

Palm Oil Fresh Fruit Bunch Supply Chain in Bengkulu Province: A Study on Trust Levels Among Actors

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ABSTRACT

The lack of trust can greatly impact the performance and efficiency of the Fresh Fruit Bunch (FFB) supply chain. This study aims to assess the level of trust among suppliers in the FFB supply chain in Bengkulu Province. The trust level among FFB suppliers in Bengkulu Province is evaluated based on three dimensions: ability, benevolence, and integrity. These dimensions are measured using a Likert scale to calculate a trust index. The findings indicate that the trust level among suppliers in the FFB supply chain is high (trust index 89.69%). The study identifies certain indicators that could potentially weaken trust, including competency and experience indicators in the ability dimension, empathy and acceptance indicators in the benevolence dimension, and relevance and reliability indicators in the integrity dimension. To address these potential trust-weakening indicators, a collaborative effort involving independent farmers, suppliers, and mills is recommended.

Keywords: *palm oil, supply chain, trust between actors*

BACKGROUND

The main producers of palm oil in Bengkulu Province are the districts of Mukomuko, North Bengkulu, Central Bengkulu, Seluma, and South Bengkulu. Table 1 details palm oil production in the province from 2021 to 2022. During this time, the production of Fresh Fruit Bunches (FFB) increased by 70%, decreased by 20%, and then stabilized at 10% across various centers. The initial production increase was due to rising selling prices of FFB, which were positively received by farmers, intermediaries, RAM, and CPO mills. The prospects for the development of palm oil plantations in Bengkulu Province are very promising. This is supported by the availability of suitable land, a labor force, support for the policy of the local government, and market availability. The production of palm oil from Bengkulu Province has been utilized to meet the demand of the local CPO mill and other mills in the province around Bengkulu (West Sumatera, South Sumatera, and Lampung).

The main product of palm oil plantations is FFB. Fresh Fruit Bunches is classified as a product with high economic value but requires intensive management. They carry risks and are easily damaged both in post-harvest handling and marketing distribution (Yusianto, *et al*, 2020). Farmers, as one of the FFB suppliers, cannot rely solely on direct sales to the CPO mill. The distribution and

marketing of FFB involve many marketing agencies to ensure accurate and quick product channeling, forming an FFB supply chain system. The risk can be mitigated through cooperation between suppliers in the supply chain (Muslim & Susilowati, 2018).

Table 1. Palm Oil Production of Bengkulu Province in 2021 - 2022

No	Region	Production (Ton)	
		2021	2022
1	Mukomuko	451.770	452.360
2	Bengkulu Utara	93.100	101.860
3	Seluma	69.500	69.630
4	Bengkulu Tengah	50.560	50.600
5	Bengkulu Selatan	36.570	29.290
6	Kaur	18.960	19.050
7	Kota Bengkulu	6.340	6.500
8	Rejang Lebong	1.160	1.150
9	Kepahiang	240	280
10	Lebong	70	70
Total		728.260	730.790

Source: (BPS Provinsi Bengkulu, 2023)

The supply chain involves three flows: goods, information, and money. Each actor in the supply chain system plays a crucial role (Hasanah, et. al, 2019; Herdiansyah et al., 2021; Watts et al., 2021; Adwiyah et al., 2023). The primary objective is to deliver FFB to consumers in good condition to reduce the risk of product quality decline (Anderson, 2019; Copra & Meindl, 2016). Every actor in the supply chain system aims to provide various services to consumers, ensuring timely, accurate quantity, and quality product delivery. Standardization and set-up are essential for converting services into incentives for all stakeholders in the supply chain system due to the number of chain points, product fragility, and transaction costs (Rantung, 2016; Raharja et al., 2020; Laeequddin, et al, 2010). A well-functioning FFB supply chain system is indicated by the smooth flow of FFB from farmers to suppliers (collectors, agents, wholesalers, and CPO mill), money from suppliers to farmers, and information between farmers and suppliers. This ensures equitable benefits for all actors involved in the FFB supply chain system, leading to optimal profits. Trust is crucial in establishing cooperation in the FFB supply chain system (Fukuyama, 2002; Mamad & Ouazzani Chahdi, 2013; Mukhsin, 2017; Munizu, 2017). Low mutual trust can disrupt partnerships in the supply chain (Stefani & Sunardi, 2014; Capaldo & Giannoccaro, 2015; Collier & Sarkis, 2023).

Trust impacts collaboration, performance, and relationships between actors and suppliers in the supply chain. Research on the level of supplier trust in the FFB supply chain system in Bengkulu Province is scarce. Existing research focuses on satisfaction with product attributes, supply chain identification, supply chain risks, competition, service, and supply chain effectiveness including raw materials (Siahaya, 2013 ; Perdana & Soemardjito, 2015). Other research focuses on a model selection for price forecasting of crude palm oil (Sukiyono et al., 2021).

RESEARCH METHODS

The mixed-methods research used as a research approach techniques for collecting and analyzing qualitative and quantitative data (Pluye et al., 2014). The research was conducted in two districts in the Bengkulu Province, namely North Bengkulu and Seluma Districts. These locations were purposively selected as the second largest FFB producers in Bengkulu Province. From each district, two villages were chosen in one sub-district for the highest productivity. The simple random sampling used for determining palm oil farmer sample, while others sample used snow ball sampling, by following information from the farmer. The respondent included four groups: 1) Palm oil farmers, 2) Collector traders in the village, 3) Big traders, and 4) CPO mill. The number of respondents in each group is presented in Table 2.

Table 2. The Number of Respondents

No	Respondent	Number of People
1	Palm oil farmers	93
2	Collector Trader	23
3	Big Trader	9
4	CPO mill	3
Total		128

The trust is assessed through three dimensions in each supply chain actors to be evaluated, namely ability, benevolence, and integrity. The ability dimension consists of five indicators, namely 1) institutional approval, 2) level of knowledge, 3) transaction security, 4) competence, and 5) experience. The Benevolence dimension consists of five indicators, namely 1) benefits, 2) attention, 3) empathy, 4) confidence, and 5) acceptance. The integrity dimension consists of seven indicators, namely 1) fairness, 2) fulfillment, 3) loyalty, 4) directness, 5) relatedness, 6) reliability and 7) habits. In evaluating the level of trust of the indicators a measurement with a Likert scale of 5 levels, very good (5); good (4), good enough (3); poorly good (2); and badly good (1). Trust index was calculated by following formula (Cahyat et al., 2007) below:

$$\text{Trust Index (\%)} = \frac{(\text{Total Score Obtained}) - (\text{Minimum Total Score})}{(\text{Maximum Total Score}) - (\text{Minimum Total Score})} \times 100$$

RESULT AND DISCUSSION

The FFB supply chain phenomenon that applies in Bengkulu Province is as follows. Business actors in the FFB supply chain in Bengkulu Province are not allowed to sell FFB directly to CPO factories. They must sell FFB through middlemen or RAM). Independent farmers in North Sumatra are not able to sell their FFB directly to CPO mill (Tanjung, 2022). This is supported by a number of factors, as follow.

First, there are strong financial, social, and cultural ties between actors. Financial ties such as capital loans, production cost assistance and others. Socio-cultural ties as kinship or family or one village. Second, the distance and location of oil palm plantation with transactions among farmer, Middlemen, RAM and CPO factories are far. The average distance reaches 5 kilometers to 60

kilometers. Farmers need transportation facilities with a large volume of FFB. Meanwhile, the volume of FFB production, especially for farmers, is relatively small, an average of 0.2 - 2 tons per hectare, so it is less efficient and transportation costs are high. Third, the CPO mills issues a delivery order to partners (middlemen and RAM) who have a large volume of FFB. While farmers can only sell FFB through corporate partners or CPO mills that have sales access in the form of delivery order. Primalasari et al (2017) found that only partner can sell FFB directly to CPO mills.

This phenomenon gives rise to the hypothesis that when geographical factors are held constant, particularly among relatives—whether they are family members or neighbors—and associated partner farmers, the degree of trust among the parties involved in transactions within the TBS supply chain is expected to be significantly elevated. This increased trust may enhance collaboration and facilitate smoother interactions within the supply chain framework.

Suppliers's Characteristics in The FFB Supply Chain

The characteristics of oil palm farmers described in this research are: age, gender, education, farming experience, and land size and organization membership. It can be seen in Table 3.

Table 3. Characteristics of Oil Palm Farmers in Bengkulu Province

Characteristics	Percentage (%)
Age (year)	
a. Young (27-42)	30,5
b. Middle-aged (43-57)	50,9
c. Old (58-79)	18,6
Sex	
a. Men	94,9
b. Women	5,1
Education	
a. Basic	57,6
b. Middle	36,4
c. Higher	5,9
Experience (year)	
a. (2 – 19)	48,3
b. (20 – 37)	39,0
c. (38 – 56)	12,7
Land size cultivated (Ha)	
a. (0,5 – 9,5)	94,9
b. (10 – 18)	2,5
c. (18,5 – 28)	2,5
Organization member	
a. No	55
b. Cooperative	21
c. Farmer group	17

Source: Primary data processed (2023)

The average age of oil palm farmers in Bengkulu Province is 49.08 years, with the majority falling in the middle-aged category at 50.9%. This age group is considered productive and capable of effectively managing their businesses (Pinem & Pratiwi, 2020; De Vos et al., 2023). The gender distribution shows that 94.9% of oil palm farmers are men. The remaining 5.1% of activities are carried out by women include collecting palm kernels, record keeping and administration. It is reflecting the physical demands of oil palm farming and cultural norms.

In terms of education, 57.6% of farmers have a basic educational background, which may impact their ability to manage their farms optimally. Although Tinaprilla et al., (2013) stated a formal education only learns general knowledge and does not provide information about business technicalities. It does not directly correlate with farmer's technical abilities in engaged in oil palm farming. Often, farmers obtain this knowledge and skills from informal education and/or training which can be drawn from their experience in oil palm farming.

Experience plays a significant role in farming success, with oil palm farmers in Bengkulu Province having an average of 20.13 years of experience. This experience provides learning for them in running their farming business in order to increase the productivity and to obtain optimal results. The longer the business partner experience, the more likely they are to have a high level of business skills, confidence and trust (Primalasari et al., 2019).

Land size cultivated by oil palm farmers varies, with the majority owning plantations between 0.5 to 8 hectares. With this large area of land, there are very open opportunities for farmers to obtain optimal production results if managed intensively.

Farmer organizations, such as cooperatives and farmer groups, provide access to resources and inputs, but only a portion of farmers in Bengkulu Province are members of such organizations. This happens because farmers feel that farmer organizations do not respect local initiatives, formalities, tend not to be participative and do not prioritize dialogue. Therefore, building farmers' awareness and understanding of the importance of being involved in organizations is important for the sustainability of farming. Building awareness about the benefits of joining these groups is crucial for the sustainability of farming practices (Neo, 2016; Putri et al., 2022; de Vos et al., 2023).

Marketing channels for oil palm farmers involve village collecting traders and RAM institutions. These channels play a vital role in distributing goods from producers to consumers. Village collecting traders are predominantly young, with an average age of 39 years, and have varying levels of formal education. RAM institutions, on the other hand, are managed by individuals in the middle age group, with an average of 15.33 years of business experience. Overall, understanding the demographics and characteristics of oil palm farmers is essential for developing strategies to improve farming practices and sustainability in Bengkulu Province (Watts et al., 2021).

Level of Supplier Trust in The FFB Supply Chain

Trust is an individual attitude that relies on the belief that others can provide benefits and fulfill expectations (Deutsch, et al, 2011; Tejpal, et al, 2013).). The trust level index among suppliers in the FFB supply chain is evaluated based on 17 indicators across three dimensions: ability, benevolence, and integrity. The assessment results of trust levels in four FFB supply chain suppliers – farmers, middlemen, RAM, and CPO mill – are presented in Table 4.

Table 4. Trust dimension index among FFB supplier

Supplier	Trust Dimension Index		
	Ability	Benevolence	Integrity
Farmer	89,21	90,39	89,46
Middleman	85,00	88,88	88,79
RAM	88,89	90,41	89,63
CPO mill	92,78	98,25	94,81

Source: Primary data processed (2023).

Note : the trust index is assessed based on the assumption that the interactions of A & B = the interactions of B & A in the FFB supply chain.

The assessment reveals that the trust level among suppliers in the FFB supply chain is high, with an average trust index of 89.69%. Each supplier's trust index falls within the high category, ranging from 87.56% to 95.28%. Trust plays a fundamental role in fostering collaboration within the palm oil FFB supply chain in Bengkulu Province. Strong collaborative relationships, built on high levels of trust, yield positive outcomes for all suppliers in the supply chain. A high level of trust enhances performance and ensures the smooth functioning of the FFB supply chain (Sridharan & Simatupang, 2013). Conversely, a low level of trust can hinder the formation or even dissolve the supply chain network (D. Y. Kim et al., 2010). Trust is a critical element in fostering cooperation and enhancing the quality of partnerships among supply chain suppliers (Mamad & Ouazzani Chahdi, 2013; Ryu, I., et al, 2009; Mayer et al., 1995).

The growth of trust among suppliers in the FFB supply chain, as highlighted by Mayer et al., (1995), is influenced by three key aspects: ability, benevolence, and integrity. While these three aspects generally exhibit high index values above 80%, specific indicators within each dimension vary. Some indicators strengthen trust growth, while others may weaken it. The research identifies indicators within the ability, benevolence, and integrity dimensions that have the potential to weaken trust levels, as outlined in Table 5.

Table 5. Indicators are strongly suspected of reducing trust among suppliers in supply chain

Dimension	Indicators			
	Farmer	Middleman	RAM	CPO mill
Ability	Competency, and exprience	Competency	Competency	Competency, and exprience
Benevolence	Receptivity	-	-	Empathy and receptivity
Integrity	Connectedness, and reliability	Connectedness, and reliability	Connectedness, and reliability	Connectedness, and reliability

Note: (-) respondents think there is no role

Source: Primary data processed (2023)

Indicators that may weaken trust levels among suppliers in the FFB supply chain are consistent across dimensions. The following analysis delves into the implications of these indicators on trust levels. The ability dimension, encompassing competency and experience indicators, signifies a supplier's capacity to navigate and control their environment effectively (Kim et al., 2003). In the

FFB supply chain context, this relates to a supplier's ability to conduct transactions, provide services, and ensure the security of the transaction process. Competency and experience instill confidence in suppliers, ensuring satisfaction and security in FFB transactions (Mustaniroh et al., 2023; Nashr et al., 2021). The level of experience, reflecting the duration of service provision to FFB suppliers in the region, influences farmers' trust. With an average business experience of 15.33 years, effective and efficient business management is facilitated. However, the influx of new suppliers in the FFB supply chain in Bengkulu Province poses a potential threat to trust levels.

The emergence of RAM as a new supplier, characterized by substantial capital, individual ownership, and advanced facilities for handling large FFB quantities, introduces competitive dynamics and profit opportunities. While latent conflicts may arise due to heightened competition, current management practices effectively mitigate potential conflicts (Sridharan & Simatupang, 2013). Strong financial, social, and geographical ties among suppliers foster trust and collaboration, enabling conflict resolution for mutual benefit (Yaqoub, 2011; Raharja et al., 2020).

Benevolence, denoting a person's willingness to provide satisfaction without harm, includes empathy and receptivity indicators. Empathy, crucial for understanding others' perspectives, is essential for effective communication among suppliers. Miscommunication, often stemming from educational disparities among suppliers, underscores the need for improved information dissemination and education. Empathy, demonstrated through sharing information and providing support, enhances trust levels (Jatnika et al., 2015). However, acceptance, reflecting attitudes towards new suppliers, may pose challenges in the future due to heightened competition (Marcelo & Leticia, 2016). The empathy in the form of a spirit of giving or sharing or helping to face problems is relatively better, including sharing information (Agarwal & Shankar, 2003) about changes in FFB prices with all suppliers in the supply chain, visiting one of the suppliers and/or his family who has experienced a disaster such as a work accident, illness, providing incentives. Certain times either in the form of money or in kind at certain times (holidays, etc.).

An indicator of benevolence that also has the potential to weaken the level of trust between suppliers, namely acceptance, is the attitude of suppliers in the FFB supply chain towards the presence of new suppliers. So far, acceptance between suppliers in the FFB supply chain towards the presence of new suppliers such as RAM is good. In the future, this potential conflict needs to be anticipated, this is very likely to occur with a high level of business competition. According to (Mayer et al., 1995; Kim et al., 2003) profits obtained from transactions in the FFB supply chain can be maximized without sacrificing other people's satisfaction. Suppliers not only want to obtain maximum profits personally but also consider ensuring the satisfaction of other people.

Integrity, reflecting a person's business ethics and reliability, encompasses fairness, loyalty, and reliability indicators (Yaqoub, 2011; Vorst, 2006; Witjaksono et al., 2023). While most integrity indicators exhibit high trust levels, certain indicators, such as linkage and reliability, warrant attention. Sustainable cooperation and satisfaction between suppliers hinge on transparent practices and adherence to quality standards. Ensuring traceability and transparency in FFB transactions may initially disrupt existing practices but is crucial for building trust and sustaining partnerships (Papadonikolaki & Qian, 2020).

The findings of this study offer valuable insights for business actors and policymakers, emphasizing the significance of trust in guaranteeing product quality and adherence to standards. Enhancing distribution efficiency, reducing costs, and improving performance hinge on trust,

performance, and satisfaction assessments. Political support is crucial to safeguard the livelihoods of communities dependent on oil palm plantations. Aligning product/service offerings with customer expectations is pivotal for successful supply chain operations.

CONCLUSION AND SUGGESTION

Based on the research results, several conclusions can be drawn. Firstly, the level of trust between FFB supply chain suppliers is categorized as high, with an average trust index of 89.69%. Secondly, indicators that have the potential to weaken the level of trust include competency and experience indicators from the capability dimension, empathy and receptivity indicators from the kindness dimension, and connectedness and reliability indicators from the integrity dimension.

Based on the theory formulated by the researcher, it can be seen that trust is suspected to have low among actors in supply chain. However, in reality in the field, it is known that trust in Palm Oil Supply Chain is high mutual trust among actors is a significant factors to strenghten of partnership. Therefore, the level of trust between actors in the palm oil FFB supply chain needs to be maintained and improved so that the palm oil FFB supply chain is able to provide and increase their income. factors such as Connectedness, reliability, empathy, competence need to be improved and enhanced

Some suggestions to anticipate the weakening level of trust between suppliers in the FFB supply chain in Bengkulu Province include collaborative efforts involving independent farmers, suppliers, and CPO mills in FFB transactions. Additionally, building a joint commitment to provide transparent information regarding the origin of FFB transacted in the supply chain is recommended. It is hoped that these efforts will result in excellent product and service performance that meets the expectations of all stakeholders, leading to sustainable cooperation between suppliers in the FFB supply chain in Bengkulu Province.

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