

Cocoa Revitalization Sustainability in North Kolaka Regency: A Literature Review

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Abstrak. Cocoa revitalization in North Kolaka Regency is a strategic effort to promote sustainable agriculture and rural resilience. This study examines the sustainability of cocoa revitalization across four dimensions: economic, social, environmental, and institutional. A systematic literature review of Scopus-indexed journals and reputable international publications from the past decade was conducted and analyzed using qualitative narrative synthesis. The results show that sustainability depends on the integration of these four dimensions, including strengthened agribusiness systems, farmer participation, environmentally friendly agroforestry practices, and effective institutional support. An integrated sustainability framework is therefore essential for inclusive and sustainable cocoa development in North Kolaka Regency.

1 Introduction

The revitalization of the cocoa sector in North Kolaka Regency represents a strategic agenda for advancing sustainable agricultural development and strengthening rural resilience. Recent studies emphasize that the success of cocoa revitalization extends beyond productivity improvements and depends on the integrated interaction of four key sustainability dimensions: economic, social, environmental, and institutional. Synergy among these dimensions is essential to enhance sectoral resilience and support the transition toward inclusive, locally adaptive, and sustainable cocoa systems [1-4].

From an economic perspective, sustainable cocoa revitalization is closely linked to the strengthening of local agribusiness systems, improved farmer income, and fair market access. Previous studies indicate that sustainable farming practices and stronger agribusiness institutions can enhance economic efficiency and farmers' bargaining positions within the cocoa value chain [1]. Socially, cocoa farming contributes significantly to rural livelihoods, food security, and community resilience, with farmer participation, gender equity, and agricultural education identified as key supporting factors [5].

Environmental sustainability remains a major challenge, particularly in addressing deforestation, land degradation, and biodiversity loss associated with cocoa expansion. The

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literature consistently highlights agroforestry as a viable approach to balancing productivity with ecological conservation and climate resilience, especially in cocoa-producing regions where land-use pressure continues to intensify. Institutionally, the effectiveness of cocoa revitalization policies depends on strong governance structures and coordination among government agencies, the private sector, civil society, and farmer organizations. Collaborative governance, responsive policies, and institutional capacity building are therefore critical to promoting sustainable cocoa practices while sustaining farmer livelihoods [4].

Despite the growing body of literature on cocoa sustainability, existing studies remain largely fragmented and sectoral, often focusing separately on productivity, market efficiency, or environmental conservation. Integrated analyses that simultaneously address economic, social, environmental, and institutional dimensions within a single analytical framework are still limited in the Indonesian context, particularly in emerging production areas such as North Kolaka Regency [6]. Moreover, most empirical studies concentrate on major cocoa-producing regions, while local contexts with distinct ecological and institutional characteristics remain underexplored. In addition, the literature is dominated by descriptive or short-term evaluations and lacks sustainability indicator-based frameworks capable of assessing long-term policy effectiveness and integrating socio-economic and ecological dimensions [3].

Accordingly, this study aims to provide a comprehensive literature-based analysis of cocoa revitalization sustainability in North Kolaka Regency by integrating economic, social, environmental, and institutional dimensions within a unified framework. By synthesizing existing evidence, this review seeks to clarify key sustainability challenges and identify integrated solutions to support inclusive and sustainable development in the cocoa sector [3, 5,7].

2 Methods

2.1 Data sources and materials

The study materials consisted of journal articles retrieved from the Scopus database and publications from reputable international publishers published over the past decade. A systematic literature review was conducted to identify and synthesize key developments in cocoa sustainability research across economic, social, environmental, and institutional dimensions.

2.2 Literature selection

A systematic search was conducted using keywords and Boolean combinations such as "cocoa sustainability," "cocoa revitalization," "cocoa governance," "cocoa agroforestry," and "institutional cocoa farming." Articles were included if they were published in Scopus-indexed journals, written in English or Indonesian, and addressed at least one sustainability dimension relevant to developing-country contexts.

2.3 Analytical procedure

A qualitative narrative synthesis supported by thematic coding was applied. Each article was classified according to the four sustainability dimensions, and key information on research objectives, methodological approaches, indicators, and principal findings was extracted.

Studies addressing multiple dimensions were examined to identify cross-dimensional linkages and integrative patterns.

2.4 Analytical framework

The analysis was guided by four sustainability dimensions: economic (productivity, farm income, agribusiness efficiency, value addition, and market access); social (farmer empowerment, gender roles, agricultural education, and household food security); environmental (land use, cocoa agroforestry systems, biodiversity conservation, and land degradation); and institutional (government roles, farmer institutional capacity, public policy, and collaborative governance).

2.5 Synthesis approach

No quantitative meta-analysis was performed. Instead, a qualitative thematic synthesis was conducted through iterative comparison and thematic mapping of the selected studies to identify dominant patterns, convergences, divergences, and research gaps. This approach provided a concise and methodologically appropriate basis for the Results and Discussion sections, consistent with the scope and length requirements of a conference proceeding.

3 Results and Discussion

3.1 Economic Dimension

The literature consistently demonstrates that the sustainability of the cocoa sector is fundamentally shaped by farmers' economic capacity, particularly their ability to enhance productivity, access fair markets, and capture greater value along the supply chain. Sustainable agronomic practices such as organic farming and crop diversification are associated with improved farm incomes, especially when supported by effective agribusiness institutions. Strengthened local organizations, including cooperatives and integrated farm enterprises, reduce transaction costs, improve access to finance and markets, and enhance supply chain efficiency, thereby increasing smallholder competitiveness[2].

Comparative evidence from other cocoa-producing regions indicates that productivity gains and certification schemes generate economic benefits only when embedded within supportive market and institutional frameworks[1]. In contrast, certification-led strategies often yield uneven outcomes, disproportionately benefiting better-resourced farmers [2]. Context-specific economic interventions and strong institutional coordination among farmers, buyers, and government agencies are therefore critical determinants of success [8]; [9]. In the North Kolaka context, end-to-end integration linking farm-level technology adoption, post-harvest infrastructure, and sustainability certification emerges as a key pathway to accessing premium markets.

From a scientific perspective, these findings reinforce the need for integrative approaches that connect agricultural economics with social and institutional analysis to explain sustainability transitions. Practically, cocoa revitalization should prioritize strengthening farmer cooperatives, supporting local cocoa enterprises, facilitating access to productive finance, and connecting producers to higher-value market segments through credible certification systems. Farm-level economic viability thus functions as both an objective and a prerequisite for sustainable transformation, underpinning progress across social, environmental, and institutional dimensions.

Table 1. Summary of Key Literature on the Economic Dimension.

Author(s)	Focus	Economic Dimension	Key Findings
Mithöfer et al. (2017)	Productivity gains and value chains	Productivity and market efficiency	Productivity improvements generate economic benefits only when embedded in supportive market and institutional frameworks
Ingram et al. (2018)	Certification in cocoa systems	Distribution of economic benefits	Certification schemes often produce uneven outcomes, favoring better-resourced farmers
Awazi (2025)	Context-specific economic interventions	Institutional coordination	Economic performance depends on locally adapted interventions and coordination among farmers, buyers, and government

3.2 Social Dimension

The social dimension of cocoa revitalization in North Kolaka is closely linked to household welfare, food security, gender equity, and community participation. The literature highlights that social outcomes in cocoa systems are shaped by structural factors such as land tenure, access to education, and the capacity of farmer organizations [10]. Access to technical training and productive resources contributes directly to household food security, while women’s empowerment in cocoa production is associated with improved household nutrition and stronger roles in economic decision making. Participatory revitalization processes that position farmers as active agents of innovation further enhance social sustainability, with farmer education and agricultural literacy playing a critical role in shaping attitudes toward sustainable practices .

International evidence supports these findings, showing that farmer education and collective decision making within producer groups positively influence technology adoption and productivity. However, social progress is often constrained by persistent gender norms and unequal access to land, credit, and training, particularly for women [10]. In Indonesia, top-down policy approaches can also limit farmer and community engagement, underscoring the need for more inclusive and participatory governance mechanisms [6,11].

From a scientific perspective, these findings confirm that social transformation at the community level is a prerequisite for sustainable agricultural development. Practically, cocoa revitalization in North Kolaka should adopt participatory and gender-responsive approaches by strengthening farmer groups, expanding needs-based training, and empowering women through secure resource access and local leadership opportunities. Social sustainability thus reinforces economic viability and underpins long-term resilience in cocoa farming systems.

Table 2. Summary of Key Literature on the Social Dimension.

Author(s)	Focus	Social Dimension	Key Findings
Gore (2025)	Gender and innovation in cocoa value chains	Women’s participation and equitable access	Women play major roles but face limited access to land and training
Leksono et al. (2021)	Organic cocoa farming and farmer participation in Indonesia	Farmer participation, education, and institutional capacity	Limited farmer engagement and top-down policy approaches constrain participation and adoption of sustainable practices in cocoa systems.

Author(s)	Focus	Social Dimension	Key Findings
Drøge et al. (2025)	Socio-institutional dynamics of Indonesia's cocoa sector	Community engagement and rural livelihoods	Weak community involvement and policy inconsistency reduce farmer participation and social resilience in cocoa revitalization efforts.

3.2 Environmental Dimension

Environmental sustainability is central to cocoa revitalization due to increasing pressures from land expansion, intensive input use, and forest conversion. The literature consistently shows that unsustainable cocoa cultivation leads to land degradation, declining soil fertility, and biodiversity loss. Agroforestry systems—integrating cocoa with shade trees and conservation species are widely identified as the most effective response, as they improve soil quality, stabilize microclimates, and support ecosystem functions while maintaining acceptable economic returns [7].

Comparative evidence from West Africa indicates that integrated cocoa–forest programs can substantially reduce deforestation pressures when productivity and conservation objectives are pursued simultaneously [12]. In Indonesia, including North Kolaka, scaling agroforestry remains constrained by limited policy coherence, low ecological awareness, and restricted access to environmentally friendly technologies [6,11]. Nevertheless, the persistence of traditional ecological practices suggests strong potential for locally adapted agroforestry models.

From a scientific perspective, the findings affirm that environmental management must be embedded within cocoa production systems to ensure long-term resilience. Practically, revitalization strategies should prioritize incentives for agroforestry adoption, coordinated training and extension services, provision of shade tree seedlings, and compensation mechanisms for forest and biodiversity conservation. Environmental sustainability is therefore closely linked to economic viability and supportive social and institutional arrangements, reinforcing the integrated nature of cocoa revitalization.

Table 3. Summary of Key Literature on the Environmental Dimension.

Author(s)	Focus	Environmental Dimension.	Key Findings
Kouassi et al. (2024)	Shade tree integration in cocoa agroforestry systems	Soil quality, microclimate regulation, and cocoa bean quality	The integration of shade trees improves cocoa bean physicochemical characteristics, enhances soil fertility, and stabilizes microclimates within cocoa agroforestry systems.
Kalischek et al. (2023)	Cocoa expansion and deforestation in West Africa	Land-use change and forest loss	Cocoa plantation expansion is strongly associated with deforestation, indicating the need for integrated cocoa–forest management approaches.
Leksono et al. (2021)	Organic and environmentally friendly cocoa farming in Indonesia	Sustainable land management and environmental practices	The adoption of organic and environmentally friendly cocoa practices is constrained by policy gaps, limited institutional support, and low ecological awareness among farmers.

Author(s)	Focus	Environmental Dimension.	Key Findings
Dröge et al. (2025)	Land-use transition and future of cocoa plantations in Indonesia	Forest conservation and agroforestry sustainability	Weak policy coherence and economic pressures increase the risk of cocoa land conversion to palm oil, limiting the scaling of agroforestry-based cocoa systems.

3.4 Institutional Dimension

The institutional dimension is critical to the sustainability of cocoa revitalization, particularly in relation to policy coherence, service delivery capacity, and the effectiveness of farmer-based organizations. However, several studies highlight persistent constraints, including weak coordination between national and subnational policies, limited technical and organizational capacity of local institutions, and inadequate incentive and accountability mechanisms. These institutional weaknesses significantly reduce program effectiveness at the grassroots level, as evidenced by insufficient extension services, unreliable farmer data, and slow bureaucratic processes [4].

Comparative evidence from other cocoa-producing regions indicates that revitalization outcomes are stronger when supported by adaptive, transparent, and participatory institutional arrangements, as evidenced in studies examining collective governance and smallholder engagement in sustainability transitions. Certification and sustainable practice adoption are effective only when facilitated by credible local institutions and farmer organizations that enhance access to inputs, services, and markets, whereas weak governance structures often lead to inefficient use of resources and uneven impacts on farmer welfare and environmental performance [13,14], findings on the need for coordinated policy action and institutional support). Inclusive governance models, such as cooperatives, producer groups, and farmer-based organizations, have been shown to improve smallholders’ access to markets, credit, technology, and collective decision-making, thereby contributing to more sustainable and equitable rural development outcomes (research on farmers’ organizations and collective models for smallholder support; studies on collective models enhancing market access and livelihood opportunities) [15];

From a scientific perspective, these findings highlight institutions as the foundational layer of sustainable agricultural systems, where resource governance is closely linked to political authority and social legitimacy. Practically, cocoa revitalization should prioritize strengthening local government capacity, empowering farmer organizations, improving cross-sector coordination, and involving civil society and academia in monitoring and evaluation. Strong, adaptive, and accountable institutions thus function as the binding mechanism that integrates economic, social, and environmental dimensions, ensuring the long-term sustainability of cocoa farming systems.

Table 4. Summary of Key Literature on the Institutional Dimension.

Author(s)	Focus	Institutiona Dimension.	Key Findings
Lee & Park (2023)	National–local policy alignment	Weak coordination between governance levels	Reduces effectiveness of revitalization programs at grassroots level
Zhao (2023)	Local institutional capacity	Inadequate technical capacity and poor	Limits service delivery, data reliability, and bureaucratic efficiency

		accountability mechanisms	
Krumbiegel & Tillie (2024)	Governance and sustainability transitions	Adaptive, transparent governance enhances sustainability practice adoption	Strengthens institutional support for smallholder inclusion and certification
Adams & Carodenuto (2023)	Role of local institutions in certification and policy support	Importance of credible institutions in facilitating access to services and policy alignment	Improves equity and resource efficiency
Kale & Dangi (2025)	Collective models for institutional innovation	Inclusive models (e.g., cooperatives, farmer groups) improve market and credit access	Contribute to equitable rural development and long-term institutional resilience
Akbar et al. (2024)	Farmer-based organizations and governance outcomes	Strengthening producer organizations leads to more participatory and accountable governance	Enhances coordination, inclusion, and impact at the local implementation level

4 Conclusion

This review highlights that the sustainability of cocoa revitalization in North Kolaka Regency depends on the integrated performance of four interrelated dimensions: economic, social, environmental, and institutional. Economically, sustainable outcomes require improved smallholder incomes supported by strong local institutions and access to higher-value markets. Social sustainability is shaped by community participation, women’s empowerment, and agricultural literacy, which strengthen household and community resilience. Environmentally, the adoption of cocoa agroforestry and environmentally sound practices is essential to reduce ecosystem degradation while maintaining productivity. Institutionally, effective policy coordination, capable local institutions, and inclusive governance arrangements are critical for ensuring that sustainability initiatives deliver durable outcomes. Together, these dimensions underscore the need for a coherent and integrated approach to cocoa revitalization to support long-term sustainability in North Kolaka.

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References

1. D. Mithöfer, J.M. Roshetko, J.A. Donovan, E. Nathalie, V. Robiglio, D. Wau, D.J. Sonwa, T. Blare, Unpacking ‘sustainable’ cocoa: do sustainability standards, development projects and policies address producer concerns in Indonesia, Cameroon and Peru?, *Int. J. Biodivers. Sci. Ecosyst. Serv. Manag.* **13**, 444–469 (2017),

- <https://doi.org/10.1080/21513732.2018.1432691>
2. V. Ingram, F. Van Rijn, Y. Waarts, H. Gilhuis, The impacts of cocoa sustainability initiatives in West Africa, *Sustainability* **10**, 4249 (2018), <https://doi.org/10.3390/su10114249>
 3. G. Mattalia, A. Wezel, P. Costet, P. Jagoret, O. Deheuvels, P. Migliorini, C. David, Contribution of cacao agroforestry versus mono-cropping systems for enhanced sustainability: a review with a focus on yield, *Agrofor. Syst.* **96**, 1077–1089 (2022), <https://doi.org/10.1007/s10457-022-00765-4>
 4. H. Lee, M.S. Park, Transformation of the global governance in the cocoa sector with three characteristics: diversification, flexibilization, and coordination, *For. Policy Econ.* **153**, 102977 (2023), <https://doi.org/10.1016/j.forpol.2023.102977>
 5. V.A. Maguire-Rajpaul, K. Khatun, M.A. Hirons, Agricultural information's impact on the adaptive capacity of Ghana's smallholder cocoa farmers, *Front. Sustain. Food Syst.* **4**, 28 (2020), <https://doi.org/10.3389/fsufs.2020.00028>
 6. A.S. Leksono, I. Mustafa, Z.P. Gama, A. Afandhi, A. Zairina, Organic cocoa farming in Indonesia: constraints and development strategies, *Org. Agric.* **11**, 445–455 (2021), <https://doi.org/10.1007/s13165-021-00351-5>
 7. A.T. Kouassi, A. Christiane, E. Boko, S.H. Blei, D.M. Angaman, Y. Sadaïou, S. Barima, Influence of shade in cocoa agroforestry systems on physicochemical and functional characteristics of cocoa beans in Bonon, central-west Côte d'Ivoire, *Sci. World J.* **2024**, 1543904 (2024), <https://doi.org/10.1155/2024/1543904>
 8. N.P. Awazi, Cocoa-based agroforests for carbon credits and markets, soil fertility improvement, and soil macro-fauna conservation: governance and policy paradigms, pp. 409–452, https://doi.org/10.1007/978-3-032-08052-3_8
 9. K. Krumbiegel, P. Tillie, Sustainable practices in cocoa production: the role of certification schemes and farmer cooperatives, *Ecol. Econ.* **222**, 108211 (2024), <https://doi.org/10.1016/j.ecolecon.2024.108211>
 10. E. Gore, Colonial afterlives in the global cocoa supply chain: sharecropping, labour exploitation, and gendered (re)production, *Rev. Int. Polit. Econ.* **32**, 1–30 (2025), <https://doi.org/10.1080/09692290.2025.2567360>
 11. S. Droge, J. Bemelmans, C. Depoorter, M.J.M. Jusrin, A. Marx, B. Verbist, L.B. Prasetyo, M. Maertens, B. Muys, From chocolate to palm oil: the future of Indonesia's cocoa plantations, *Ambio* **54**, 151–161 (2025), <https://doi.org/10.1007/s13280-024-02061-0>
 12. N. Kalischek, N. Lang, C. Renier, R.C. Daudt, T. Addoah, W. Thompson, W.J. Blaser-Hart, R. Garrett, K. Schindler, J.D. Wegner, Cocoa plantations are associated with deforestation in Côte d'Ivoire and Ghana, *Nat. Food* **4**, 384–393 (2023), <https://doi.org/10.1038/s43016-023-00751-8>
 13. M.A. Adams, S. Carodenuto, Stakeholder perspectives on cocoa's living income differential and sustainability trade-offs in Ghana, *World Dev.* **165**, 106201 (2023), <https://doi.org/10.1016/j.worlddev.2023.106201>
 14. R.B. Kale, P.A. Dangi, How are new collective models transforming support for smallholder farmers? Empirical evidence from thematic and sentiment content analysis, *Front. Sustain. Food Syst.* **8**, 1542676 (2025), <https://doi.org/10.3389/fsufs.2024.1542676>

15. Jumiati Akbar, A. Rumallang, Sustainability of agribusiness institutions (case study on horticultural agribusiness farmer groups in Bantaeng Regency), IOP Conf. Ser.: Earth Environ. Sci. **1302**, 012123 (2024), <https://doi.org/10.1088/1755-1315/1302/1/012123>