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Environmentally sustainable supply chain practices in palm oil: Perspectives from Telangana

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Abstract

Sustainable practices in palm oil supply chains are critical for balancing production efficiency with environmental protection. This study, titled "Environmentally sustainable supply chain practices in palm oil: perspectives from Telangana", examined the views of key stakeholders including farmers, processing units, and logistics operators on the adoption of eco-friendly practices. Data were collected through structured surveys administered to 120 farmers, 20 processing units, and 20 logistics operators in Bhadradri Kothagudem district. Responses were analyzed using descriptive statistics and cross-tabulations to identify variations among stakeholder groups. Results indicate that farmers moderately recognize the benefits of sustainable practices for quality and yield (48.8% agreement), but concerns remain regarding cost, feasibility, and limited training support. Processing units showed strong positive perceptions, with 80% agreeing that sustainability enhances product quality and yield, and 75% reporting adequate training. Logistics operators demonstrated general awareness and willingness to implement sustainable practices, though perceived direct benefits on product quality were less pronounced. Institutional support from TSOILFED was acknowledged by all stakeholder groups, while collaboration among supply chain partners was seen as a key factor for effective adoption. The study highlights that while sustainability is valued across the supply chain, challenges related to capacity building, cost perception, and inter-partner coordination need to be addressed.

Keywords: Sustainable practices, palm oil supply chain, environmental sustainability

Introduction

Sustainable supply chains have emerged as a critical dimension of agribusiness worldwide, balancing economic growth with ecological preservation. With changing consumption patterns and growing demand for edible oils, palm oil cultivation has gained prominence as a high-yield and versatile crop. Recognized for its efficiency and multiple industrial applications, palm oil presents both opportunities and challenges for countries seeking to reduce edible oil imports and enhance farmer incomes. Globally, the palm oil industry has faced scrutiny for its environmental impacts, including deforestation, biodiversity loss, and greenhouse gas emissions. To counter these challenges, global sustainability frameworks such as RSPO certification and national missions have emphasized eco-friendly practices, transparency, and traceability across supply chains. In India, where palm oil consumption is rising, policy makers have stressed the adoption of sustainable practices from the outset to avoid the negative outcomes experienced by major producing nations like Indonesia and Malaysia. Within India, Telangana has positioned itself as a leading state in palm oil promotion, supported by favorable agro-climatic conditions and policy initiatives. The Telangana State Cooperative Oilseeds Growers Federation (TSOILFED) plays a central role in facilitating cultivation, procurement, processing, and distribution of palm oil. As a federated model, TSOILFED not only ensures assured markets for farmers but also has the potential to embed environmentally sustainable practices into its supply chain operations. While much attention has been given to production and policy aspects, the perceptions of supply chain partners-such as farmers, processors, and distributors-remain less studied. Understanding their views is critical, as sustainability initiatives succeed only when stakeholders across the chain recognize, adopt, and support them. Against this backdrop, the present study explores the Environmentally sustainable supply chain practices in palm oil: perspectives from Telangana, offering insights into stakeholder alignment and the scope for strengthening sustainable value chains.

Materials and Methods

The present study was carried out in Bhadradri Kothagudem district of Telangana, a prominent region for oil palm cultivation and home to TSOILFED processing facilities. A multistage purposive sampling approach was employed. Initially, two mandals-Aswaraopeta and Dammapeta-were selected based on their active participation in oil palm farming and proximity to processing units. In the next stage, two villages from each mandal were chosen. From these villages, 80 farmers representing various landholding sizes were randomly selected. Additionally, 40 respondents from TSOILFED's processing and logistics units were included, bringing the total sample size to 120. Primary data were collected using structured interview schedules, and the information obtained was analyzed using descriptive statistics, including percentages, to summarize the perceptions of different stakeholders.

Results and Discussion

Perceptions of Farmers on Sustainable Practices of Palm Oil: Farmers are the primary stakeholders in palm oil cultivation, and their perceptions play a decisive role in shaping the adoption of environmentally sustainable practices. Understanding their views is essential, as these determine the extent to which sustainability measures are implemented at the ground level.

Table 1: Perceptions of Farmers on Sustainable Practices of palm oil

S. No.	Perceptions of Farmers	Responses in percentage (%)				
		5	4	3	2	1
1	Sustainable practices improve quality and yield of palm oil products	13.8	35	40	10	1.3
2	Adoption of sustainable practices does not increases cost of operations	-	33.8	42.5	13.8	10
3	Sufficient training and support available for adopting sustainable practices in my role	3.8	25	37.5	25	8.8
4	Sustainable practices are practical and feasible for me to implement.	5	17.5	37.5	30	10
5	Sustainable practices provide better market opportunities and price premiums	5	40	33.8	20	1.3
6	TSOILFED actively encourages sustainable practices across the supply chain	5	12.5	42.5	26.3	13.8
7	Collaboration among supply chain partners helps in better adoption of sustainability measures.	5	25	47.5	15	7.5

Key Observations

- About 49% of farmers agreed that sustainable practices improve quality and yield, while 40% remained neutral and 11% disagreed, indicating moderate recognition of benefits.
- Cost concerns were evident, with only 34% agreeing that adoption does not raise expenses, while over half (52.5%) disagreed or remained doubtful.
- Training and support availability appeared limited, as 71% of farmers expressed neutrality or disagreement regarding adequate guidance.
- Practical feasibility was also questioned, with 37.5% neutral and 40% disagreeing that such practices could be implemented easily.
- On market opportunities, 45% recognized potential benefits, though the remaining 55% were either uncertain or disagreed.
- Institutional encouragement from TSOILFED was weakly perceived, with just 17.5% agreeing, while more than half (55%) expressed skepticism.
- Collaboration within the supply chain was seen as only moderately effective, with 30% supportive and the rest neutral or negative.

Perceptions of Processing Units on Sustainable Practices of Palm Oil: Processing units form a crucial stage in the palm oil supply chain, where their operational practices directly influence the overall sustainability of the system. Capturing their perceptions helps to identify strengths and gaps in achieving environmentally sustainable outcomes.

Table 2: Perceptions of Processing units on Sustainable Practices of palm oil

S. No.	Perceptions of Processing units	Responses in percentage (%)				
		5	4	3	2	1
1	Sustainable practices improve quality and yield of palm oil products	50	30	10	5	5
2	Adoption of sustainable practices does not increases cost of operations	20	40	20	10	10
3	Sufficient training and support available for adopting sustainable practices in my role	45	30	20	5	-
4	Sustainable practices are practical and feasible for me to implement.	30	30	20	10	10
5	Sustainable practices provide better market opportunities and price premiums	35	25	30	10	
6	TSOILFED actively encourages sustainable practices across the supply chain	40	40	10	10	-
7	Collaboration among supply chain partners helps in better adoption of sustainability measures.	20	20	40	10	10

Key Observations

- A strong majority (80%) agreed that sustainable practices improve the quality and yield of palm oil products.
- Around 60% felt that adopting sustainable measures does not significantly increase operational costs, though about one-fifth expressed concerns.
- Training and support for implementing sustainability were seen as adequate by 75% of respondents.
- Nearly 60% agreed that sustainable practices are practical and feasible to implement, although some reported challenges.
- About 60% believed these practices could provide better market opportunities, while a notable proportion remained uncertain.
- Encouragement from TSOILFED was recognized by 80% of respondents, reflecting strong institutional backing.
- Opinions on collaboration across supply chain partners were mixed, with only 40% supportive and a large

share staying neutral.

Perceptions of Logistics Units on Sustainable Practices of Palm Oil

Logistics operators play a crucial role in minimizing the environmental impact of palm oil through efficient transport, fuel management, and sustainable packaging. Their perceptions provide insight into the adoption and effectiveness of sustainability measures across the supply chain.

Table 3: Perceptions of Logistic units on Sustainable Practices of palm oil

S. No.	Perceptions of Logistic units	Responses in percentage (%)				
		5	4	3	2	1
1	Sustainable practices improve quality and yield of palm oil products	25	25	30	10	10
2	Adoption of sustainable practices does not increases cost of operations	15	55	20	5	5
3	Sufficient training and support available for adopting sustainable practices in my role	50	30	10	10	-
4	Sustainable practices are practical and feasible for me to implement.	20	50	20	10	-
5	Sustainable practices provide better market opportunities and price premiums	10	55	25	5	5
6	TSOILFED actively encourages sustainable practices across the supply chain	20	50	20	10	-
7	Collaboration among supply chain partners helps in better adoption of sustainability measures.	45	30	20	5	-

Key Observations

- About half of the logistics respondents agreed that adequate training and support is available for implementing sustainable practices.
- Seventy percent found sustainability measures practical and feasible to adopt in their operations.
- Perceptions regarding cost and market benefits were moderately positive, with 70% indicating that sustainable practices do not increase operational costs and 65% recognizing potential market opportunities.
- Fewer respondents strongly associated sustainable practices with improvements in product quality and yield (50% agreement), suggesting operational benefits are less directly visible in logistics.
- Encouragement from TSOILFED was acknowledged by 70% of respondents, while 75% agreed that collaboration among supply chain partners helps in adopting sustainability measures.

Conclusion

The analysis of stakeholder perceptions reveals that while sustainable practices in palm oil production and supply chains are broadly acknowledged as beneficial, the extent of acceptance and implementation varies across farmers, processing units, and logistics operators. Farmers demonstrated moderate recognition of the advantages but expressed concerns over costs, feasibility, and limited institutional support, reflecting the need for stronger extension services and training. Processing units showed comparatively higher awareness and adoption readiness, particularly in recognizing quality improvements and institutional encouragement, though collaboration with other actors remained a challenge. Logistics operators reported practical feasibility and institutional backing, with stronger agreement on cost neutrality and market opportunities, yet their perceived link to product quality was less pronounced. Overall, the results suggest that sustainable practices are gaining traction across the palm oil value chain but require tailored interventions like capacity-building programs for farmers, strengthened collaboration mechanisms for processing units, and greater visibility of quality-related benefits for logistics. Enhancing TSOILFED's role as a facilitator of training, market linkage, and cross-sector coordination will be critical in promoting widespread and effective adoption of sustainability in palm oil cultivation and supply chains.

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