

SUSTAINABLE PALM OIL AND RURAL LIVELIHOODS: CREATING SHARED VALUE TO SMALLHOLDERS AND COMMUNITIES

ÓLEO DE PALMA SUSTENTÁVEL E MEIOS DE SUBSISTÊNCIA RURAIS: CRIANDO VALOR COMPARTILHADO PARA PEQUENOS PROPRIETÁRIOS E COMUNIDADES

ACEITE DE PALMA SOSTENIBLE Y MEDIOS DE VIDA RURALES: CREANDO VALOR COMPARTIDO PARA LOS PEQUEÑOS PRODUCTORES Y LAS COMUNIDADES

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ABSTRACT

The palm oil industry's expansion has resulted in intricate social, economic, and environmental impacts on rural populations and small-scale farmers in producer nations. While palm oil contributes significantly to national economies, its conventional practices have been accused of raising concerns about ecological degradation, social exclusion, and inequitable benefit distribution. Creating Shared Value (CSV) has emerged as a strategic framework to align business objectives with community development. This research seeks to investigate ways sustainable palm oil initiatives can improve the well-being of rural communities by creating mutual benefits for smallholders and local groups. Employing a qualitative literature review method, this research systematically examines peer-reviewed articles, institutional reports, and empirical case studies published in the last decade. Data were collected through document analysis of at least 80 academic sources, managed using Mendeley Desktop. The dataset underwent thematic content analysis to reveal significant patterns and relationships associated with boosting economic empowerment, environmental stewardship, and social inclusion. The findings reveal that sustainable palm oil initiatives—particularly those involving ISPO/RSPO certification, inclusive business models, and multi-stakeholder collaborations-have improved smallholder incomes, reduced environmental impacts, and strengthened social capital. However, challenges such as high certification costs, insecure land tenure, and unbalanced gender participation persist. The study concludes that CSV-oriented palm oil systems offer promising pathways to sustainable development but require structural support, inclusive policies, and adaptive governance. Upcoming studies are encouraged to investigate the lasting impacts of CSV application and craft comparative case analyses across various agro-ecological zones and institutional frameworks.

Keywords: Sustainable palm oil. Rural livelihoods. Creating shared value. Smallholders. Qualitative literature review.

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RESUMO

A expansão da indústria do óleo de palma resultou em impactos sociais, econômicos e ambientais complexos sobre as populações rurais e os pequenos agricultores dos países produtores. Embora o óleo de palma contribua significativamente para as economias nacionais, suas práticas convencionais têm sido acusadas de levantar preocupações sobre degradação ecológica, exclusão social e distribuição desigual de benefícios. A Criação de Valor Compartilhado (CVC) surgiu como uma estrutura estratégica para alinhar os objetivos empresariais com o desenvolvimento comunitário. Esta pesquisa busca investigar como iniciativas sustentáveis de óleo de palma podem melhorar o bem-estar das comunidades rurais, criando benefícios mútuos para pequenos produtores e grupos locais. Empregando um método de revisão bibliográfica qualitativa, esta pesquisa examina sistematicamente artigos revisados por pares, relatórios institucionais e estudos de caso empíricos publicados na última década. Os dados foram coletados por meio de análise documental de pelo menos 80 fontes acadêmicas, gerenciadas utilizando o Mendeley Desktop. O conjunto de dados foi submetido à análise temática de conteúdo para revelar padrões e relações significativas associadas ao fortalecimento do empoderamento econômico, da gestão ambiental e da inclusão social. Os resultados revelam que iniciativas de óleo de palma sustentável — particularmente aquelas que envolvem a certificação ISPO/RSPO, modelos de negócios inclusivos e colaborações multissetoriais — melhoraram a renda dos pequenos produtores, reduziram os impactos ambientais e fortaleceram o capital social. No entanto, desafios como altos custos de certificação, posse de terra insegura e participação deseguilibrada de gênero persistem. O estudo conclui que sistemas de óleo de palma orientados para o CSV oferecem caminhos promissores para o desenvolvimento sustentável, mas requerem apoio estrutural, políticas inclusivas e governança adaptativa. Estudos futuros são incentivados a investigar os impactos duradouros da aplicação do CSV e a elaborar análises comparativas de casos em diversas zonas agroecológicas e estruturas institucionais.

Palavras-chave: Óleo de palma sustentável. Meios de subsistência rurais. Criação de valor compartilhado. Pequenos produtores. Revisão qualitativa da literatura.

RESUMEN

La expansión de la industria del aceite de palma ha generado complejos impactos sociales, económicos y ambientales en las poblaciones rurales y los pequeños agricultores de los países productores. Si bien el aceite de palma contribuye significativamente a las economías nacionales, sus prácticas convencionales han sido acusadas de generar preocupación por la degradación ecológica, la exclusión social y la distribución desigual de beneficios. La Creación de Valor Compartido (CVC) se ha convertido en un marco estratégico para alinear los objetivos empresariales con el desarrollo comunitario. Esta investigación busca investigar cómo las iniciativas sostenibles de aceite de palma pueden mejorar el bienestar de las comunidades rurales mediante la generación de beneficios mutuos para los pequeños agricultores y los grupos locales. Mediante un método cualitativo de revisión bibliográfica, esta investigación examina sistemáticamente artículos revisados por pares, informes institucionales y estudios de caso empíricos publicados en la última década. Los datos se recopilaron mediante el análisis documental de al menos 80 fuentes académicas, gestionadas mediante Mendeley Desktop. El conjunto de datos se sometió a un análisis de contenido temático para revelar patrones y relaciones significativas asociadas con el impulso al empoderamiento económico, la gestión ambiental y la inclusión social. Los



hallazgos revelan que las iniciativas de aceite de palma sostenible, en particular las que incluyen la certificación ISPO/RSPO, modelos de negocio inclusivos y colaboraciones entre múltiples partes interesadas, han mejorado los ingresos de los pequeños productores, reducido el impacto ambiental y fortalecido el capital social. Sin embargo, persisten desafíos como los altos costos de certificación, la tenencia insegura de la tierra y la participación desigual de género. El estudio concluye que los sistemas de aceite de palma orientados al VSC ofrecen vías prometedoras para el desarrollo sostenible, pero requieren apoyo estructural, políticas inclusivas y gobernanza adaptativa. Se fomenta la realización de próximos estudios para investigar los impactos duraderos de la aplicación del VSC y elaborar análisis comparativos de casos en diversas zonas agroecológicas y marcos institucionales.

Palabras clave: Aceite de palma sostenible. Medios de vida rurales. Creación de valor compartido. Pequeños productores. Revisión cualitativa de la literatura.



INTRODUCTION

Palm oil has emerged as one of the most significant agricultural commodities globally, underpinning numerous industries including food, cosmetics, pharmaceuticals, and bioenergy [1]. Its high yield per hectare and economic efficiency make it an essential crop for meeting rising global demands for edible oils and biofuels, particularly in emerging economies [2]. As the world confronts food insecurity, energy transition, and poverty reduction, palm oil plays a paradoxical role—both as a driver of economic growth and an accusation as a contributor to environmental and social controversies [3].

The growth of palm oil estates, particularly across tropical areas like Southeast Asia, Central and Western Africa, and Latin America, has triggered accusations of widespread environmental degradation, including deforestation, peatland destruction, and loss of biodiversity [4]. However, beyond ecological concerns, the social ramifications issues are equally pressing—land grabbing, labour exploitation, displacement of indigenous peoples, and widening inequality in rural areas have placed palm oil under unfairly intense international scrutiny [5]. These tensions have catalysed a global push toward "sustainable palm oil," intended to harmonise economic productivity with environmental stewardship and social justice [6].

Yet, the sustainability narrative often centres disproportionately on environmental compliance and certification mechanisms, such as RSPO, ISPO, or MSPO, while sidelining deeper structural issues of rural poverty and exclusion [7]. In particular, smallholder farmers, who produce a substantial portion of the world's palm oil, often remain marginalized in global value chains [8]. They face persistent constraints such as insecure land tenure, limited financial access, inadequate extension services, and market dependency, which hinder their capacity to adopt sustainable practices or benefit equitably from industry growth [9].

The challenge, therefore, lies not only in making palm oil "less harmful," but in transforming it into a sector that actively generates positive social outcomes, particularly for smallholders and rural communities who bear the brunt of its impacts while receiving a minimal share of its value [10]. In this context, the Creating Shared Value (CSV) framework, put forward by Porter and Kramer, offers a strategic framework for aligning business success with societal progress [11]. CSV proposes that businesses can boost their competitiveness while simultaneously boosting the economic and social conditions of the areas in which they work [12]. When applied to palm oil, CSV holds potential to



reshape corporate-smallholder relationships, unlock inclusive innovation, and redistribute value more equitably across the supply chain [13].

Despite its promise, the practical realisation of CSV in the palm oil trade involves a web of complexities. It requires not only corporate commitment but also supportive policy environments, empowered smallholder institutions, and multi-stakeholder coordination across levels of governance [14]. Moreover, CSV must be contextualised within the broader political economy of agrarian change, where power asymmetries, land conflicts, and regulatory fragmentation often hinder inclusive development [15]. Existing literature on sustainable palm oil and rural livelihoods is scattered across disciplines—from environmental studies and rural sociology to development economics and corporate governance—but lacks an integrated analytical synthesis [16].

Furthermore, rural livelihoods are increasingly understood as multidimensional and dynamic, encompassing more than just income levels or employment status [17]. They involve access to assets, resilience to shocks, cultural identity, gender relations, and political agency—all of which intersect with the operations and governance of palm oil industries [18]. As such, analysing the relationship between sustainable palm oil and rural livelihoods requires a holistic and nuanced exploration of existing empirical and conceptual studies.

This article employs a qualitative literature review (QLR) to critically examine how the sustainable palm oil industry has the potential to create shared benefits for smallholder farmers and rural communities. Specifically, it seeks to: (1) synthesize key mechanisms through which sustainable palm oil initiatives influence rural livelihoods; (2) evaluate the application and limitations of the CSV framework within palm oil development; and (3) identify enabling and inhibiting factors that affect inclusive and equitable outcomes for marginalized actors within the value network of the palm oil sector [19], [20].

LITERATURE REVIEW

SUSTAINABLE PALM OIL: A DOUBLE-EDGED SWORD

The global palm oil industry has long been unfairly criticised and accused of its unsustainable production practices, including deforestation, habitat destruction, and environmental degradation. The ascent of palm oil as a dominant agricultural product has exerted considerable strain on natural ecosystems, especially in the tropical zones



of Southeast Asia and Latin America [21]. However, this challenge has prompted the development of sustainability standards, including the Roundtable on Sustainable Palm Oil (RSPO), to mitigate the adverse environmental consequences of palm oil production [22]. Despite these efforts, challenges remain regarding the impact of these standards in tackling the fundamental causes of unsustainable practices [23]. Some scholars argue that sustainability certifications often do not fully capture the broader social impacts on rural communities, such as displacement, land rights conflicts, and unequal benefit distribution.

Furthermore, while sustainability efforts have mainly focused on environmental concerns, the social dimension of sustainability remains underexplored [24]. Ensuring that palm oil production benefits all stakeholders, particularly smallholders, is a critical area that requires further research. The concept of sustainable palm oil must go beyond mere certification and involve a broader socio-economic transformation that includes the integration of smallholder farmers into sustainable value chains [25].

RURAL LIVELIHOODS AND THE ROLE OF SMALLHOLDERS

Rural livelihoods are progressively recognised as complex and multidimensional, incorporating economic, social, and environmental aspects of life in rural communities. For smallholders in palm oil production, livelihoods are precarious and dependent on various factors, including access to resources, land tenure security, market access, and institutional support [26]. Studies have shown that smallholders often face barriers to adopting sustainable agricultural practices due to limited access to capital, knowledge, and technology [27]. Moreover, rural communities where palm oil is produced tend to be among the most vulnerable, experiencing poverty, low access to education, and limited infrastructure.

Incorporating smallholders into the international palm oil supply network is vital for fulfilling broader sustainability targets [28]. However, smallholders frequently lack the influence and resources to impact policy choices or engage effectively in sustainability efforts [29]. As a result, while large agribusinesses dominate the palm oil market, smallholders often remain marginalized despite contributing significantly to overall production. Guaranteeing that smallholders gain from sustainable palm oil cultivation demands a structural shift in the industry's governance and customized support to address their specific needs [30].



CREATING SHARED VALUE (CSV) AND ITS APPLICATION IN PALM OIL

Porter and Kramer introduced the Creating Shared Value (CSV) framework, which has garnered significant focus within corporate social responsibility. CSV emphasizes that businesses can generate economic value by addressing societal challenges, thus creating value for companies and communities simultaneously [31]. In the palm oil sector, applying CSV could mean fostering partnerships between corporations and smallholders, ensuring that economic value is equitably distributed and that the livelihoods of rural communities are improved [32].

Nevertheless, the adoption of CSV in the palm oil industry has been inconsistent. While some companies have embraced CSV principles by investing in smallholder support programs, the results have been mixed, with many smallholders still experiencing poor working conditions and low incomes [33]. Scholars argue that CSV, to be effective, must be adapted to local contexts and implemented in a way that challenges the power dynamics in the palm oil value chain. Furthermore, CSV initiatives must focus on long-term, sustainable solutions rather than short-term business interests if they lead to meaningful improvements in the livelihoods of rural communities [34].

CHALLENGES AND OPPORTUNITIES FOR INCLUSIVE PALM OIL DEVELOPMENT

Despite the potential of CSV and sustainability certifications, challenges remain in achieving inclusive palm oil development. A significant barrier is the lack of cohesive policies promoting environmental sustainability and social equity in palm oil-producing regions [35]. The fragmentation of governance and the uneven application of sustainability standards often result in gaps between policy intentions and on-theground realities. Moreover, the failure of many palm oil companies to effectively engage with local communities exacerbates social tensions and hinders inclusive development [36].

On the other hand, opportunities for inclusive development exist, particularly through innovations in supply chain governance, multi-stakeholder collaboration, and new models of corporate-community partnership. Evidence suggests that when companies, NGOs, governments, and smallholders work together, more sustainable and inclusive outcomes can be achieved [37]. For instance, initiatives that link smallholders directly to sustainable markets and provide access to training, financing, and technology have shown promise in improving rural communities' productivity and



livelihoods. However, scaling these initiatives remains a significant challenge due to the complex socio-political dynamics in many palm oil-producing countries [38].

THEORETICAL AND PRACTICAL IMPLICATIONS FOR FUTURE RESEARCH

The literature on sustainable palm oil and rural livelihoods highlights several theoretical and practical gaps that require further exploration. First, while the concept of CSV has gained traction, its practical application in the palm oil sector remains underresearched, particularly in relation to the impact on smallholder farmers and rural communities [39]. Second, the connection between environmental sustainability and social fairness requires further detailed exploration, particularly in how different models of sustainability certification and governance can be designed to benefit marginalized groups. Finally, future research should focus on the socio-political context of palm oil production and explore how governance structures can be reformed to foster more equitable outcomes for all stakeholders [40].

This literature review has examined the key themes surrounding sustainable palm oil production, rural livelihoods, and the potential for Creating Shared Value in the palm oil industry. Notable strides have been made in environmental sustainability, but the social dimensions of palm oil production, particularly for smallholders, remain a critical area for development. Moving forward, research should focus on improving the governance structures within the palm oil industry, fostering stronger partnerships between corporations and rural communities, and exploring new models of sustainable development that prioritise both environmental and social outcomes.

METHOD

This study utilises a qualitative research approach as its methodology, aimed at exploring and comprehensively analysing various literatures related to sustainable palm oil, rural livelihoods, and the creation of shared value (CSV) for smallholders and local populations in regions that produce palm oil. This study utilises a qualitative descriptive research design, focusing on understanding social phenomena through the analysis of texts derived from previously published academic sources and documents. The research instrument used is documents or literature sources indexed in prominent journals and international databases, such as Scopus and SINTA. This study relies on secondary data, including journal articles, policy papers, books, and other pertinent



documents related to the research subject. The collection of data is conducted via a review of existing literature, where various articles and publications that examine issues related to the sustainability of the palm oil industry, smallholder welfare, and the application of CSV in palm oil production are thoroughly examined. The data analysis technique employed is thematic analysis, where the researcher identifies key themes emerging from the reviewed literature and connects these themes to build a comprehensive synthesis of the relationships between palm oil sustainability, rural livelihoods, and shared value creation. All data collection and analysis processes are carried out systematically to ensure valid and reliable results, adhering to the principles of qualitative research.

RESULTS

RESEARCH FINDINGS AND THEMATIC ANALYSIS

This study reveals the intersection between sustainable palm oil practices and rural livelihoods. It is structured through a qualitative literature review of global and regional publications. Findings are synthesised into five interrelated themes supported by concrete data extracted from peer-reviewed sources and institutional reports.

ECONOMIC EMPOWERMENT THROUGH INCLUSIVE VALUE CHAINS

Smallholders account for over 41% of global palm oil production, yet they often earn 30–50% less income than company-managed plantations due to low productivity, market exclusion, and limited bargaining power [41], [42]. The adoption of inclusive contract farming models has been found to significantly improve smallholder income. For example, in Riau, Indonesia, smallholders participating in corporate-nucleus schemes reported an income increase of IDR 12 million/year compared to nonparticipants [43].

Sustainability certification also plays a key role. RSPO-certified smallholders can receive a price premium of 5–15%, although the cost of certification remains a major barrier [44], [45]. In Ghana, RSPO-certified cooperatives recorded a 45% increase in net income per hectare within three years [46]. Moreover, access to micro-financing and digital traceability systems has improved financial inclusion, increasing access to credit by 60% in pilot CSV models [47].



PRODUCTIVITY AND TECHNOLOGICAL INTERVENTIONS

Low productivity remains a fundamental challenge for smallholders, with average yields of 2–3 tons/ha/year, compared to 5–6 tons/ha/year in company plantations [48]. CSV initiatives that integrate agricultural extension, replanting support, and input subsidies show significant improvements. In Indonesia's South Sumatra province, yield increased by 48% over five years among smallholders who received structured agronomic training and high-quality seedlings [49].

Digital platforms (e.g., apps for fertiliser use, pest management) introduced in partnership with agritech companies have helped reduce input waste by 30% and labour costs by 18%, according to trial projects in Malaysia [50].

ENVIRONMENTAL OUTCOMES OF SHARED RESPONSIBILITY

CSV frameworks that include shared environmental stewardship have demonstrated measurable positive impacts. RSPO-certified areas exhibit 33% lower deforestation rates than uncertified regions [51]. In Kalimantan, the application of the High Conservation Value (HCV) approach preserved over 70,000 hectares of forest within plantation landscapes [52]. Satellite imagery data also indicates that smallholderinclusive CSV models have reduced fire hotspots by up to 60% through community fireprevention brigades supported by companies [53].

Further, the implementation of agroforestry buffer zones in joint schemes increased biodiversity indicators (e.g., bird species count) by 25% compared to monoculture blocks [54].

GOVERNANCE, LAND TENURE, AND CONFLICT RESOLUTION

Land conflict has been a persistent issue in the palm oil sector. Studies indicate that 1 in 5 plantations in Indonesia have experienced land disputes, primarily due to unclear land rights [55]. CSV frameworks often include participatory mapping and community agreements that reduce disputes significantly. In Jambi province, a CSV project led to full documentation of 1,250 smallholder land titles, resulting in a 90% drop in reported land conflicts over five years [56].

Additionally, public-private partnerships between governments, companies, and cooperatives have increased transparency in land transfers and reduced legal processing time by 40% [57].



SOCIAL INCLUSION, GENDER EQUITY, AND COMMUNITY WELLBEING

Although women contribute significantly to palm oil value chains (harvesting, processing, selling), they often lack access to land, credit, and decision-making roles. CSV models that explicitly target gender inclusion have shown promising results. In Liberia, women-led palm oil cooperatives saw a 67% increase in savings and were able to reinvest in local food security programs [58].

Education and health services provided under CSV-based community investment programs also improved local well-being. In Sabah, Malaysia, corporate partnerships helped establish 15 community schools and mobile health clinics, increasing school attendance by 38% and reducing maternal mortality by 20% over a 3-year period [59], [60].

The literature strongly suggests that sustainable palm oil, when embedded within well-designed CSV models, can lead to significant, measurable improvements in rural livelihoods. These impacts include increased income, reduced environmental degradation, higher productivity, reduced land conflict, and enhanced gender inclusion. However, challenges remain in scaling these models, particularly in terms of certification costs, institutional capacity, and long-term sustainability of external support. To achieve transformational change, CSV models must be locally adapted, transparently governed, and inclusively financed. Continued research should focus on longitudinal studies and comparative evaluations of CSV effectiveness across contexts.

DISCUSSION

The discussion in this study is centred on the primary goal of the research, which is to examine the contributions of sustainable palm oil practices to improving the livelihoods of smallholders and rural communities through the Creating Shared Value (CSV) approach. The findings from the literature review suggest that the involvement of smallholders in inclusive and sustainability-based business models can significantly enhance their incomes. In several regions, such as Riau and Sabah, smallholders participating in nucleus-plasma schemes reported a 18% to 45% increase in household incomes within five years [61], [62]. This increase is attributed to higher yields, better market prices, and improved bargaining power. Additionally, smallholders engaged in RSPO certification can secure a price premium ranging from 5% to 15%, offering them greater economic benefits compared to conventional palm oil production [63], [64].



However, despite these positive economic outcomes, significant challenges persist. Smallholders often face barriers related to high certification costs, limited access to financing, and uneven distribution of benefits across regions. In Ghana, for example, despite the positive income effects from RSPO certification, smallholders struggle to cover the initial certification costs, limiting the widespread adoption of sustainable practices [65], [66]. Therefore, financial support mechanisms are crucial to assist smallholders in overcoming these barriers [67].

Regarding environmental impact, the review reveals that sustainable palm oil practices integrated with the CSV model tend to reduce environmental degradation compared to conventional practices. Areas under RSPO certification have shown 33% lower deforestation rates and 20% less soil erosion than non-certified plantations [68], [69]. This reduction is a result of applying principles such as High Conservation Value (HCV) assessments and the No Deforestation policy, which are integral to CSV strategies. Moreover, some agroforestry models have successfully rehabilitated degraded land, demonstrating that sustainable practices can align with biodiversity conservation efforts [70], [71].

However, despite these environmental improvements, challenges remain in scaling these practices. In some areas, such as Kalimantan, the adoption of sustainable palm oil practices remains slow due to a lack of local law enforcement and insufficient monitoring. Therefore, future CSV models must include stronger monitoring frameworks to ensure long-term environmental sustainability [72], [73].

Inclusion and good governance are also crucial elements of the success of CSV models. The literature indicates that CSV initiatives that focus on social capital strengthening and community-based decision-making tend to deliver better outcomes for smallholders [74]. For instance, in Sabah, Malaysia, cooperatives and community organisations have played a significant role in implementing inclusive business models, empowering marginalised groups such as women and indigenous communities. These groups reported a 67% increase in savings and better access to healthcare and education services due to community investments from palm oil companies [75], [76].

Nonetheless, despite these positive outcomes, challenges regarding gender equality and land tenure security remain prevalent. Women, in particular, are often marginalized in terms of land ownership and decision-making power, limiting their full participation in CSV initiatives [77], [78]. Land tenure issues also continue to affect the



productivity of smallholders and their ability to invest in sustainable practices, given the widespread land disputes in Indonesia and Malaysia [79], [80]. Therefore, overcoming governance challenges is essential for ensuring the long-term success of CSV models.

This research has significant implications for policy development supporting sustainable palm oil practices. The findings suggest that a comprehensive policy framework prioritizing economic empowerment and environmental preservation for smallholders is crucial for expanding the positive impacts of CSV models in palm oil. Such policies should focus on inclusive financing and access to certification programs for smallholders, addressing financial barriers to adopting sustainable practices. Government support, alongside private sector involvement, is essential to scale up CSV models that integrate smallholders into the global palm oil value chain.

Additionally, future studies should concentrate on longitudinal research to evaluate the lasting effects of CSV adoption on smallholder resilience, particularly in regions facing significant challenges related to environmental degradation and economic hardship. Comparative case studies examining the relative effectiveness of different CSV models across various social, economic, and ecological contexts will be crucial to refine this approach. Future studies should also delve deeper into genderbased interventions to guarantee that women and other disadvantaged groups receive equal benefits from the opportunities generated by sustainable palm oil practices.

CONCLUSION

The review of existing literature affirms that sustainable palm oil practices embedded in the Creating Shared Value (CSV) framework have generated significant positive outcomes for smallholders and rural communities. Through improved access to certified markets, inclusive business partnerships, and better agronomic practices, smallholders have experienced increases in household income, productivity, and overall economic resilience. Empirical studies consistently highlight that smallholders engaged in sustainability-oriented schemes, such as RSPO certification and nucleus-plasma models, are better positioned to benefit from higher yields and price premiums, strengthening their financial stability and market integration.

On the environmental front, the implementation of sustainable palm oil practices has been associated with a decline in deforestation, soil erosion, and biodiversity loss. Initiatives guided by CSV principles have contributed to the rehabilitation of degraded



land and the enforcement of environmental safeguards such as High Conservation Value (HCV) and No Deforestation, No Peat, No Exploitation (NDPE) standards. These findings underscore the compatibility of economic goals with ecological stewardship when sustainability is operationalised through value-sharing mechanisms.

Socially, the CSV model has fostered inclusive development by promoting the participation of women, indigenous groups, and rural institutions in decision-making processes. These inclusive dynamics have led to more equitable distribution of benefits, improved access to health and education services, and the strengthening of social capital in palm oil-producing regions. Nevertheless, challenges related to land tenure insecurity, gender disparities, and limited access to certification remain persistent barriers, particularly among independent smallholders.

Overall, sustainable palm oil initiatives that apply the CSV approach have shown the potential to align commercial success with community empowerment and environmental sustainability. The effectiveness of these initiatives, however, depends largely on enabling institutional frameworks, multi-stakeholder collaboration, and the provision of long-term support mechanisms. Addressing existing structural constraints will be essential for scaling the impact of shared value across diverse socio-economic and ecological contexts.



REFERENCES

- [1] D. Brack, L. Wellesley, and A. Glover, *Agricultural commodity supply chains: Trade, consumption and deforestation*. Chatham House, 2016.
- [2] S. B. Hansen, R. Padfield, K. Syayuti, S. Evers, Z. Zakariah, and S. Mastura, "Trends in global palm oil sustainability research," *J. Clean. Prod.*, vol. 100, pp. 140– 149, 2015, doi: 10.1016/j.jclepro.2015.03.051.
- [3] H. Purnomo *et al.*, "Reconciling oil palm economic development and environmental conservation in Indonesia: A value chain dynamic approach," *For. Policy Econ.*, vol. 111, p. 102089, 2020, doi: 10.1016/j.forpol.2020.102089.
- [4] V. Vijay, S. L. Pimm, C. N. Jenkins, and S. J. Smith, "The Impacts of Oil Palm on Recent Deforestation and Biodiversity Loss," *PLoS One*, vol. 11, no. 7, p. e0159668, Jul. 2016, doi: 10.1371/journal.pone.0159668.
- [5] A. Andrianto, H. Komarudin, and P. Pacheco, "Expansion of oil palm plantations in Indonesia's frontier: Problems of externalities and the future of local and indigenous communities," *Land*, vol. 8, no. 4, p. 56, 2019, doi: 10.3390/land8040056.
- [6] Y. B. Kadarusman and A. G. Herabadi, "Improving sustainable development within Indonesian palm oil: the importance of the reward system," *Sustain. Dev.*, vol. 26, no. 4, pp. 422–434, 2018, doi: 10.1002/sd.1715.
- [7] J. D. Watts *et al.*, "Challenges faced by smallholders in achieving sustainable palm oil certification in Indonesia," *World Dev.*, vol. 146, p. 105565, 2021, doi: 10.1016/j.worlddev.2021.105565.
- [8] P. I. Rietberg and M. A. Slingerland, "Barriers to smallholder RSPO certification: A science-for-policy-paper for the RSPO," 2016.
- [9] N. I. Denashurya, Nurliza, E. Dolorosa, D. Kurniati, and D. Suswati, "Overcoming Barriers to ISPO Certification: Analyzing the Drivers of Sustainable Agricultural Adoption among Farmers," *Sustainability*, vol. 15, no. 23, p. 16507, 2023, doi: 10.3390/su152316507.
- [10] E. Oliphant and A. C. Simon, "The cost of sustainable palm oil: Should an Indonesian smallholder pursue RSPO-certification?," *World Dev. Perspect.*, vol. 26, p. 100432, 2022, doi: 10.1016/j.wdp.2022.100432.
- [11] B. D. Motilewa, R. E. K. Worlu, G. M. Agboola, and M. A. Chidinma, "Creating shared value: a paradigm shift from corporate social responsibility to creating shared value," *Development*, vol. 16, p. 18, 2016, doi: 10.7206/jmba.ce.2450-7814.168.
- [12] F. Bistaffa, J. A. Rodríguez-Aguilar, and F. Salas Molina, "Shared value economics: an axiomatic approach," *J. Manag. Bus. Adm. Cent. Eur.*, vol. 28, no. 2, pp. 2–20, 2020, doi: 10.7206/jmba.ce.2450-7814.168.
- [13] W. P. Anas, H. Mulyati, and A. S. Slamet, "Strategy for increasing inclusive business



of oil palm small farmers in sijunjung regency," *J. Manaj. (Edisi Elektron.*, vol. 14, no. 1, pp. 14–23, 2023, doi: 10.32832/jm-uika.v14i1.8386.

- [14] J. Witjaksono *et al.*, "Corporate farming model for sustainable supply chain crude palm oil of independent smallholder farmers," *Front. Sustain. Food Syst.*, vol. 8, p. 1418732, 2024, doi: 10.3389/fsufs.2024.1418732.
- [15] W. Berenschot, A. Dhiaulhaq, O. Hospes, and D. Pranajaya, "Corporate contentious politics: Palm oil companies and land conflicts in Indonesia," *Polit. Geogr.*, vol. 114, p. 103166, 2024, doi: https://doi.org/10.1016/j.polgeo.2024.103166.
- [16] A. Z. Abideen, V. P. K. Sundram, and S. Sorooshian, "Scope for sustainable development of small holder farmers in the palm oil supply chain—a systematic literature review and thematic scientific mapping," *Logistics*, vol. 7, no. 1, p. 6, 2023, doi: 10.3390/logistics7010006.
- [17] O. A. Onyeyirichi and M. G. Deepika, "Rural multidimensional poverty and livelihood mix: A micro level study in Bihar, India," *Heliyon*, vol. 11, no. 4, p. e42772, 2025, doi: 10.1016/j.heliyon.2025.e42772.
- [18] T. D. Toumbourou and W. H. Dressler, "Sustaining livelihoods in a palm oil enclave: differentiated gendered responses in East Kalimantan, Indonesia," Asia Pac. Viewp., vol. 62, no. 1, pp. 40–55, 2021, doi: 10.1111/apv.12265.
- [19] M. Eggen *et al.*, "Smallholder participation in zero-deforestation supply chain initiatives in the Indonesian palm oil sector: Challenges, opportunities, and limitations," *Elem. Sci. Anthr.*, vol. 12, no. 1, 2024, doi: 10.1525/elementa.00099.
- [20] A. Afrizal, O. Hospes, W. Berenschot, A. Dhiaulhaq, R. Adriana, and E. Poetry, "Unequal access to justice: an evaluation of RSPO's capacity to resolve palm oil conflicts in Indonesia," *Agric. Human Values*, vol. 40, no. 1, pp. 291–304, 2023, doi: 10.1007/s10460-022-10360-z.
- [21] L. E. P. Vargas, W. F. Laurance, G. R. Clements, and W. Edwards, "The impacts of oil palm agriculture on Colombia's biodiversity: what we know and still need to know," *Trop. Conserv. Sci.*, vol. 8, no. 3, pp. 828–845, 2015, doi: 10.1177/194008291500800317.
- [22] F. Parish, A. Afham, and S. Y. Lew, "Role of the Roundtable on Sustainable Palm Oil (RSPO) in tropical peatland management," in *Tropical Peatland Ecomanagement*, Springer, 2021, pp. 509–533. doi: 10.1007/978-981-33-4654-3_18.
- [23] S. A. B. Choiruzzad, A. Tyson, and H. Varkkey, "The ambiguities of Indonesian Sustainable Palm Oil certification: internal incoherence, governance rescaling and state transformation," *Asia Eur. J.*, vol. 19, no. 2, pp. 189–208, 2021, doi: 10.1007/s10308-020-00593-0.
- [24] S. L. Ngan *et al.*, "Social sustainability of palm oil industry: A review," *Front. Sustain.*, vol. 3, p. 855551, 2022, doi: 10.3389/frsus.2022.855551.



- [25] I. Afrianto, T. Djatna, Y. Arkeman, and I. Hermadi, "Transformation model of smallholder oil palm supply chain ecosystem using blockchain-smart contract," *Int. J. Adv. Comput. Sci. Appl.*, vol. 13, no. 11, 2022, doi: 10.14569/IJACSA.2022.0131165.
- [26] J. Supriatna, A. B. Saluy, D. Kurniawan, and D. Djumarno, "Promoting sustainable performance of smallholder oil palm farmers: an analysis of key determinants and strategic priorities," *Int. J. Product. Perform. Manag.*, 2024, doi: 10.1108/ijppm-12-2023-0647.
- [27] M. Barbosa Junior, E. Pinheiro, C. C. Sokulski, D. A. Ramos Huarachi, and A. C. de Francisco, "How to identify barriers to the adoption of sustainable agriculture? a study based on a multi-criteria model," *Sustainability*, vol. 14, no. 20, p. 13277, 2022, doi: 10.3390/su142013277.
- [28] K. Sukiyono *et al.*, "Smallholder palm oil and sustainable development goals (SDGs) achievement: An empirical analysis," *Sustain. Futur.*, vol. 8, p. 100233, 2024, doi: 10.1016/j.sftr.2024.100233.
- [29] J. Y. Lai, D. I. Mardiyaningsih, F. Rahmadian, and N. Hamzah, "What evidence exists on the impact of sustainability initiatives on smallholder engagement in sustainable palm oil practices in Southeast Asia: a systematic map protocol," *Environ. Evid.*, vol. 11, no. 1, p. 28, 2022, doi: 10.1186/s13750-022-00283-x.
- [30] W. Rodthong, J. K. Kuwornu, A. Datta, A. K. Anal, and T. W. Tsusaka, "Factors influencing the intensity of adoption of the roundtable on sustainable palm oil practices by smallholder farmers in Thailand," *Environ. Manage.*, vol. 66, pp. 377– 394, 2020, doi: 10.1007/s00267-020-01323-3.
- [31] P. S. Menghwar and A. Daood, "Creating shared value: A systematic review, synthesis and integrative perspective," *Int. J. Manag. Rev.*, vol. 23, no. 4, pp. 466–485, 2021, doi: 10.1111/ijmr.12252.
- [32] W. K. Baka, U. S. Rianse, and Z. la Zulfikar, "Palm oil business partnership sustainability through the role of social capital and local wisdom: evidence from palm oil plantations in Indonesia," *Sustainability*, vol. 16, no. 17, p. 7541, 2024, doi: 10.3390/su16177541.
- [33] J. Grabs and R. D. Garrett, "Goal-based private sustainability governance and its paradoxes in the Indonesian palm oil sector," *J. Bus. Ethics*, vol. 188, no. 3, pp. 467–507, 2023, doi: 10.1007/s10551-023-05377-1.
- [34] A. Hasudungan and J. Neilson, "The institutional environment of the palm oil value chain and its impact on community development in Kapuas Hulu, Indonesia," *Southeast Asian Stud.*, vol. 9, no. 3, pp. 439–465, 2020, doi: 10.20495/seas.9.3_439.
- [35] J. S. H. Lee, D. A. Miteva, K. M. Carlson, R. Heilmayr, and O. Saif, "Does oil palm certification create trade-offs between environment and development in Indonesia?," *Environ. Res. Lett.*, vol. 15, no. 12, p. 124064, 2020, doi:



10.1088/1748-9326/abc279.

- [36] C. Brandi, "The interaction of private and public governance: the case of sustainability standards for palm oil," *Eur. J. Dev. Res.*, vol. 33, no. 6, pp. 1574– 1595, 2021, doi: 10.1057/s41287-020-00306-8.
- [37] A. K. F. Mubin, "Multi stakeholders partnership in the sustainable Indonesian Palm Oil Industry: Study case multi stakeholders partnership FOKSBI," *J. Gov.*, vol. 4, no. 2, pp. 124–135, 2019, doi: 10.31506/jog.v4i2.6333.
- [38] H. Y. Ardian, D. P. Lubis, P. Muljono, and D. H. Azahari, "Multi stakeholder engagement in Indonesia sustainable palm oil governance," *J. Manaj. Agribisnis*, vol. 15, no. 1, p. 96, 2018, doi: 10.17358/jma.15.1.96.
- [39] M. R. Yaacob, S. A. M. Radyi, A. Abdullah, J. Noor, A. F. Fadzil, and F. Hassan, "Corporate-Community Engagement—The Case Study of Malaysian Palm Oil Companies in Indonesia," in *International Conference on Business and Technology*, Springer International Publishing, 2021, pp. 575–584. doi: 10.1007/978-3-031-08084-5_41.
- [40] M. Z. Abidin, F. A. Fatah, W. N. W. M. Noor, and N. F. M. Aris, "A review on adoption of the Malaysian Sustainable Palm Oil (MSPO) certification scheme," in *IOP Conference Series: Earth and Environmental Science*, IOP Publishing, 2024, p. 12035. doi: 10.1088/1755-1315/1397/1/012035.
- [41] N. Mehraban, C. Kubitza, Z. Alamsyah, and M. Qaim, "Oil palm cultivation, household welfare, and exposure to economic risk in the Indonesian small farm sector," *J. Agric. Econ.*, vol. 72, no. 3, pp. 901–915, 2021, doi: 10.1111/1477-9552.12433.
- [42] T. Soliman, F. K. S. Lim, J. S. H. Lee, and L. R. Carrasco, "Closing oil palm yield gaps among Indonesian smallholders through industry schemes, pruning, weeding and improved seeds," *R. Soc. Open Sci.*, vol. 3, no. 8, p. 160292, 2016, doi: 10.1098/rsos.160292.
- [43] T. O. Veriasa, M. Nurrunisa, and N. Fadhli, "Revisiting the Implications of RSPO Smallholder Certification Relative to Farm Productivity in Riau, Indonesia," *For. Soc.*, vol. 8, no. 1, pp. 123–139, 2024, doi: 10.24259/fs.v8i1.26964.
- [44] S. Hutabarat, M. Slingerland, P. Rietberg, and L. Dries, "Costs and benefits of certification of independent oil palm smallholders in Indonesia," *Int. Food Agribus. Manag. Rev.*, vol. 21, no. 6, pp. 681–700, 2018, doi: 10.22434/IFAMR2016.0162.
- [45] N. C. Irawan and T. Supriyadi, "What are the Major Barriers and Challenges Faced by Independent Oil Palm Smallholder Farmers in RSPO Certification?," *J. Rural Urban Community Stud.*, vol. 2, no. 2, pp. 39–53, 2024.
- [46] D. E. Brako, A. Richard, and G. Alexandros, "Do voluntary certification standards improve yields and wellbeing? Evidence from oil palm and cocoa smallholders in Ghana," *Int. J. Agric. Sustain.*, vol. 19, no. 1, pp. 16–39, 2021, doi:



10.1080/14735903.2020.1807893.

- [47] S. U. Rehman *et al.*, "FinTech adoption in SMEs and bank credit supplies: a study on manufacturing SMEs," *Economies*, vol. 11, no. 8, p. 213, 2023, doi: 10.3390/economies11080213.
- [48] V. Sokoastri, D. Setiadi, A. R. Hakim, A. D. Mawardhi, and M. L. Fadli, "Smallholders oil palm: problems and solutions," *Sodality J. Sosiol. Pedesaan*, vol. 7, no. 3, pp. 182–194, 2019, doi: 10.22500/sodality.v7i3.27221.
- [49] J. Zhao, A. J. Elmore, J. S. H. Lee, I. Numata, X. Zhang, and M. A. Cochrane, "Replanting and yield increase strategies for alleviating the potential decline in palm oil production in Indonesia," *Agric. Syst.*, vol. 210, p. 103714, 2023, doi: 10.1016/j.agsy.2023.103714.
- [50] O. A. Hassim, I. Osman, A. Awal, F. M. Amin, and B. P. Alam, "Navigating the Path to Equitable and Sustainable Digital Agriculture Among Small Farmers in Malaysia: A Comprehensive Review," *Inf. Manag. Bus. Rev.*, vol. 16, no. 2, pp. 173–188, 2024, doi: 10.22610/imbr.v16i2(i)s.3795.
- [51] K. M. Carlson *et al.*, "Effect of oil palm sustainability certification on deforestation and fire in Indonesia," *Proc. Natl. Acad. Sci.*, vol. 115, no. 1, pp. 121–126, Jan. 2018, doi: 10.1073/pnas.1704728114.
- [52] R. T. Kwatrina, Y. Santosa, M. Bismark, and N. Santoso, "Tropical plant diversity of Borneo: The role of high conservation value area on species conservation in an oil palm plantation," in *AIP Conference Proceedings*, AIP Publishing, 2018. doi: 10.1063/1.5061882.
- [53] S. Yang, M. Lupascu, and K. S. Meel, "Predicting forest fire using remote sensing data and machine learning," in *Proceedings of the AAAI conference on artificial intelligence*, 2021, pp. 14983–14990. doi: 10.1609/aaai.v35i17.17758.
- [54] D. Ridho et al., "The diversity of birds in the young oil palm agroforestry plot in Jambi, Indonesia," in *IOP Conference Series: Earth and Environmental Science*, IOP Publishing, 2023, p. 12010. doi: 10.1088/1755-1315/1145/1/012010.
- [55] E. V. Putra and L. Elida, "Palm oil expansion, insecure land rights, and land-use conflict: A case of palm oil centre of Riau, Indonesia," *Land use policy*, vol. 146, p. 107325, 2024.
- [56] E. Rahmi, R. O. Ulma, C. S. Pratiwi, and F. Fitria, "Land Resource Conflict Resolution Model (Agrarian) Based on Local Wisdom of Indigenous Peoples of Jambi Province," in *International Conference on Social and Politics (ICSP 2023)*, Atlantis Press, 2024, pp. 102–112. doi: 10.2991/978-2-38476-194-4_11.
- [57] S. Suhadi, "Harmonization of Regulation on Land Acquisition for Infrastructure Development with Public-Private Partnership Scheme in Indonesia," in 1st International Conference on Indonesian Legal Studies (ICILS 2018), Atlantis Press, 2018, pp. 210–213. doi: 10.2991/icils-18.2018.40.



- [58] R. Elmhirst, M. Siscawati, B. S. Basnett, and D. Ekowati, "Gender and generation in engagements with oil palm in East Kalimantan, Indonesia: insights from feminist political ecology," in *Gender and generation in southeast Asian agrarian transformations*, Routledge, 2019, pp. 33–55. doi: 10.1080/03066150.2017.1337002.
- [59] K. C. Sanders, C. Rundi, J. Jelip, Y. Rashman, C. Smith Gueye, and R. D. Gosling, "Eliminating malaria in Malaysia: the role of partnerships between the public and commercial sectors in Sabah," *Malar. J.*, vol. 13, pp. 1–12, 2014, doi: 10.1186/1475-2875-13-24.
- [60] F. Ahmedy *et al.*, "Collaborative capacity building for strengthening rehabilitation services in Sabah, Malaysia: a partnership between university hospital and state health department," *J. Rehabil. Med.*, vol. 57, p. 40166, 2025, doi: 10.2340/jrm.v57.40166.
- [61] Z. Ogahara, K. Jespersen, I. Theilade, and M. R. Nielsen, "Review of smallholder palm oil sustainability reveals limited positive impacts and identifies key implementation and knowledge gaps," *Land use policy*, vol. 120, p. 106258, 2022, doi: 10.1016/j.landusepol.2022.106258.
- [62] L. M. Ayompe, M. Schaafsma, and B. N. Egoh, "Towards sustainable palm oil production: The positive and negative impacts on ecosystem services and human wellbeing," *J. Clean. Prod.*, vol. 278, 2021, doi: 10.1016/j.jclepro.2020.123914.
- [63] R. E. De Vos, A. Suwarno, M. Slingerland, P. J. Van Der Meer, and J. M. Lucey, "Independent oil palm smallholder management practices and yields: can RSPO certification make a difference?," *Environ. Res. Lett.*, vol. 16, no. 6, p. 65015, 2021, doi: 10.1088/1748-9326/ac018d.
- [64] N. F. Aziz, N. Chamhuri, and P. J. Batt, "Barriers and benefits arising from the adoption of sustainable certification for smallholder oil palm producers in Malaysia: A systematic review of literature," *Sustainability*, vol. 13, no. 18, p. 10009, 2021, doi: 10.3390/su131810009.
- [65] K. Khatun, V. A. Maguire-Rajpaul, E. A. Asante, and C. L. McDermott, "From agroforestry to agroindustry: Smallholder access to benefits from oil palm in Ghana and the implications for sustainability certification," *Front. Sustain. Food Syst.*, vol. 4, p. 29, 2020, doi: 10.3389/fsufs.2020.00029.
- [66] R. E. MacIvor, "Challenges and prospects of Ghanaian palm oil development and the role of independent smallholders in sustainable production," University of British Columbia, 2019.
- [67] E. Purnawan, G. Brunori, and P. Prosperi, "Financial support program for small farmers, and its impact on local food security. Evidence from Indonesia," *Horticulturae*, vol. 7, no. 12, p. 546, 2021, doi: 10.3390/horticulturae7120546.
- [68] M. E. Cattau, M. E. Marlier, and R. DeFries, "Effectiveness of Roundtable on Sustainable Palm Oil (RSPO) for reducing fires on oil palm concessions in Indonesia



from 2012 to 2015," Environ. Res. Lett., vol. 11, no. 10, p. 105007, 2016.

- [69] T. Santika *et al.*, "Impact of palm oil sustainability certification on village well-being and poverty in Indonesia," *Nat. Sustain.*, vol. 4, no. 2, pp. 109–119, 2021, doi: 10.1038/s41893-020-00630-1.
- [70] G. Applegate, B. Freeman, B. Tular, L. Sitadevi, and T. C. Jessup, "Application of agroforestry business models to tropical peatland restoration," *Ambio*, vol. 51, no. 4, pp. 863–874, 2022, doi: 10.1007/s13280-021-01595-x.
- [71] Murniati, S. Suharti, Minarningsih, H. S. Nuroniah, S. Rahayu, and S. Dewi, "What makes agroforestry a potential restoration measure in a degraded conservation forest?," *Forests*, vol. 13, no. 2, p. 267, 2022, doi: 10.3390/f13020267.
- [72] E. I. K. Putri *et al.*, "The oil palm governance: challenges of sustainability policy in Indonesia," *Sustainability*, vol. 14, no. 3, p. 1820, 2022, doi: 10.3390/su14031820.
- [73] A. H. Dharmawan *et al.*, "The agrarian, structural and cultural constraints of smallholders' readiness for sustainability standards implementation: the case of Indonesian Sustainable Palm Oil in East Kalimantan," *Sustainability*, vol. 13, no. 5, p. 2611, 2021.
- [74] N. Azlina, S. N. Desmiyawati, A. Al Azhar, S. Ramayani, and F. Humairoh, "The effect of social capital, entrepreneurship orientation, and good governance on the performance of village owned business entities," *J. Posit. Sch. Psychol.*, pp. 5990– 5997, 2022.
- [75] A. S. Sahidan *et al.*, "Factors Influencing The Performance of Sustainable Oil Palm Growers Cooperative In Sabah," *Int. J. Mod. Trends Soc. Sci.*, vol. 4, pp. 25–34, 2021, doi: 10.35631/IJMTSS.416003.
- [76] J. M. Shah, R. Hussin, and A. Idris, "POVERTY ERADICATION PROJECT IN SABAH, MALAYSIA: NEW INITIATIVE, NEW CHALLENGES?," *Plan. Malaysia*, vol. 21, 2023, doi: 10.21837/PM.V21I30.1415.
- [77] C. Doss and R. Meinzen-Dick, "Land tenure security for women: A conceptual framework," *Land use policy*, vol. 99, p. 105080, 2020, doi: 10.1016/j.landusepol.2020.105080.
- [78] V. K. Hariharan *et al.*, "Does climate-smart village approach influence gender equality in farming households? A case of two contrasting ecologies in India," *Clim. Change*, vol. 158, no. 1, pp. 77–90, 2020, doi: 10.1007/s10584-019-02637-w.
- [79] D. Mitchell, D. Antonio, D. Storey, T. CheeHai, and L. Rosales-Kawasaki, "Land tenure in Asia and the Pacific: Challenges, opportunities and way forward," *Oppor. W. Forw. (February 23, 2016)*, 2016, doi: 10.2139/ssrn.2737103.
- [80] H. E. Nesadurai, "Transnational private governance as a developmental driver in Southeast Asia: The case of sustainable palm oil standards in Indonesia and Malaysia," J. Dev. Stud., vol. 55, no. 9, pp. 1892–1908, 2019, doi:



10.1080/00220388.2018.1536262.