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## **Integration of global standards into the independent smallholders' Fresh Fruit Bunch (FFB) supply chain**

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**Abstract**---The fresh fruit bunch (FFB) supply chain in Seruyan Regency, Indonesia is complex and dynamic, yet it has not fully met global standards, particularly in traceability and sustainability. This poses a challenge as compliance with international standards is essential for accessing global markets that increasingly prioritize sustainability and transparency. This study aims to: (1) identify the FFB supply chain of independent smallholders; (2) analyze its conformity with global standards; and (3) assess the potential integration of global standards into the supply chain. Using a qualitative approach, the research was conducted in Seruyan Regency, Central Kalimantan, Indonesia. Findings reveal that the FFB supply chain among independent smallholders is highly varied, with key challenges including inconsistent FFB quality, lack of traceability systems, incomplete data on supply chain actors, and a high number of uncertified smallholders. As a result, the current system does not fully comply with global standards such as those of the Roundtable on Sustainable Palm Oil (RSPO). Jurisdictional Certification (JC) emerges as a promising approach to support the integration of global standards across the region. To achieve this, the Seruyan Government must strengthen JC institutions, assess infrastructure needs, and design appropriate strategies to improve traceability and sustainability in the FFB supply chain.

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## **Introduction**

There are currently two standards widely used by palm oil producers in Indonesia: The Roundtable on Sustainable Palm Oil (RSPO), which is voluntary and driven by the global market; and the Indonesian Sustainable Palm Oil (ISPO), which is mandatory and driven by the government. The RSPO was formed as an initiative of various oil palm stakeholders in response to global demands to manage and develop oil palm production sustainably (Voge & Hutz-Adams, 2014). The RSPO Independent Smallholder Standard was developed in response to growing recognition by stakeholders of the need to enhance smallholder engagement into the RSPO system through mechanisms that take into account the diversity of challenges and situations faced by independent smallholders globally, along with the diverse needs and concerns of smallholders (RSPO, 2019).

Seruyan's palm oil production contributes 19% to the total production of Central Kalimantan Province, or equivalent to a value of 1.4 million tonnes of palm oil. Of this amount, Seruyan ranks as the second largest palm oil producer in Central Kalimantan (BPS, 2023). Independent smallholders in Seruyan Regency generally sell their FFB to collectors so that the product flow process is not recorded and the origin of the fruit cannot be known. This condition is exacerbated by the price of FFB which tends to be lower than the price set by the government. Smallholders also find it difficult to obtain information, including price information, market information, and information on central and local government funding/assistance.

In line with this condition, independent smallholders are faced with the requirement of compliance with sustainable palm oil standards that must be fulfilled so that the FFB produced can be accepted by mills, get premium prices and reach a wider market. If they do not meet global standards, palm oil from Seruyan is at great risk of losing access to international markets, especially those that require sustainability and traceability such as the European Union market. Therefore, the integration of sustainability standards throughout the upstream chain of products, especially Fresh Fruit Bunches (FFB), is crucial to ensure competitiveness and long-term sustainability.

The supply chain is the physical network, namely the companies involved in supplying raw materials, producing goods, and delivering them to end users (Fiatno et al., 2021). The supply chain is not only about increasing value added but also about meeting consumer demand, enhancing competitiveness, increasing profits, and building good relationships among actors in the supply chain. According to Guritno & Harsasi (2014), there are various flows managed by the actors in the supply chain. These flows include: the flow of goods, which moves from upstream to downstream; the flow of money, which moves from downstream to upstream; and the flow of information, which moves both from upstream to downstream and from downstream to upstream.

In this era of globalization, sustainability has become a key requirement in the supply chain. Sustainability assessments are typically conducted by sustainability certification bodies, particularly in the context of palm oil. The three key aspects emphasized are economic, environmental, and social. Despite the benefits for many people, palm oil cultivation is associated with significant environmental impacts, including the destruction of some of the world's oldest rainforests and their endemic fauna. Additionally, while some indigenous communities have benefited, others have lost their ancestral lands and, in some cases, their way of life (e.g., forest nomads like the Penang in Kalimantan (Jensen et al., 2016)). Tropical lands suitable for oil palm plantations tend to overlap with tropical rainforest areas rich in biodiversity and carbon (Pareira, 2023). In Southeast Asia, the most suitable lands are found in Indonesia and Malaysia, where oil palm development is currently thriving. This expansion occurs on mineral soils and peatlands with diverse biodiversity, carrying significant economic and environmental implications (Pacheco et al., 2017). The environmental impacts of palm oil production have made palm oil one of the most controversial commodities in the world.

Various efforts to address sustainability challenges across the palm oil supply chain have been undertaken, led by companies, civil society, and governments, often through multi-stakeholder partnerships (CDP & Proforest, 2023). Competing schemes for palm oil certification include the RSPO, Rainforest Alliance Sustainable Agriculture Standards, Palm Oil Innovation Group (POIG), and the International Sustainability and Carbon Certification (ISCC) system (Watts et al., 2021). The RSPO is an organization that works through a third-party monitoring mechanism for compliance with RSPO standards, which primarily cover land and environmental performance issues. RSPO membership brings together various stakeholders from seven sectors of the palm oil industry, namely palm oil producers, palm oil traders and processors, consumer goods manufacturers, retailers, banks and investors, environmental conservation NGOs, and social NGOs (Pareira, 2023).

The jurisdictional approach (JC) emerged as a response to the limitations of conventional certification schemes, which focus more on individual plantations or factories, while many social and environmental impacts arise at a broader administrative level, such as the district or provincial level. This approach enables the application of RSPO Principles & Criteria to all actors within a region, including smallholder farmers, collectors, companies, and local governments, thereby expanding the scope of sustainability and inclusion of smallholder farmers. This scheme enables the application of RSPO Principles & Criteria to all actors within an administrative region (e.g., district), including smallholder farmers, mills, collectors, and local governments, thereby expanding the impact of sustainability and the inclusion of smallholder farmers (Padmanaba et al., 2023). The role of the district government is essential in promoting the comprehensive achievement of sustainability certification. The JC approach has not been widely researched, especially regarding its implementation in regions such as Seruyan Regency. This research seeks to determine the condition of the FFB supply chain, analyse the conformity of the supply chain with global standards and fill the gap by examining the potential of JC as a mechanism for integrating global standards into the FFB supply chain in the Independent Smallholders of Seruyan Regency.

## **Material and Methods**

A qualitative approach was used to describe the situation or phenomenon and to enable an in-depth examination of the problem's focus. The research begins with identifying the actual conditions in terms of the main players and the flows that occur in the supply chain, both the flow of information, products and money. After obtaining the actual conditions, an analysis of the suitability of the actual conditions of the FFB supply chain in independent smallholders with global palm oil standards is carried out, in this case it will be analyzed for conformity with principle 1, principle 2, principle 3, principle 4 and internal control system requirements. The results of the analysis of the conformity of the actual supply chain with the standards are used as a reference in integrating global standards into the FFB supply chain of independent smallholders to be implemented in the future.

The data collected consists of quantitative and qualitative data. Quantitative data consisted of data on the number of independent smallholders, the number of palm oil companies, the number of palm oil mills, the price of fresh fruit bunches (FFB), and FFB production. Qualitative data is in the form of information or information from informants and related parties and is presented in the form of sentences, sourced from interviews with independent smallholders, collectors, DO holders, palm oil plantation company management, palm oil mill management, civil society organisations and local government in this case regional apparatus organisations (OPD). The data collection method uses observation, interview, and documentation techniques carried out by direct observation in the field and using a questionnaire and entry form.

The population in this study are independent smallholders divided into certified and uncertified independent smallholders, collectors, delivery order (DO) holders, oil palm companies, palm oil mills, civil society organisations and local governments in Seruyan District. The population of independent oil palm smallholders in Seruyan District totals 5,859 farmers who own 9,759 parcels with an area of 12,356 hectares and are spread across 10 sub-districts. Meanwhile, based on the Decree of the Seruyan Regent number 188.45/145/2022 on the Establishment of a Jurisdiction-Based Palm Oil Certification Working Group in Seruyan Regency, it is known that the number of oil palm companies in Seruyan Regency that are members of the Working Group is 14 companies, as well as 14 palm oil mills, 12 civil society organisations and 24 regional apparatus organisations. The population of collectors and delivery order holders cannot be mentioned in the Regent Decree and the number is unknown.

Sampling in this study was carried out using a combination of purposive sampling, which is a sample selected based on certain considerations, namely considering parties who work with Kaleka and the local government. Other criteria included ease of reach during interviews and involvement in RSPO certification. Informants were purposively selected with a working area coverage in Seruyan Regency. The determination of the number of informants considered the uniformity of the typology of smallholders in Seruyan District. The research sample is summarised in Table 1.

Table 1. Research Sample

Purposes	Respondent	Category	Number of respondents
Identify the FFB supply chain & analyse the conformity with global standards	Independent smallholders	<i>Certified*</i>	2
		<i>Non-certified</i>	2
	Small middlemen	With DO and without DO	2
	Big middlemen	With DO and without DO	2
	DO holders	Non middlemen	1
	Palm oil mills	<i>Certified</i>	1
<i>Non-certified</i>		1	
Potential integration	Government	Regional Planning and Development Agency (Bappeda) and the Food Security and Agriculture Service (DKPP)	2
Potential integration	Civil Society Organizations	Kaleka and Serikat Petani Kelapa Sawit (SPKS)	2
Total Respondent			15

The variable approach in this study refers to the term theme. There were three main themes analysed, viz: supply chain flow, supply chain compatibility, and strategies for integrating global supply chain standards into existing supply chain systems. For the supply chain flow theme, an in-depth exploration was conducted of the movement of goods, financial flows, and information exchange, as well as the identification of challenges faced in the current supply chain system. For the supply chain suitability theme, we evaluated the condition of the supply chain based on two main aspects, namely sustainability of cultivation practices and traceability. Meanwhile, for the integration strategy theme, we conducted a case study on the jurisdictional approach in realising a sustainable palm oil supply chain. This study took the example of the implementation in Seruyan District, where the researcher identified various lessons learnt from the implementation of the approach in the field. Data were analysed thematically through transcription, compilation of information, and triangulation.

### Results and Discussion

The FFB supply chain has diverse flows for each actor. In more detail, the actors involved include:

- 1) Farmers, act as the main FFB suppliers and are the key actors of FFB quality and quantity. The average farmer in Seruyan Regency has an area of around 2-4 hectares, thus classified as a smallholder. Farmers can deliver their FFB through several options depending on their SPK ownership. Farmers who have an SPK with a mill can deliver their FFB directly to the mill. However, for farmers who do not have SPKs, they will deliver to collectors and then transact with the collectors directly. Farmers require a direct payment scheme, so usually the collector will pay for the farmer's FFB purchase after weighing the FFB.
- 2) The collector, plays a role in collecting FFB from the farmers. Usually, collectors have a platform, which is a place for sorting and temporary storage of FFB before being transported to the mill. Collectors can be individuals or groups/institutions. In Seruyan, cooperatives, BUMDes and farmer groups can also act as collectors. On the other hand, there are other collectors who do not have platforms. For this category, collectors will sell FFB to other collectors who have platforms. Similar to independent smallholders, collectors who do not have SPKs have the freedom to sell FFBs to whichever collector offers the highest purchase price.
- 3) DO holders are parties who have a Letter of Cooperation (SPK) with the mill. The role of the DO holder is as the capital owner who guarantees the supply of FFB to the PKS. DO holders bridge the mills to obtain FFB supply from independent smallholders. In addition to being independent, DO holders can also be farmers or collectors.
- 4) Palm Oil Mill (PKS). The mill used as a case study is PT Perkebunan Musirawas Citra Harpindo (PWCH). The mill has several priority farmer groups. In the supply arrangement, PT PWCH prioritises the supply of FFB from these groups. In addition to receiving FFB supply, PT PWCH provides support to farmers to obtain financial facilities in the form of interest-free loans. This loan is used for plantation development until planting. In addition, farmers receive quality production facilities. Loan payments can be made by deducting FFB sales to PKS.

The description of the role of each actor above indicates the diversity of the FFB supply chain. The flow of the FFB supply chain in Seruyan, is described as follows:

- 1) Flow of goods. FFB flow starts from the production process at the farm level. Farmers do the harvesting, then grouping and transporting. Quality control can start from the field, but not all farmers conduct quality control in the field. In the FFB delivery scheme from the farmer to the mill, each supply chain actor conducts fruit sorting to minimise losses from FFB quality mismatches. The mill will perform grading in accordance with the desired standard specifications. If there are findings of non-conforming fruit, the mill will deduct the amount of payment to the DO Holder. The mill will prioritise the partner institution as the main supplier, but it is inevitable that if the quality of the partner's FFB is not suitable, the payment deduction will still be made.
- 2) Financial Flow. Financial flow covers the scheme of money flow in and out throughout the supply chain. Starting from the mill, the mill will provide DO to its partners. The partner then offers to collectors or farmers to supply FFB to the partner. After obtaining the FFB, the DO holder will send it to

the mill for grading. Payment is then processed after all FFBs are received by the mill, usually within a period of time as agreed with the mill. Unlike the payment from the mill to the DO holder, collectors or farmers who supply FFB to the DO holder will receive direct cash or payment directly after weighing. At the farm level, collectors will make direct payments to farmers after weighing. Farmers see the practicality of this direct payment as an added value, making it easier to fulfil their needs without a long waiting period. Regarding prices, basically, the longer the supply chain, the lower the selling price of FFB at the farm level. The greater number of intermediaries will increase operational costs. In addition, the risk of fruit damage or grading also increases with the length of the supply chain. The supervision and duration of delivery from the farmer to the mill is less than optimal. If there is a decline in FFB quality, the responsibility lies with the middlemen.

- 3) Information Flow. All actors in the FFB supply chain are open to informing the price of FFB to other partners including farmers. Usually, farmers and collectors already know the price at the mill level. The collectors also collect data on the source of the FFB, but it is then mixed when it is delivered to the mill. Therefore, the mill will only be able to know the village origin of the fruit delivered by the DO holder. This information flow is closely related to traceability. The lack of integrated documentation from the collectors to the mill results in a lack of accurate information on the identity of the fruit. On the other hand, the length of the supply chain results in delayed delivery of information from DO holders to collectors and farmers. Briefly, the actors and flow of the Farmer FFB supply chain to the mill are depicted in Figure 1.

The challenges that occur during the process of channeling FFB from farmers to mills can be divided into several aspects, namely:

- 1) Inconsistent FFB quality. The mill has the authority to accept and reject farmers' crops. When the fruit is in the grading process at the mill, cases of under-ripe or over-ripe fruit from farmers have occurred several times. This results in the inevitable return of fruit to the farmers. In some cases, it is often the case that the average fruit deposited with the mill is not the fresh fruit harvested on that day. In other words, the mill encounters cases of restan (not fresh) fruit. This is due to the storage of fruit at the collector level for several days before it enters the mill. This is usually the case for small farmers (2-4 hectares), where they have to leave or collect their harvest to a business organisation or group that holds a DO from the mill before it is sent to the mill. Restan fruit can also be indicated as raw fruit that has been sitting for a long time and may come from outside the mill partners. The mill tolerates a 3-day delay in fruit delivery. The mill approaches farmer groups to minimise FFB grading. Farmer groups are regularly invited to attend the mill and socialised on practices to maintain the quality of harvested fruits.
- 2) Complex and unpredictable supply chain. Independent smallholders do not have an SPK (Letter of Cooperation Agreement) with the mill. Smallholders have the freedom to sell FFB to any collector. Farmers have supply chain schemes that involve more than two tiers of collectors. One respondent said. This results in unpredictable farm-gate prices that are lower than the price

set by the province. Farmers will choose the collector who offers the highest price, and there is no binding agreement between the collector and the farmer. This scheme causes uncertainty in the palm oil supply chain with fluctuating sales flows. However, it is also beneficial for farmers, as they can obtain the best price.

- 3) Data Collection of Supply Chain Actors is Not Yet Comprehensive. Supply chain actors are currently not fully captured. The data collection that has not yet been done is at the intermediary level, namely collectors. During the FFB distribution process, data on collectors is difficult to obtain. Without data on collectors, it will be difficult to monitor and ensure the availability of quality FFB.

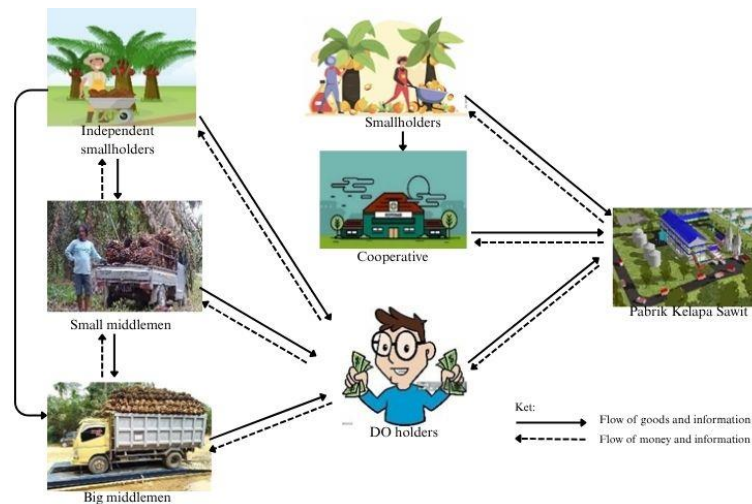


Figure 1: Flow of FFB Supply Chain from Smallholders to Mill.

- 4) Lack of traceability system along the supply chain. Traceability is related to data collection. Farmers currently get copies of sales from collectors, but generally do not have their own sales records. Some have recorded sales, albeit manually. Farmer sales data is difficult to monitor and analyse as it is not digitised. At the farm level, all FFBs are kept together without being separated based on quality. On the other hand, the platform does not separate the fruit bunches and does not label the FFB based on the supplier. If there are findings of poor FFB quality, it is difficult to trace the source.

Certified farmers automatically apply sustainability principles in their cultivation. However, for those who are not yet certified, there are important aspects that have not been done in relation to sustainability. Among the aspects that have not been fulfilled is the guarantee of sustainable cultivation. Based on the gap analysis of the RSPO Independent Smallholder Standard, in terms of Principle 1, smallholder institutions, including legality and human resource capacity, are still partially compliant because they do not have an internal control system and have not attended Good Agricultural Practices (GAP) training. Principle 2, related to land rights and utilisation, shows that some smallholders have not complied with mapping and legality of land ownership (rarely have SKT or SHM), and have not

recorded coordinates for traceability. The Free, Prior and Informed Consent (FPIC) process is also not compliant as non-certified farmers have not been trained and have not implemented it. Some riverside lands that should not be planted with oil palm are still planted by smallholders, and for new plantings, many do not follow RSPO requirements related to HCV, HCS, slope or peat areas, and have not received information on land remediation.

On Principle 3, although there is no forced labour in principle and the age limit for children is known to some farmers, farmers have not received training on fair labour. There is a complaint system to the village, but it is not yet systemised in the Internal Control System (ICS), and farmers have not received training on complaints. Working conditions and facilities are not safe and do not meet minimum legal requirements, with working facilities often provided by workers themselves, and no training on Occupational Health and Safety (OHS). Although farmers are familiar with the prohibition of violence and harassment, they have not received formal training in terms of global standards.

Principle 4 also shows some gaps. Smallholders are aware of the importance of protecting environmental and biodiversity areas, but do not know the detailed boundaries and locations of HCV and HCS areas, so environmental safeguards are not comprehensive. The use of fire for land preparation, pest control or waste management is still done on a limited scale because it is considered efficient, even though farmers are aware of its prohibition and have not received training in integrated no-burn land management. Farmers also lack detailed knowledge and information on the location of river buffer zones. Lastly, pesticide use is still an issue as smallholders do not have the capacity to reduce paraquat and have not implemented pesticide risk mitigation, and although some are aware of integrated pest management, implementation is not yet underway as there has been no formal training.

Overall, the gap analysis of RSPO principles (Principles 1-4) shows that adoption of the global sustainability standard is still at an early stage and most criteria have not been met or only partially met. This indicates that achieving full compliance with global standards requires comprehensive interventions ranging from strengthening legal and institutional foundations, technical capacity building and awareness, to the implementation of integrated systems for traceability.

Jurisdictional Certification (JC) as a solution to integrate global standards into the FFB supply chain. JC is a programme led by the Regional Head in Seruyan. JC is implemented through a Working Group (Pokja) in accordance with Regent Decree No. 188.45/305/2021 on the Establishment of the Seruyan Jurisdiction-based Palm Oil Certification Working Group. In contrast to regular certification which focuses on individuals/groups of farmers, JC is orientated at the district scale. The JC Working Group consists of three Sub-Working Groups with a focus on: a) protection of high conservation value areas, reducing deforestation and protection of high carbon stock areas; 2) prevention of social conflict in palm commodity production; and 3) empowerment of farmers, indigenous peoples and local communities. JC implementation involves multi-stakeholders consisting of local government, palm oil companies (private), farmer groups, and non-profit

organisations. Regular Pokja meetings are held to discuss the progress of each party related to the agenda of each Sub-Working Group. One of the important activities related to the FFB supply chain is data collection and training of farmers, traceability of palm oil products, and mapping of palm oil concession areas. JC takes an inclusive approach that involves all stakeholders involved in the palm oil supply chain.

The JC to certification is a phased approach consisting of 4 stages. Stage 1 is referred to as the pilot stage, stage 2 as the application stage, stage 3 as the implementation stage and stage 4 as the certification stage. The implementation of JC in Seruyan District is currently progressing towards stage 2, and has successfully passed stage 1 in 2023. Some of the lessons learnt that can be evaluated in relation to the risks that hinder JC integration are the multi-stakeholder collaboration process, the change of leadership in the region, the gap in regulations governing sustainable palm oil practices, and the monitoring system is not yet optimal. Integration of global FFB supply chain standards can be done through a regional/jurisdiction-based approach scheme. The integration of global sustainability standards requires supply chain actors to be involved in certification. This can be realised by implementing RSPO and ISPO as a whole in the supply chain.

The relevance of the JC programme to the FFB supply chain lies in the aspect of recording activities from upstream to downstream. In line with RSPO principles and criteria, JC requires all actors in the palm oil supply chain to record. In the context of the FFB supply chain, JC emphasises the availability of information from the farmer level to the PKS. The current challenge is that there is no good traceability at the smallholder level. Not all farmers have cultivation certificates (STDB) and not all farmers have sustainability certification. JC is present as a solution to encourage the issuance of STDB at the farm level and update the supply chain data collection, so that FFB traceability becomes more accurate and reliable.

Strengthening the FFB supply chain needs to be integrated into the JC programme. The most important aspects that can be prioritised at this time are: comprehensive RSPO and ISPO certification, data collection on all FFB supply chain actors, farmer group institutional strengthening and capacity building, and infrastructure and farmer capacity building in traceability. JC is an appropriate approach to integrate the FFB supply chain into the global sustainability system as it enables the application of RSPO and ISPO principles collectively at the district level, including for independent smallholders who are often marginalised from conventional certification schemes. This approach not only strengthens area-based sustainability governance, but also encourages systematic data collection of supply chain actors (including collectors), enhances farmer group capacity, and builds digital traceability infrastructure and systems essential for global market penetration. JC is an integrative approach that addresses market challenges, smallholder inclusion, and supply chain transparency simultaneously.

Moreover, the initiative is gaining recognition from global markets, with some multinational companies providing market incentives such as buying preferences

or price premiums for products from jurisdictionally certified regions. This presents a great opportunity for the adoption of this approach in the Indonesian palm oil commodity, especially in areas with strong local leadership and adequate institutional support (Seymour et al., 2020).

Implementation of JC can be done through integration into regional medium-term development plans (RPJMD), local regulations (Perda), or other derivative regulations that promote sustainable governance across sectors. The district government acts as the leader of the initiative, sets collective certification targets, and encourages multistakeholder collaboration in planning and implementation (Brandi, 2021).

The next steps for farmer inclusion in JC are strengthening data and institutional foundations, socialising sustainability certification, and forming/strengthening farmer groups, consists of capacity building and standards adoption, mapping of supply chain actors and smallholder land, development of local regulations supporting JC, training on GAP and post-harvest handling, assistance with STDB issuance and initial certification, pilot project of simple digital traceability system, consists of full implementation and ongoing monitoring, expansion of traceability and data collection systems, full implementation of GAP practices, development of formal smallholder-PKS partnerships, and ongoing monitoring and evaluation.

## **Conclusion**

The palm oil fresh fruit bunch (FFB) supply chain in Seruyan District is highly diverse, which poses challenges such as inconsistent FFB quality, complex and unpredictable supply chains, incomplete data collection on supply chain actors, and lack of traceability systems along the supply chain. The FFB supply chain in Seruyan currently does not fully meet global standards, especially RSPO standards. This is due to the large number of uncertified farmers and the lack of an adequate traceability system. Support from various stakeholders is key to realising comprehensive sustainability certification in the region. Jurisdictional certification in Seruyan Regency can be utilised as an alternative approach to strengthen the adoption and integration of global supply chain standards into the FFB supply chain.

The next step is to strengthen the Jurisdictional Certification (JC) institution to support supply chain strengthening. The local government needs to identify supply chain infrastructure needs according to current conditions, and develop appropriate planning and implementation to ensure that the palm oil supply chain in Seruyan meets global standards. Through the JC approach, capacity building of smallholders in sustainable practices can be done in a more inclusive manner. In addition, collectors also need to be actively involved, especially in terms of data collection and business legality, to support traceability along the FFB supply chain. Value distribution in JC is potentially fairer as it encourages equitable benefit sharing among local actors, including smallholders. This approach can increase legitimacy and incentivise participation in certification, and strengthen the long-term sustainability of production systems. Further research is needed to explore benefit-sharing mechanisms and their impact on the adoption and success of certification in different local contexts.

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