," *Iop Conf. Ser. Earth Environ. Sci.*, vol. 1299, no. 1, p. 12003, 2024, doi: 10.1088/1755-1315/1299/1/012003.

[13] D. I. Contreras-Medina, L. M. Contreras-Medina, J. P. Núñez, L. A. Olvera-Vargas, and C. M. R. Peralta, "Roadmapping as a Driver for Knowledge Creation: A Proposal for Improving Sustainable Practices in the Coffee Supply Chain From Chiapas, Mexico, Using Emerging Technologies," *Sustainability*, vol. 12, no. 14, p. 5817, 2020, doi: 10.3390/su12145817.

[14] D. M. J. Nabilah, P. A. Ryandi, R. Frediansyah, and W. Wachdijono, "The Influence of Prices, Baristas, Products, and Store Atmosphere on Sustainability Coffee Shop Business in the Lowlands," *J. Soc. Sci.*, vol. 2, no. 11, pp. 1027–1044, 2023, doi: 10.57185/joss.v2i11.157.

[15] M. Alfarizi, P. L. Samputra, and N. I. D. Arista, "Role of Entrepreneur's Perspective of Waste Management for Coffee Shop Sustainability," *Probl. Perspect. Manag.*, vol. 21, no. 4, pp. 502–515, 2023, doi: 10.21511/ppm.21(4).2023.38.

[16] D. I. Faronny, M. J. Rahma, W. B. Sunarharum, and L. Hakim, "Local Ecological Knowledge of Liberoid Coffee Farmers in Banyuwangi: An Ancestral Legacy in Preserving the Natural Environment," *J. Presipitasi Media Komun. Dan Pengemb. Tek. Lingkung.*, vol. 21, no. 1, pp. 249–263, 2024, doi: 10.14710/presipitasi.v21i1.249-263.

[17] H. Saputra, N. Nazir, and R. Yenrina, "Nilai Tambah yang Adil pada Pelaku Rantai Pasok Gambir di Sumatera Barat," *J. Teknol. dan Manaj. Agroindustri*, vol. 7, no. 3, pp. 170–180, 2018.

[18] A. Mutolib, C. Nuraini, O. Helbawanti, and A. Rahmat, "Knowledge and Practice of Sustainable Land Management of Coffee Agroforestry in Community Forest Areas, West Lampung Regency," *Iop Conf. Ser. Earth Environ. Sci.*, vol. 1266, no. 1, p. 12017, 2023, doi: 10.1088/1755-1315/1266/1/012017.

[19] M. Mauladi, J. Mulyo, and D. H. Darwanto, "Coffee Supply Chain Management: A Case Study in Ciamis, West Java, Indonesia," *Habitat*, vol. 33, no. 3, pp. 201–211, 2022, doi: 10.21776/ub.habitat.2022.033.3.20.

[20] N. Rosiana and F. Feryanto, "Farmer Sales Decisions and the Sustainability of the Coffee Supply Chain in Indonesia," *Iop Conf. Ser. Earth Environ. Sci.*, vol. 1107, no. 1, p. 12083, 2022, doi: 10.1088/1755-1315/1107/1/012083.

[21] I. B. Suryaningrat and E. Novita, "Implementation of Green Supply Chain Management for Sustainable Agroindustry in Coffee Processing Unit, a Case of Indonesia," *Coffee Sci.*, vol. 17, pp. 1–8, 2023, doi: 10.25186/.v17i.2042.

[22] M. Bashiri, B. Tjahjono, J. Lazell, J. Ferreira, and T. Perdana, "The Dynamics of Sustainability Risks in the Global Coffee Supply Chain: A Case of Indonesia–UK," *Sustainability*, vol. 13, no. 2, p. 589, 2021, doi: 10.3390/su13020589.

[23] R. M. Y. A. P. Nugroho, R. Ustiatik, B. Prasetya, and S. Kurniawan, "Response of Different Coffee-Based Agroforestry Management on Microbial Respiration and Density," *J. Ecol. Eng.*, vol. 24, no. 9, pp. 158–170, 2023, doi: 10.12911/22998993/169179.

[24] D. F. Adhim and N. B. Mulyono, "Supply Chain Financing System Factors, Solutions, and Benefits: A Systematic Literature Review," *Oper. Supply Chain Manag. an Int. J.*, pp. 242–253, 2023, doi: 10.31387/oscm0530386.

[25] V. G. Zuin and L. Z. Ramin, "Green and Sustainable Separation of Natural Products From Agro-Industrial Waste: Challenges, Potentialities, and Perspectives on Emerging Approaches," 2018, doi: 10.1007/978-3-319-90653-9_8.

[26] G. Kudama, H. Wana, and M. Dangia, "The Adoption of Bundled Sustainable Farm and Environmental Practices by Coffee Farmers in Southwest Ethiopia," *Sci. World J.*, vol. 2021, pp. 1–11, 2021, doi: 10.1155/2021/9954230.

[27] A. N. Shonte and Q. Ji, "Management Commitment and Sustainable Coffee Export Performance, Evidence From Ethiopian Companies: The Mediating Role of Corporate Social Responsibility," *Sustainability*, vol. 14, no. 19, p. 12630, 2022, doi: 10.3390/su141912630.