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# Building Green Supply Chain Collaboration at the Jurisdictional Level Towards Sustainable Palm Oil

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**Abstract** The palm oil industry plays an important role in meeting the world's vegetable oil needs, but faces sustainability challenges such as deforestation, land degradation, and land conflicts. This study analyzes the implementation of deforestation-free green supply chain practices in Kandis District, Siak Regency, Riau. Data were collected through in-depth interviews, field observations, and document analysis. The results show that companies have started to implement ISPO certification standards, including environmental impact management, and multi-stakeholder collaboration, having a significant impact in supporting the palm oil sustainability industry. However, in the implementation of green supply chains, challenges were found in the data collection of supply chains up to the farm level, due to the lack of trust of farmers and the absence of incentives, so it has not been able to ensure deforestation-free supply chains. The jurisdictional approach works to strengthen multi-stakeholder collaboration and accelerate the adoption of sustainable palm oil practices and green supply chains. The conclusion of this study confirms that the implementation of deforestation-free green supply chains can be achieved through the support of improved policies, governance, accelerated ISPO certification, farmer assistance and encouraging partnerships between companies and smallholders, in support of sustainable palm oil practices as a whole.

**Keywords:** Supply chains, partnerships, jurisdiction, governance.

## Introduction

The palm oil industry has been in the global spotlight for its significant role in meeting the world's vegetable oil needs, as well as its contribution to sustainability issues. According to data from the Food and Agriculture Organization (FAO), palm oil accounts for more than 30% of global vegetable oil demand. However, the massive expansion of oil palm plantations has triggered various environmental problems, such as deforestation, peatland degradation, and biodiversity loss. The European Union, through its forthcoming European Union Deforestation Regulation (EUDR), strictly regulates palm oil imports to ensure that the product does not come from deforested land after 2020. This sustainability issue has become a major concern in global supply chains, encouraging industry players to adopt green supply chain practices.

Some of the main factors that trigger sustainability issues in the palm oil industry include weak land governance, environmentally unfriendly production practices, and low adoption of sustainability certifications such as ISPO. Based on research by Putri et al. (2022), more than 60% of oil palm land in Indonesia overlaps

with forest areas. In addition, the lack of waste management technology leads to increased greenhouse gas emissions from palm oil mills. Meanwhile, independent smallholders' limited access to sustainability education and financing hinders the implementation of green supply chains at the local level.

The impact of these factors is not only felt locally but also impacts the reputation of Indonesian palm oil in the global market. For example, the rejection of Indonesian palm oil products in the European Union and the United States reflects the pressure on industry players to improve transparency and sustainability in the supply chain. Socially, land conflicts between companies and indigenous communities often occur due to a lack of legality in land governance. In the environmental context, the MoEF report (2021) notes that palm oil expansion accounted for up to 14% of total national deforestation between 2000 and 2020. This suggests the need for technology-based solutions and more assertive policies to address this challenge.

Green supply chain is a holistic approach that integrates sustainability aspects in the entire supply chain process, from raw material procurement to final distribution. In the context of the palm oil industry, green supply chain practices involve energy efficiency, waste management and technology implementation to ensure a lower carbon footprint. According to Dawei et al. (2015), green supply chain management aims to minimize environmental impacts through reduced emissions, good waste management, and resource efficiency. On the other hand, sustainability in the palm oil industry includes the fulfillment of environmental, social, and economic aspects. Certifications such as ISPO are one of the parameters to assess the sustainability level of this industry. However, the implementation of this certification still faces many challenges, especially in palm oil mill companies without plantations and at the independent smallholder level.

This study offers a new approach in analyzing green supply chain practices in the palm oil industry in Kandis District, Siak Regency, Riau, which has unique characteristics such as the dominance of large plantations and high intensity of land conflicts. Unlike previous research, this study integrates the evaluation of industry readiness in the face of global regulations such as EUDR with a jurisdictional approach to support sustainability. This approach not only highlights technology adoption in supply chain management but also examines interactions between stakeholders, including local governments, local communities and industry players.

The urgency of this research lies in the urgent need to improve the governance of the palm oil industry in Indonesia, especially in areas with high land conflict intensity such as Kandis District. In the face of global market pressures and increasingly stringent sustainability regulations, industry players need strategies that can improve operational efficiency while maintaining environmental and social balance. This research is expected to provide strategic insights to address sustainability challenges, both at the local and national levels, through the implementation of effective green supply chain practices.

This study aims to analyze the implementation of green supply chain processes in the palm oil processing industry in Kandis District, Siak Regency. In addition, this research also aims to evaluate the readiness of the palm oil industry in meeting the supply chain transparency requirements set by the EUDR. Finally, this research examines the application of the jurisdictional approach in supporting sustainable palm oil practices to reduce environmental and social impacts in the region.

The benefits of this research include three main aspects. First, for companies, this research provides practical guidance in adopting green supply chain practices that can improve competitiveness in the global market. Second, for the government, the results of this study can serve as a basis for formulating policies that support the sustainability of the palm oil industry while increasing multi-stakeholder involvement in resource management. Third, for academics, this research enriches the literature on green supply chains in the palm oil sector and opens opportunities for further research related to sustainability in other strategic sectors.

## Methods

This research uses a qualitative approach with descriptive methods to explore in-depth understanding of the implementation of green supply chain practices in supporting the sustainability of the palm oil industry. This approach was chosen to enable researchers to identify phenomena. The research was conducted in Kandis Sub-district, an area with a significant concentration of oil palm plantations and mills. This location was chosen due to its relevance to sustainability issues and challenges in supply chain governance. The sample companies selected were palm oil mill companies without plantations that are fully dependent on receiving palm fruit from external parties. The research was conducted over a period of two months, from June to July 2024, involving direct observation, in-depth interviews, and secondary data collection from relevant documents.

The data collection process was conducted through three main stages. First, in-depth interviews were conducted with key informants to get their perspectives on sustainability practices. Second, field observations were conducted at palm oil mills and plantations to identify operational practices and challenges faced. Third, secondary data collection was conducted through relevant document searches, including industry reports and government regulations.

## Results and Discussion

This research focuses on the implementation of green supply chain practices in the palm oil industry in Kandis District, Siak Regency, Riau. The region is known as one of the centers of oil palm production in Indonesia, with significant plantation area and the presence of a number of processing mills. Statistics Indonesia (2024), states that Kandis Sub-district has more than 46,000 hectares of oil palm plantations with a major contribution to the local economy. The palm oil industry in the region consists of large RSPO and ISPO certified companies, as well as independent

smallholders who still face challenges in the adoption of sustainability standards. This study collected data from 6 key informants, including mill management representatives, buying companies, government officials, and NGO members.

The main variables studied in this research are green supply chain practices and the sustainability of the palm oil industry. Green supply chain practices include energy efficiency, waste management, and the application of environmentally friendly technologies. Sustainability is evaluated based on the fulfillment of environmental, social, and economic aspects. Preliminary findings show that some companies have implemented environmental management, followed government regulations and followed international sustainability standards. However, due to internal limitations, farmer distrust, and the absence of company-farmer partnerships, it was found that companies face obstacles in collecting data on FFB supply chains down to the independent smallholder level to ensure traceability and deforestation-free supply chains.

The research utilized primary data collected through in-depth interviews and field observations, as well as secondary data from industry reports and government regulations. A total of 6 interviews were conducted with an average duration of 60 minutes per session. Secondary data included company policy documents, local regulations and their annexes, company ISPO certification reports, and statistics on palm oil production in Kandis sub-district. The three main discussions in this study include:

a. Implementation of Green Supply Chain Practices
   Most of the large companies in Kandis sub-district have adopted green supply chain practices. ISPO certification is an important tool to ensure sustainability and legal compliance in the palm oil sector, as is the case for two sample companies, which have successfully obtained certification and are in the process of fulfilling certification.
b. Challenges in Implementing deforestation-free Green Supply Chains.
   The forthcoming EU regulation on zero deforestation requires full transparency down to the smallholder level. This research looks at how companies are prepared with limited supply chain data and the constraints encountered in the data collection process. And how buying companies prioritize their target markets to meet their needs.
c. Jurisdictional Approach Program Support for Sustainable Palm Oil.
   With the jurisdictional approach in place, it is important to see how the program supports improved palm oil governance in the existing Regional Action Plan for Sustainable Palm Oil.

This research shows that the implementation of green supply chain practices can support the sustainability of the palm oil industry. However, the gap between what is required by oil palm mill companies without plantations and the expectations and conditions of independent smallholders is a major obstacle. The

main problems faced by independent smallholders are the quality and quantity of FFB, legality issues, and the absence of institutions in the management of smallholder groups. This condition is the reason why companies have not yet built partnerships with farmers in a sustainable manner.

To overcome this problem, a multi-stakeholder approach involving the government, large companies and NGOs is needed. Training programs on good agricultural practices, fulfilling farmer legality through STDB data collection, and fostering and forming farmer groups and cooperatives. The jurisdictional approach through the Siak-Pelalawan Landscape Program (SPLP) helps create synergies between local governments and companies to address sustainability challenges. SPLP supported the development of the Regional Action Plan for Sustainable Palm Oil (RAD KSB) in Siak District.

The program provides agronomy training, farmer institutional assistance, and facilitates land legality through Cultivation Registration Certificate (STDB), which increases transparency and productivity of smallholders. Multi-stakeholder support through SPLP strengthens collaborative governance, which is essential for meeting sustainability standards such as ISPO, RSPO, and EUDR, while improving the company's position in the global market.

In addition, the process of harmonization between companies and farmers through partnerships by applying agronomic best practices, paying attention to green supply chain principles, as well as certainty of legality and compliance with regulations, can make conditions that meet the expectations and needs of buying companies for the global market and can increase the competitiveness of Indonesian palm oil products in the global market. If these solutions are implemented, the palm oil industry in Kandis District can improve operational efficiency, reduce social and environmental impacts, and strengthen its position in the international market.

This study adds to the literature by integrating an evaluation of the readiness of the palm oil industry, especially for palm oil mill companies without plantations, to deal with deforestation-free supply chain requirements under European Union regulations using a jurisdictional approach. In contrast to previous studies that only focus on technology adoption or environmental impact , this study also highlights inter-stakeholder interactions as a key factor in the implementation of sustainability practices.

This research confirms the importance of a holistic approach in addressing the sustainability challenges of the palm oil industry. By strengthening multi-stakeholder coordination and increasing support for independent smallholders, the industry can become a successful example of implementing green supply chain principles. The results also provide practical guidance for policymakers and industry players to integrate sustainability aspects in their operations.

## Conclusion

This study aims to analyze the implementation of green supply chain practices in supporting the sustainability of the palm oil industry in Kandis District, Siak Regency. The main findings show that although large companies have successfully adopted sustainability practices such as environmental management technology and ISPO certification, they face obstacles in mapping the supply chain down to the independent smallholder level, including trust issues, lack of incentives, and technological limitations. This research emphasizes the importance of multi-stakeholder collaboration, including building partnerships between companies and independent smallholders, to address these gaps and support holistic industry sustainability. By integrating global regulations such as EUDR and jurisdictional approaches, this research offers strategic solutions to improve the competitiveness of Indonesian palm oil products.

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