

A Qualitative Case Study of a Community-Based Knowledge Intermediary Support Independent Smallholders

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ABSTRACT

Sustainable palm oil certification, such as the Roundtable on Sustainable Palm Oil (RSPO), was introduced as a voluntary global scheme to promote environmentally responsible palm oil production. The certification has become an important mechanism for strengthening sustainability practices in the palm oil sector while also aiming to improve socio-economic outcomes among independent smallholders. However, independent smallholders often face challenges in adopting and maintaining RSPO certification due to limited access to technical knowledge, administrative capacity, and institutional support, resulting in a gap between formal sustainability standards and everyday farming practices. This study examines how a community-based knowledge intermediary facilitates knowledge transfer to support independent smallholders in sustaining RSPO certification, drawing on a social innovation perspective. A qualitative case study approach was employed, involving in-depth interviews with members of a smallholder association and representatives from supporting institutions in Johor, Malaysia, supplemented by field observations and document analysis. The data were analyzed using QSR NVivo version 14. The findings indicate that the intermediary organization plays a critical role in translating certification requirements into practical, locally relevant guidance, delivering training programs, and assisting smallholders in record-keeping and compliance processes. These mechanisms enhance smallholders' capacity to understand and sustain certification requirements over time. This study contributes to the literature on sustainability certification and social innovation by demonstrating how community-based knowledge intermediaries function as mediating actors that bridge institutional sustainability standards and local smallholder practices, thereby supporting the long-term sustainability of certification systems in resource-constrained contexts.

Keywords: Sustainable Palm Oil Certification, Roundtable on Sustainable Palm Oil, Community-Based Knowledge Intermediary, Social Innovation, Independent Smallholders

INTRODUCTION

The palm oil industry plays a crucial role in the global economy, particularly in major producing countries such as Malaysia and Indonesia, where it contributes significantly to export earnings, rural employment, and national economic growth (Adwiyah et al., 2023). Palm oil is also one of the most widely used vegetable oils globally due to its high productivity and efficiency, supplying raw materials for more than half of packaged consumer products and supporting numerous global supply chains (Ostfeld & Reiner, 2024). Despite its economic importance, the rapid expansion of oil palm plantations has raised significant environmental and social concerns, including deforestation, biodiversity loss, and sustainability challenges in producing regions (Naidu & Moorthy, 2021).

In response to these concerns, sustainability certification initiatives have been introduced to promote more responsible production practices in the palm oil sector (Abdul Majid et al., 2021). One of the most prominent initiatives is the Roundtable on Sustainable Palm Oil (RSPO), a global multi-stakeholder certification scheme established to promote the production and use of sustainable palm oil through internationally recognized standards (Suhardjo et al., 2024). As a voluntary transnational governance mechanism, RSPO certification aims to ensure that palm oil production meets environmental, social, and economic sustainability criteria across the

global supply chain (Pereira, 2021; Johnson, 2022).

Within this framework, RSPO certification has increasingly been recognized as an important mechanism to support independent smallholders in achieving sustainability and improving their participation in global value chains (Wibowo et al., 2023). The certification encourages smallholders to adopt better agricultural and land management practices that enhance environmental sustainability while maintaining long-term productivity (Martinez-Nuñez et al., 2024). In addition, participation in RSPO certification can facilitate market access for smallholders, as international buyers and supply chains increasingly prioritize certified sustainable palm oil (Ekaputri et al., 2025). Empirical studies also indicate that certification participation can contribute to livelihood improvements through higher productivity, better farm management, and enhanced economic resilience among smallholder households (Mensah et al., 2025).

However, while existing studies have extensively examined RSPO certification from the perspectives of policy frameworks, environmental standards, and sustainability outcomes, there remains a limited focus on the social and knowledge-related processes that enable smallholders to effectively adopt and sustain certification practices (Siti-Dina et al., 2023). Much of the current literature is concentrated on institutional and compliance dimensions of sustainability, with comparatively fewer studies addressing the role of knowledge systems and intermediary actors in translating certification standards into everyday practice (Danylo et al., 2023).

Prior research has also tended to emphasize structural barriers such as legality, market access, and regulatory compliance, often overlooking the relational and communicative processes through which sustainability knowledge is interpreted and operationalized at the local level (Danylo et al., 2023). This signals the need to move beyond a purely institutional perspective towards a more socially grounded understanding of certification practices.

Emerging evidence further suggests that smallholders' challenges are not solely rooted in technical or institutional limitations, but also in the absence of effective knowledge transfer mechanisms that bridge global sustainability standards with local socio-cultural contexts (Alamsyah et al., 2024). Despite the growing recognition of smallholders as key actors in sustainable palm oil production, the role of community-based knowledge intermediaries such as NGOs, cooperatives, and local organizations in supporting certification adoption remains underexplored and fragmented across disciplines (Veriasa et al., 2024). This highlights a critical gap in understanding how knowledge is mediated, translated, and embedded within smallholder communities to support the sustainability of certification practices such as RSPO.

This study aims to analyse how a community-based knowledge intermediary facilitates knowledge transfer to support independent smallholders in sustaining RSPO certification. Despite the growing body of literature on sustainability certification, much of it continues to privilege formal governance structures, policy instruments, and compliance mechanisms, often treating implementation as a technical process rather than a socially mediated one. As a result, limited attention has been given to the everyday relational and contextual processes through which sustainability knowledge is interpreted, negotiated, and made meaningful within smallholder communities.

In response, this study conceptualizes knowledge transfer not as a linear diffusion of information, but as an embedded social process shaped by interaction, trust, and continuous adaptation among actors operating at different levels. In this context, the study draws on a social innovation perspective to better understand how knowledge transfer processes are embedded within community practices and interactions. Theoretically, it contributes to the literature on social innovation and sustainability transitions by reframing community-based knowledge intermediaries as active agents of translation and mediation between global sustainability standards and local lived realities. Rather than merely facilitating compliance, these intermediaries play a crucial role in shaping how knowledge is interpreted and operationalized within resource-constrained and culturally specific smallholder contexts. This perspective advances a more nuanced understanding of sustainability transitions by emphasizing that the durability of certification practices depends not only on institutional arrangements, but also on relational infrastructures that sustain learning, adaptation, and collective sense-making at the community level.

LITERATURE REVIEW

Sustainable Palm oil Certification

The Roundtable on Sustainable Palm Oil (RSPO), established in April 2004 under Article 60 of the Swiss Civil Code, represents the first global standard-setting initiative for palm oil and a multi-stakeholder platform aimed at promoting sustainable production worldwide (Pareira, 2021). As a transnational governance mechanism, RSPO plays a central role in addressing environmental and social concerns associated with palm oil expansion by establishing internationally recognized sustainability standards (Majid et al., 2021). These standards encompass key dimensions of sustainability, including transparency, legal compliance, environmental management, agricultural practices, labor, and social responsibility (Npueng et al., 2023; Majid et al., 2021).

However, the distribution of certification remains highly uneven. While more than half of the certified area is concentrated in Indonesia and dominated by industrial plantations, smallholder participation remains limited. Globally, smallholder-certified areas account for only 452,933 hectares or approximately 11.6% of total RSPO- certified land, with independent smallholders managing merely 26,615 hectares (0.68%) (RSPO, 2020). This disparity reflects not only structural inequalities but also knowledge-related constraints, indicating that certification adoption extends beyond technical compliance and is deeply embedded in social and institutional contexts.

In response, leading palm oil-producing countries such as Indonesia and Malaysia have introduced national certification frameworks to enhance sustainability compliance among producers. Indonesia has implemented several initiatives, including the Rainforest Alliance Sustainable Agriculture Standard, the Palm Oil Innovation Group (POIG), and the Indonesian Sustainable Palm Oil (ISPO) scheme introduced in 2011 (Watts et al., 2021; Majid et al., 2021). Similarly, Malaysia introduced the Malaysian Sustainable Palm Oil (MSPO) standard in 2015, which aims to strengthen smallholder economic performance, improve management practices, ensure occupational safety, and support environmental conservation (De Vos et al., 2021).

The integration of smallholders into certification systems is therefore critical for global supply stability, inclusivity, and legitimacy. Smallholders constitute an essential component of the palm oil supply chain, and their exclusion risks undermining certified supply sustainability, particularly amid increasing global demand for sustainable palm oil (RSPO, 2024). However, many smallholders continue to face structural, institutional, and resource-based barriers that limit their effective participation, often requiring targeted support mechanisms to enable inclusion (Reich & Musshoff, 2025; Rosdin et al., 2023). These conditions highlight that certification outcomes are not merely determined by compliance frameworks, but are significantly shaped by knowledge accessibility and social support systems.

Social Innovation and Community-Based Intermediary

Social innovation is increasingly recognized as a transformative approach for addressing complex sustainability challenges in agricultural systems. It extends beyond technological innovation by emphasizing changes in social relations, governance arrangements, and institutional coordination. In smallholder agricultural contexts, social innovation becomes particularly relevant because farmers often operate under structural constraints such as limited access to information, weak institutional support, and fragmented value chains. According to Klerkx and Begeman (2020), these constraints require collective and system-level responses rather than individual-level solutions.

In agricultural innovation systems, social innovation is increasingly understood as a multi-actor and multi-level process involving interactions between farmers, government agencies, private sector actors, and civil society organizations. This perspective challenges traditional top-down innovation models and instead highlights the importance of collaborative governance structures. Such systems enable the co-creation of solutions that are more context-sensitive and responsive to local needs, particularly in smallholder-dominated agricultural landscapes (Klerkx & Begemann, 2020).

A key component of social innovation is the emergence of intermediary actors who function as bridges

between global sustainability standards and local implementation contexts. These intermediaries play a crucial role in translating complex regulatory and certification requirements into actionable practices for farmers. In doing so, they reduce institutional distance and facilitate coordination across different stakeholder groups within agricultural systems (Ouerghemmi et al., 2024).

Community-based intermediaries such as farmer organizations, cooperatives, and NGOs are particularly effective because they are embedded within local social structures. This embeddedness allows them to build trust, understand farmer realities, and provide culturally appropriate support. Unlike formal state institutions, these actors operate through relational networks that enhance communication, knowledge exchange, and collective problem-solving within farming communities (Pretty et al., 2020).

However, despite their importance, intermediary roles are still not fully integrated into mainstream agricultural innovation theory. Many studies treat intermediaries as supportive actors rather than central components of transformation processes. This limits understanding of how intermediaries actively shape sustainability outcomes, particularly in certification systems where compliance depends heavily on coordination, trust, and knowledge translation (Ouerghemmi et al., 2024).

Knowledge Transfer in Certification Context

Knowledge transfer plays a central role in the implementation of sustainability certification systems, particularly among smallholders who must comply with complex technical and environmental standards. In this context, knowledge transfer involves more than the dissemination of information; it requires the translation of abstract certification requirements into practical and locally relevant farming practices. As highlighted by Zeng et.al (2025), this makes knowledge transfer a dynamic and context-dependent process rather than a simple instructional activity.

Agricultural knowledge transfer is typically delivered through extension services, training programs, advisory systems, and demonstration activities. These mechanisms aim to enhance farmers' technical capacity and improve their ability to adopt sustainable agricultural practices. However, the effectiveness of these mechanisms depends not only on the availability of information but also on the accessibility, continuity, and relevance of the knowledge provided to farmers (Zeng et al., 2025).

Importantly, knowledge transfer is not a linear process but a relational and socially embedded phenomenon. It depends heavily on trust, communication, and interaction between knowledge providers and recipients. Farmers are more likely to adopt new practices when they perceive the information source as credible and when the knowledge aligns with their lived experience and farming realities. As stated by Saito et al (2023), this highlights the importance of relational proximity in shaping learning outcomes.

In addition, knowledge transfer is increasingly conceptualized as a co-production process rather than a one-way dissemination of information. Farmers actively interpret, adapt, and modify external knowledge based on local conditions, environmental variability, and socio-economic constraints. This adaptive process ensures that sustainability practices are not simply adopted but contextualized within local farming systems, increasing their long-term relevance and effectiveness (Pretty et al., 2020).

Despite these advances, many certification systems still face significant challenges in ensuring effective knowledge transfer. These challenges include fragmented institutional structures, weak coordination between stakeholders, and unequal access to training and advisory services. As a result, knowledge often fails to reach marginalized smallholders effectively, limiting the overall impact of sustainability certification initiatives (Saito et al., 2023).

Theoretical Framework

Social Innovation Theory

Social Innovation Theory provides the primary analytical lens for this study in understanding how collective arrangements emerge to address complex sustainability challenges in agricultural systems. It emphasizes that

innovation extends beyond technological advancement to include transformations in social relations, institutional structures, and governance systems (Rajasekhar, 2020; Pel et al., 2020). In contemporary sustainability transitions research, social innovation is widely recognized as a mechanism of organized social change that reshapes how actors coordinate and solve collective problems within institutional settings (Genov, 2020).

In the context of smallholder palm oil certification, social innovation is reflected in the development of multi-stakeholder and community-based mechanisms that enable more inclusive participation in sustainability initiatives. These arrangements are often characterized by transformative processes that challenge existing institutional norms and enable new governance configurations that support sustainability outcomes (Pel et al., 2020; Jalonen, 2021). Such perspectives highlight that social innovation is not only a local intervention, but part of broader systemic change involving institutional reconfiguration and power redistribution.

These arrangements typically involve hybrid governance structures that connect farmers, cooperatives, NGOs, and industry actors, thereby strengthening coordination and collective action within agricultural systems. Within this system, smallholders are increasingly recognized as active co-producers of innovation rather than passive recipients of external interventions, reflecting a shift toward more participatory and networked innovation systems. A central component of this social innovation process is the emergence of intermediary actors who function as bridges between global certification standards and local farming realities, supporting knowledge exchange and institutional alignment across scales.

These intermediaries facilitate not only coordination and trust-building but also collective learning processes that ensure sustainability standards are meaningfully integrated into local agricultural practices. However, despite the importance of these institutional arrangements, social innovation research highlights ongoing conceptual debates and empirical gaps, particularly regarding how micro-level interactions translate into systemic change outcomes (Gurrutxaga & Galarraga, 2021; Jalonen, 2021). This indicates the need for deeper analysis of implementation processes within multi-actor sustainability governance systems.

Knowledge Transfer Theory

Knowledge Transfer Theory is employed as a complementary theoretical lens to explain how knowledge is shared, interpreted, and internalized within social innovation structures. It views knowledge transfer not as a simple transmission process, but as a socially embedded learning mechanism shaped by interaction, context, and interpretation. Recent empirical evidence in agricultural systems shows that effective knowledge transfer is highly dependent on advisory systems, extension agents, and structured learning platforms that enhance farmers' understanding and adoption of new practices (Mesfin et al., 2023; Cawley et al., 2023). This reinforces the idea that knowledge is co-produced through engagement rather than passively delivered.

In certification-based agricultural systems, knowledge transfer plays a crucial role in translating complex sustainability standards into practical, locally adapted farming practices. Evidence from smallholder systems highlights that structured learning approaches such as farmer field schools, participatory training, and advisory services significantly improve knowledge uptake and behavioral change (Amarathunga et al., 2023; Silici et al., 2021). These findings suggest that knowledge must be contextualized to local socio-economic and environmental conditions in order to be effectively adopted by farmers, particularly in diverse smallholder landscapes where capacity and resources vary widely.

The effectiveness of knowledge transfer is also strongly influenced by relational and institutional factors such as trust, social proximity, and repeated interaction between actors. Studies show that trust in extension agents, peer learning networks, and farmer-to-farmer communication significantly enhance learning outcomes and technology adoption in agricultural systems (Korir et al., 2023; Thar et al., 2021). Moreover, knowledge transfer is increasingly understood as an iterative and continuous learning process rather than a one-time intervention, where farmers actively engage in adapting and refining knowledge based on their lived experience. Within this study, Knowledge Transfer Theory is therefore positioned as a mechanism operating within Social Innovation frameworks, explaining how intermediary actors facilitate learning, adaptation, and participation in sustainability certification systems (Ochago et al., 2023).

Theoretical Integration

Knowledge Transfer Theory and Social Innovation Theory are complementary in explaining the dynamics of smallholder participation in sustainability certification. Social Innovation Theory provides a multi-level analytical lens that captures the interaction between institutional arrangements, intermediary actors, and localized practices that support smallholder inclusion. Within this perspective, Knowledge Transfer Theory is used as a complementary lens to acknowledge the role of knowledge-related processes in facilitating the translation of sustainability standards into practical farming practices. Together, these perspectives provide a broader understanding of how community-based knowledge intermediaries support smallholders in engaging with RSPO certification.

Based on Figure 1, this study develops a conceptual framework that illustrates how community-based knowledge intermediaries support the implementation of sustainability certification standards among independent smallholders within a social innovation context.

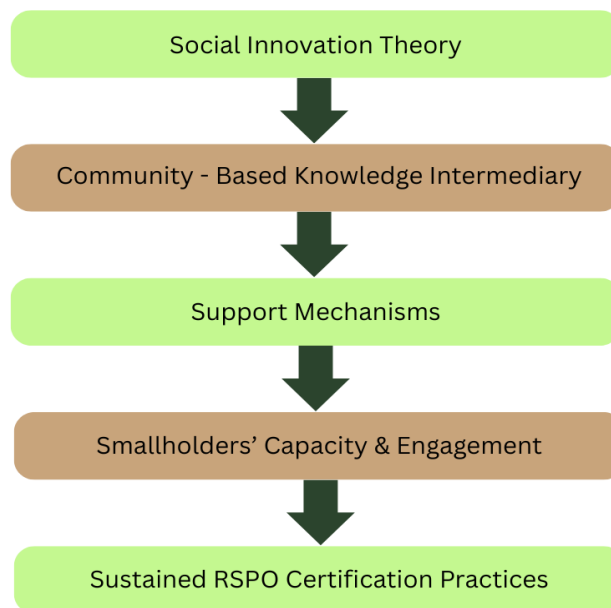


Figure 1. Conceptual Framework of the Study

The conceptual framework illustrates how community-based knowledge intermediaries operate within a social innovation system to support smallholder participation in sustainability certification. Grounded in Social Innovation Theory, the framework positions the intermediary as a central actor that facilitates coordination, engagement, and support mechanisms among smallholders and relevant stakeholders. Through these mechanisms, smallholders are enabled to enhance their capacity and actively engage in certification-related practices. This process subsequently contributes to the sustained implementation of RSPO certification practices among independent smallholders. While knowledge-related processes underpin these interactions, they are embedded within the broader social and institutional arrangements that shape smallholder participation.

METHODOLOGY

Research Design

This study adopts a qualitative case study design to examine how a community-based knowledge intermediary organization supports independent smallholders in sustaining certification under the Roundtable on Sustainable Palm Oil (RSPO). A qualitative approach is appropriate as it enables an in-depth exploration of processes, interactions, and lived experiences that shape the implementation and maintenance of certification practices. The case study design allows for a contextualized understanding of how knowledge transfer occurs within a specific socio-economic setting involving multiple stakeholders.

Research Site

The research was conducted in a district in southern Peninsular Malaysia. The site was purposively selected as an information-rich case due to the presence of RSPO-certified independent smallholders and ongoing community-based initiatives involving collaboration between a smallholder associations and supporting institutions. The research site provides a relevant empirical context for examining how knowledge transfer processes are facilitated through intermediary support mechanisms. The interaction between the community-based knowledge intermediaries organization, the smallholder association, and independent smallholders offers a suitable setting for analyzing how certification knowledge is interpreted, translated, and sustained at the community level.

Informant

Data were collected from 15 informants, selected through purposive sampling based on their direct involvement in RSPO certification and community-based knowledge transfer activities. Purposive sampling was employed because the study sought participants possessing direct experience in RSPO certification implementation and knowledge transfer activities. Participants were selected based on three criteria: (1) active involvement in RSPO certification, (2) participation in knowledge transfer programmes, and (3) ability to provide rich information relevant to the research objectives. Sampling continued until no substantially new insights emerged from subsequent interviews, indicating thematic saturation. The informants comprised representatives from a community-based knowledge intermediary organization, a smallholder association, and RSPO-certified independent smallholders. Interviews lasted between 45 and 90 minutes were conducted in Malay, audio-recorded with participants' consent and later transcribed verbatim for analysis. Semi-structured interviews were conducted to capture participants' experiences, perceptions, and practices related to certification implementation and knowledge transfer processes. In addition, participant observation was carried out to gain insights into real-time interactions and field practices. Relevant documents, including policy materials, training reports, and organizational records related to RSPO certification, were also reviewed to support triangulation of data sources. This multi-method approach enhances the depth, credibility, and reliability of the findings.

Research Positionality

The lead author previously worked with the community-based knowledge intermediary organization examined in this study, which provided valuable contextual understanding of the certification implementation process and facilitated access to field participants. However, this proximity also introduces potential researcher bias arising from pre-existing familiarity with the organization and its stakeholders. To mitigate this, a reflexive stance was consistently maintained throughout the research process, with continuous critical reflection on personal assumptions to ensure interpretations were grounded in participants' narratives rather than prior professional experiences. Methodological rigor was further strengthened through triangulation of multiple data sources, including semi-structured interviews, participant observation, and document analysis, to enhance the credibility of the findings and minimize subjective influence.

Data Analysis

All qualitative data were analyzed using QSR NVivo version 14 through a thematic analysis approach, involving a systematic and iterative process of coding, categorization, and theme development. Analysis moved back and forth between raw data and emerging conceptual patterns to refine understanding of knowledge transfer, mediation processes, and certification practices among the community-based knowledge intermediary organization, the smallholder association, and independent smallholders. The process began with initial coding to generate meaningful data segments, which were then organized into higher-order categories and progressively developed into overarching themes, with continuous refinement to ensure analytical coherence. Triangulation across semi-structured interviews, participant observation, and document analysis was employed to enhance the trustworthiness, consistency, and validity of the findings, with the overall analysis focusing on how knowledge is translated, negotiated, and operationalized within the local smallholder context.

FINDING

Role of Community-Based Knowledge Intermediary in Facilitating RSPO Certification

The findings reveal that a community-based knowledge intermediary plays a critical role in strengthening both the technical and organizational readiness of smallholder groups in navigating RSPO certification requirements. This intermediary functions as a bridging structure that connects global certification standards with local implementation practices, thereby reducing institutional and knowledge gaps faced by smallholders. However, the effectiveness of this bridging role is not uniform, as it is influenced by variations in smallholder capacity and the intensity of ongoing support required throughout the certification process.

Empirical evidence indicates that smallholder groups were systematically guided to understand complex certification requirements, particularly in farm management, documentation procedures, and audit preparation. Through structured support, these groups developed the capacity not only to comply with technical standards but also to assume responsibility as coordinators in managing certification processes at the group level. While this progression was evident among most participants, some smallholders indicated that full comprehension of documentation and audit expectations still required repeated guidance, particularly during peak agricultural periods when time constraints limited engagement. This is reflected in the experiences shared by IR1:

“Kami diajar satu per satu macam mana nak ajar pekebun kecil, semak rekod ladang, dan pastikan semua dokumen lengkap sebelum hari audit. Kami perlu faham kesemuanya sebab yang bertanggungjawab untuk berjumpa dan menjawab soalan auditor adalah kami. Jadi kalau kami faham, mudalah untuk kami nanti” (IR1)

Translation:

“We were trained step by step on how to guide smallholders, review farm records, and ensure that all documents are complete before the audit day. We need to understand everything because we are the ones responsible for meeting and answering the auditor’s questions. So if we truly understand it, it will make things much easier for us later” (IR1)

This statement illustrates how knowledge is not merely transferred but actively operationalized within the organizational structure. The ability of smallholder groups to manage training, documentation, and audit preparation reflects the mediating role of the intermediary in translating complex certification requirements into actionable practices. Nevertheless, this operationalization process is shaped by uneven levels of technical literacy and differing capacities among group members, which may affect the consistency of implementation across different smallholder clusters.

In line with knowledge transfer theory, this process demonstrates how intermediaries facilitate not only the dissemination but also the internalization of knowledge, ultimately reducing dependence on external actors and strengthening institutional capacity. However, this reduced dependency is gradual rather than absolute, as some groups continue to rely on intermediary support for clarification and compliance monitoring, particularly in more technically demanding certification components.

Social Innovation-Driven Knowledge Transfer Mechanisms in Smallholder Networks

The study further identifies that knowledge transfer within smallholder communities is embedded within socially driven and participatory mechanisms, reflecting key characteristics of social innovation. Rather than relying on conventional top-down approaches, knowledge is co-created through collaboration, peer interaction, and continuous engagement within the community. However, the effectiveness of these mechanisms varies depending on the strength of local leadership capacity and the level of sustained engagement among members.

One of the key mechanisms observed is the development of localized leadership structures, where selected individuals within the community are trained to facilitate knowledge dissemination and support their peers. This creates a decentralized knowledge system that enhances accessibility and trust within the network. While this structure strengthens peer-to-peer learning, it also places considerable responsibility on individual leaders,

which may lead to uneven knowledge distribution when leadership capacity differs across groups. This transformation is evident in informant's experiences:

"Dulu memang saya langsung tak pandai nak cakap depan orang, nak kumpul data pun blur je. Tapi lepas staf organisasi pekebun kecil ajar saya pelan-pelan, tunjuk satu-satu macam mana nak buat, lama-lama saya faham. Sekarang bukan saja saya boleh cakap depan orang dan kumpul data, tapi saya juga boleh bantu ahli-ahli saya kat bahagian, ajar mereka apa yang saya belajar, dan siap hantar laporan ke pejabat lagi. Tak sangka dulu takut, sekarang dah boleh urus sendiri" (IR2)

Translation:

"Before this, I really didn't know how to speak in front of people, and I was completely clueless about how to collect data. But after the smallholder organization guided me step by step and showed me how to do things one by one, I gradually understood. Now, not only can I speak in front of others and collect data, but I can also help the members in my section, teach them what I've learned, and even submit reports to the office. I never imagined that I used to be so afraid, and now I'm able to manage things on my own." (IR2)

This highlights how knowledge transfer extends beyond technical instruction to include empowerment and capacity building. The emergence of confidence and leadership among participants reflects the transfer of tacit knowledge through experiential learning and social interaction. However, this transformation is not uniform across all participants, as differences in confidence levels, prior exposure, and communication skills influence the extent to which individuals transition into effective knowledge brokers within their communities.

From a theoretical perspective, this aligns with social innovation, where knowledge exchange is embedded within community structures, fostering collective learning and enhancing adaptive capacity among smallholders. Nevertheless, such adaptive capacity is contingent upon sustained institutional facilitation, as peer-driven systems may weaken without continuous external support or reinforcement mechanisms.

Smallholders' Adaptation and Translation of RSPO Certification Practices

The findings demonstrate that smallholders do not adopt RSPO certification standards in a direct or uniform manner. Instead, they actively interpret and translate these standards into locally relevant practices that align with their socio-economic and cultural contexts. This process of adaptation is crucial in transforming abstract global standards into practical actions at the farm level. However, the extent and accuracy of this translation process vary across smallholders depending on their prior agricultural knowledge and exposure to structured training.

Prior to engagement with structured support, many participants perceived certification requirements as complex and difficult to implement. However, through continuous guidance and contextualized learning, these standards became more accessible and applicable in daily practices. While this improvement was widely reported, some participants still indicated uncertainty in applying certain technical inputs independently, particularly when guidance from facilitators was not immediately available. This is reflected in the following informant account:

"Organisasi pekebun kecil ini tunjukkan kat kami cara yang betul nak guna baja di kebun. Dulu kami semua main agak-agak je, takde ilmu yang betul, kadang-kadang salah cara, tapi sekarang baru faham macam mana nak buat betul supaya pokok sihat dan hasil pun banyak" (IR3)

Translation:

"The smallholder organization showed us the proper way to apply fertilizer in the plantation. In the past, we just did it by estimation without proper knowledge. Sometimes using the wrong methods but now we understand how to do it correctly so that the trees stay healthy and yields increase." (IR3)

This illustrates the process of knowledge translation, where technical requirements are simplified into actionable steps that can be integrated into routine farming activities. The findings highlight that effective

knowledge transfer involves not only dissemination but also contextualization, ensuring that global sustainability standards are aligned with local realities. Nevertheless, this translation process remains dependent on continuous reinforcement, as inconsistent guidance may lead to partial or uneven adoption of recommended practices among different smallholder groups.

This supports the theoretical view that knowledge must be adapted rather than directly adopted to ensure meaningful implementation. However, such adaptation is not purely organic; it is shaped by external facilitation, meaning that without intermediary support, the depth and consistency of translation may be reduced.

Structural and Operational Challenges in Sustaining Certification Implementation

Despite the positive outcomes, the findings also reveal several structural and operational challenges that affect the sustainability of certification implementation among smallholders. These challenges persist across technical, social, and institutional dimensions. Importantly, these constraints are not isolated incidents but represent recurring conditions that shape the long-term feasibility of sustained compliance.

At the technical level, smallholders face ongoing difficulties in maintaining consistent documentation, adhering to complex standards, and preparing for audits. While initial guidance supports compliance, sustaining these practices over time requires continuous monitoring and reinforcement. This indicates that technical compliance is not a one-off achievement but a repetitive process that becomes more difficult in the absence of structured follow-up mechanisms.

From a social perspective, variations in commitment and understanding among smallholders influence the effectiveness of implementation. Not all participants adapt at the same pace, and differences in experience and knowledge levels contribute to uneven compliance. While some groups demonstrate strong adherence, others show intermittent application of practices, particularly when support from intermediaries is less frequent. This challenge is reflected in informants' concerns:

“Kami banyak bincang dengan pekebun kecil tentang macam mana nak guna baja dan racun dengan betul. Racun mana yang boleh digunakan dan diharamkan. Kadang-kadang mereka tak tahu risiko sebenar kalau guna sembarangan, macam bahaya untuk diri sendiri, keluarga, atau alam sekitar. Jadi, kami tunjukkan cara yang selamat, step by step, supaya mereka faham dan boleh ikut dalam kerja harian mereka” (IR4)

Translation:

“We often discuss with smallholders how to use fertilizers and pesticides properly. What types are permitted and which are prohibited. Sometimes they are not aware of the real risks of improper use, such as harm to themselves, their families, or the environment. So we demonstrate safe methods step by step, so that they understand and can apply them in their daily practices.” (IR4)

At the institutional level, sustaining certification is further constrained by limitations in resources, coordination, and continuity of support. These structural limitations create dependency on intermediary actors, meaning that certification compliance remains partially externally supported rather than fully internalised within smallholder systems. These findings suggest that while social innovation and knowledge transfer mechanisms are effective in facilitating initial adoption, long-term sustainability requires stronger institutionalization and ongoing support systems. Without continuous reinforcement, the risk of declining compliance remains significant. Thus, sustainability emerges as a conditional outcome rather than an inherent result of certification engagement.

DISCUSSION

Role of Community-Based Knowledge Intermediary in Facilitating RSPO Certification

The findings demonstrate that community-based knowledge intermediaries play a significant role in facilitating the implementation of RSPO certification requirements among smallholders. This aligns with previous studies

highlighting the importance of intermediary actors in bridging institutional and knowledge gaps within sustainability certification systems (De Vos et al., 2021; Watts et al., 2021). However, the effectiveness of this role is not uniform and is shaped by varying levels of smallholder capacity and reliance on external facilitation.

Rather than functioning solely as knowledge transmitters, intermediaries actively translate complex certification requirements into practical and locally applicable processes. These include training facilitation, documentation coordination, and audit preparation support. This indicates that knowledge transfer is not linear but is instead mediated, iterative, and context-dependent (Mazorodze & Buckley, 2020). Nevertheless, the extent to which smallholders internalise these processes varies, with some groups demonstrating higher autonomy than others depending on prior experience and exposure.

From a theoretical perspective, this supports the view that knowledge transfer requires embedded intermediary structures capable of bridging global standards with local realities. In this context, intermediaries function simultaneously as knowledge brokers and institutional enablers. However, the findings also suggest that dependency on intermediary support is not fully eliminated, indicating that institutional readiness remains uneven across smallholder groups. This contributes to the literature by emphasising that intermediary effectiveness is conditional rather than absolute.

Social Innovation-Driven Knowledge Transfer Mechanisms in Smallholder Networks

The findings further reveal that knowledge transfer within smallholder communities is shaped by socially embedded and participatory mechanisms, reflecting core characteristics of social innovation. This is consistent with existing literature which emphasises that social innovation fosters collaborative learning environments and strengthens collective agency in rural development contexts (Bucio-Mendoza & Solis-Navarrete, 2024; Cunha et al., 2025).

Unlike conventional top-down approaches, knowledge transfer in this context is decentralised and community-driven, enabling peer-to-peer learning and participatory engagement. The emergence of localized leadership structures reflects the role of social networks and communities of practice in facilitating knowledge exchange and organisational learning (Zhang, 2024; Le & Tuyen, 2025). However, this decentralisation also introduces variability, as the effectiveness of knowledge dissemination depends on the capacity and commitment of individual leaders.

Moreover, the study demonstrates that social innovation facilitates the transfer of tacit knowledge through experiential learning and social interaction. This aligns with the view that knowledge is most effectively transferred when embedded within trust-based and interactive social contexts (Rizal & Nordin, 2022). Nevertheless, the extent of empowerment and adaptive capacity gained through these mechanisms is not evenly distributed across participants, as differences in confidence, experience, and engagement influence outcomes. Therefore, social innovation functions as an enabling mechanism, but its effects remain context-dependent and uneven across smallholder networks.

Smallholders' Adaptation and Translation of RSPO Certification Practices

The findings show that smallholders do not adopt RSPO certification standards in a uniform manner. Instead, they actively adapt and translate these standards into locally relevant practices that align with their socio-economic and cultural contexts. This finding is consistent with previous research which highlights that global sustainability standards require localisation to be effectively implemented (De Vos et al., 2023; Npueng et al., 2023).

However, the study extends this literature by demonstrating that translation is an ongoing process rather than a single adjustment. Through continuous guidance and contextual learning, certification requirements become more meaningful when simplified and integrated into existing farming practices. Nevertheless, the depth and accuracy of this translation vary across individuals, particularly depending on prior knowledge, technical exposure, and access to support.

From a theoretical standpoint, this supports knowledge translation theory, which emphasises that knowledge

must be adapted to local socio-cultural and economic conditions. In addition, it aligns with social innovation perspectives that prioritise co-creation and bottom-up adaptation (OECD, 2025). However, the findings also indicate that translation processes remain dependent on sustained facilitation, suggesting that local adaptation alone is insufficient without ongoing intermediary engagement. Thus, implementation outcomes are shaped by both local agency and external support structures.

Structural and Operational Challenges in Sustaining Certification Implementation

Despite the contributions of social innovation and knowledge transfer mechanisms, the findings reveal persistent structural and operational challenges that affect the sustainability of RSPO certification implementation. These constraints operate across technical, social, and institutional dimensions and are consistent with prior studies identifying resource limitations, complexity of standards, and uneven smallholder capacity as key barriers (Irawan et al., 2024; Reich & Musshoff, 2025).

At the technical level, smallholders continue to face difficulties in maintaining documentation consistency, complying with complex requirements, and preparing for audits. This indicates that certification compliance is not a one-time achievement but an ongoing process requiring continuous reinforcement. At the social level, variation in knowledge, motivation, and participation contributes to uneven implementation outcomes across groups.

At the institutional level, limitations in resources, coordination, and continuity of support further constrain long-term sustainability. While social innovation and knowledge transfer mechanisms facilitate initial adoption, their effectiveness diminishes without sustained institutional backing. This suggests that certification implementation is partially dependent on external facilitation rather than fully internalised within smallholder systems.

Overall, the findings indicate that sustainability is not an inherent outcome of certification participation but a conditional process shaped by continuous support, institutional reinforcement, and adaptive capacity. Therefore, future interventions should extend beyond initial training and focus on long-term system strengthening to ensure durable compliance and resilience among smallholders.

CONCLUSION

This study demonstrates that RSPO certification among smallholders can be strengthened through social innovation facilitated by community-based intermediaries. These intermediaries play a crucial role in bridging the knowledge gap between the complex requirements of RSPO standards and the actual capacities of smallholders at the grassroots level. Through social innovation processes, they do not merely transfer technical knowledge but also adapt, translate, and operationalize certification requirements within local socio-cultural contexts. This enables smallholders to better understand, accept, and implement sustainable practices required by RSPO certification. Therefore, the study highlights that the success of RSPO implementation depends not only on global sustainability frameworks, but also on the effectiveness of social innovation driven by intermediaries in building capacity and sustaining sustainable practices among smallholders.

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