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Governance and Institutional Arrangements in Green Trade Distribution of Spices in South Sumatra

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Abstract
Background: South Sumatra's reliance on extractive industries and monoculture plantations has intensified ecological risks and reduced the prominence of traditional spice agriculture. Objective: This study examines the governance and institutional arrangements needed to revitalize spice agriculture and support green trade distribution through village activation. Methods: A qualitative action research approach combined field observations, stakeholder interviews, focus group discussions, and literature review in spice-producing areas of the upstream Musi River watershed. Participants included farmers, government officials, academics, and civil-society representatives. Data were analyzed thematically. Results: Cinnamon, candlenut, pepper, and clove offer livelihood diversification, watershed protection, soil stabilization, and carbon-sequestration potential. Farmers viewed spice-based agroforestry as an alternative to dependence on coal mining and large-scale palm oil. Effective distribution requires empowered farmer cooperatives, transparent supply-chain institutions, sustainability certification, value-added processing, digital traceability, and collaboration among village government, communities, private actors, civil society, and academia. Conclusion: A strong village-level institutional framework and multi-stakeholder governance are essential to build an equitable, resilient, and climate-adaptive green spice value chain in South Sumatra.

Keywords: green economy; spice agriculture; institutional governance; village activation; climate change mitigation; sustainable value chain; community empowerment

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INTRODUCTION

The transition toward a green economy has become a crucial agenda for sustainable development, especially in regions that remain highly dependent on extractive industries and large-scale monoculture plantations [1-3]. In South Sumatra, this transition is both challenging and essential because regional growth has historically relied on coal mining, palm oil, and rubber plantations [4-6]. Although these sectors contribute to economic activity, they are also associated with deforestation, biodiversity loss, land degradation, and greater vulnerability to climate-related disasters [7-10]. Village activation is therefore relevant as a strategy for promoting spice cultivation, mitigating climate change, and reducing dependence on environmentally destructive activities [11-13].

Historically, South Sumatra, particularly during the Sriwijaya era, was recognized as an important center of the spice trade [14-16]. Cinnamon, candlenut, clove, and pepper were cultivated across the Bukit Barisan landscape and transported through major rivers to international markets [17-19]. The subsequent dominance of commercial monocultures marginalized traditional spice agriculture [20-22]. Revitalizing perennial spice crops through village-based agroforestry may improve soil stability, regulate water cycles, sequester carbon, and restore diversified rural livelihoods [23-28].

A green economy seeks to improve human well-being and social equity while reducing environmental risks and ecological scarcity [29-31]. In agriculture, this orientation encourages agroforestry, organic practices, biodiversity conservation, and sustainable resource management [32-34]. Green trade extends these principles to distribution by requiring that products and supply chains meet environmental and social standards [35-37].

Institutional governance is central to this transition because it establishes the rules, norms, processes, and organizations through which government, communities, civil society, and private actors coordinate their interests [38-43]. In the green spice trade, governance must support sustainability standards, fair trade, market access, price stability, transparent decision-making, accountability, participation, and policy alignment across levels of government [44-52]. Accordingly, this study aims to examine the village-level governance and institutional arrangements that support green trade distribution of spices in South Sumatra, including implementation frameworks and the division of economic roles among stakeholders.

METHODS

This research employed a qualitative action research approach integrating field observation, stakeholder interviews, focus group discussions, and literature review.

Study Design and Setting

The study focused on the upstream Musi River watershed in South Sumatra, particularly areas with historical and current spice potential, including Empat Lawang, Pagaralam, and Muara Enim. The action research design actively involved local stakeholders in identifying opportunities, challenges, and institutional needs for green spice trade.

Population, Samples and Sampling

Participants comprised key stakeholders relevant to spice production and governance: local spice farmers, government officials, academics, and activists from Sarekat Hijau Indonesia.

Participants were selected based on their direct knowledge of local agricultural practices, institutional arrangements, and market challenges.

Instruments and Criteria

Data collection used semi-structured interview guides and focus group discussion guidelines. The instruments explored local spice potential, farmer perceptions of economic transition, value-chain constraints, market access, environmental benefits, stakeholder roles, and institutional governance. The questions were aligned with the research objectives and used flexibly to capture context-specific information.

Procedure and Data Collection

Data collection involved field visits to the upstream Musi River watershed, direct observation of spice cultivation practices, interviews with predetermined stakeholders, and focus group discussions. Literature was reviewed to contextualize empirical findings on the green economy, agroforestry, rural governance, and sustainable trade.

Statistical Analysis

The qualitative data were analyzed thematically. Interview, discussion, observation, and literature review information was organized into recurring themes concerning ecological and economic potential, farmer perceptions, business innovation, stakeholder roles, and institutional governance. No inferential statistical analysis was applied.

Ethical Considerations

The study observed qualitative research ethics, including informed participation and protection of data confidentiality. Participants were informed about the purpose of the research before contributing information.

RESULTS

Ecological and Economic Potential of Spice Agriculture

The upstream Musi River watershed has microclimatic conditions suitable for several spice crops. Candlenut is prominent in Empat Lawang, while cinnamon thrives in the highland areas of Pagaralam and Semende. Perennial spice trees contribute to watershed hydrology, reduce soil erosion in the Bukit Barisan landscape, and diversify farmer income beyond single commodities that are vulnerable to global price fluctuations.

Table 1 summarizes the principal spice commodities, cultivation areas, indicative annual economic returns, and estimated carbon-sequestration potential reported in the study.

Table 1. Spice types, economic projections, and carbon sequestration in South Sumatra.

Spice Type	Main Cultivation Area	Economic Profit Projection (per Hectare/Year)	Carbon Sequestration Projection (tCO2e/ha/year)
Black Pepper (Piper nigrum)	Ogan Komering Ulu (OKU), Muara Enim	IDR 45,000,000–IDR 96,000,000	2.5-5.0

Cinnamon (Cinnamomum burmannii)	Pagaralam, Semende	IDR 30,000,000–IDR 50,000,000	10.0–15.0
Clove (Syzygium aromaticum)	Coastal and Highland Areas	IDR 25,000,000–IDR 40,000,000	8.0-12.0
Candlenut (Aleurites moluccanus)	Empat Lawang	IDR 15,000,000–IDR 25,000,000	12.0–17.0

The table indicates that spice-based agroforestry can combine competitive financial returns with climate-mitigation benefits. The projections are indicative and should be validated through longitudinal field measurements and transparent calculation assumptions.

Farmer Perceptions of Economic Transition

Farmers considered the expansion of spice cultivation increasingly urgent because local livelihoods have long depended on the "brown economy," particularly coal mining and large-scale palm oil plantations. Interview and discussion results associated coal mining with land degradation, pollution of water sources, and loss of productive agricultural land. Palm oil expansion was linked to agrarian conflict, fluctuations in fresh fruit bunch prices controlled by larger market actors, and declining soil quality under monoculture practices.

Spice revitalization was viewed as a pathway out of dependence on extractive economic activities. Spices can be managed at household scale with lower capital requirements than large-scale plantations, while agroforestry can help restore degraded land and maintain groundwater availability. This perspective also reflects collective memory of South Sumatra's historical role as a spice-producing region and creates expectations for more sustainable economic autonomy.

Business Innovation in the Spice Sector

Three areas of business innovation emerged. First, value-added processing can develop local facilities and derivative products rather than selling raw commodities. Second, digital marketing and traceability can connect farmers directly with consumers, document production origins, and strengthen sustainability claims. Third, integration with carbon-market mechanisms may enable farmers to receive compensation for the environmental services generated by perennial spice agroforestry.

Institutional Governance and Green Trade Distribution

The principal challenge lies in grassroots governance. Village activation can provide a vehicle for community participation, local-resource mapping, collective decision-making, and the establishment of support mechanisms. The proposed governance arrangement involves village governments, communities, farmer groups and cooperatives, local private actors, civil-society organizations, academia, and research institutions. Farmer cooperatives should be strengthened as transparent aggregators, while government and nongovernmental organizations facilitate sustainability certification, market access, and equitable distribution across the value chain.

DISCUSSION

The findings suggest that revitalizing spice agriculture is a viable pathway toward a green economy in South Sumatra. Village activation is particularly important because it shifts governance from a sectoral and top-down orientation toward participatory management of land, production, processing, and trade. Strong village-level institutions can connect ecological restoration with livelihood diversification, thereby reducing dependence on extractive industries and monoculture commodities.

The proposed institutional model is consistent with governance perspectives that emphasize transparent rules, accountability, stakeholder participation, and coordinated action. Empowered cooperatives can aggregate products, improve bargaining power, stabilize market access, and support traceability and certification. Collaboration among government, civil society, private actors, and academia can also link farmers to technology, financing, market information, product development, and policy support. Business innovation in processing and digital marketing is therefore not separate from governance; it depends on institutional arrangements that distribute roles and benefits fairly.

Spice-based agroforestry also provides an integrated response to ecological and economic challenges. Perennial crops can contribute to soil conservation, watershed protection, and carbon sequestration while offering diversified income. However, the economic and carbon values reported in this study are projections rather than longitudinal measurements. The study is further limited by its qualitative design, selected geographical coverage, and absence of detailed participant numbers and formal instrument-validation information. Future research should verify profitability and carbon outcomes through longitudinal field measurement, compare governance arrangements across districts, and test the proposed model through pilot implementation.

CONCLUSIONS

Revitalization of spice agriculture can generate ecological and economic benefits while helping South Sumatra reduce dependence on extractive activities. Achieving this transition requires a strong village-level institutional framework built on multi-stakeholder collaboration, empowered farmer cooperatives, transparent and equitable supply chains, sustainability certification, value-added processing, and digital traceability. In practical terms, local governments should integrate spice agroforestry into village and regional development planning, facilitate cooperative capacity building, and connect producers with green markets and technical partners. Further research should validate the projected financial and carbon benefits and evaluate pilot governance models across different spice-producing districts.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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DECLARATION OF ARTIFICIAL INTELLIGENCE USE

An AI-based language model was used to support language refinement, structural editing, and alignment of the manuscript with the conference template. All AI-assisted revisions were critically reviewed by the authors to ensure the integrity and reliability of the manuscript. The final decisions, interpretations, and responsibility for the content remain solely with the authors.

REFERENCES

1. Lo MGY, Morgans CL, Santika T, Mumbunan S, Winarni N, Supriatna J, et al. Nickel mining reduced forest cover in Indonesia but had mixed outcomes for well-being. *One Earth. 2024;* 2024;7(11):2019–2033. doi: https://doi.org/10.1016/j.oneear.2024.10.010
2. Werner TT, Toumbourou T, Maus V, Lukas MC, Sonter LJ, Muhdar M, et al. Patterns of infringement, risk, and impact driven by coal mining permits in Indonesia. *Ambio*. 2024;53(2):242–256. doi: https://doi.org/10.1007/s13280-023-01944-y
3. Fuso Nerini F, Sovacool B, Hughes N, Cozzi L, Cosgrave E, Howells M, et al. Connecting climate action with other Sustainable Development Goals. *Nat Sustain*. 2019;2:674–680. doi: https://doi.org/10.1038/s41893-019-0334-y
4. Leal Filho W, Wall T, Salvia AL, Dinis MAP, Mifsud M. The central role of climate action in achieving the United Nations Sustainable Development Goals. *Sci Rep*. 2023;13:20582. doi:https://doi.org/10.1038/s41598-023-47746-w
5. Soergel B, Kriegler E, Weindl I, Rauner S, Dirnaichner A, Ruhe C, et al. A sustainable development pathway for climate action within the UN 2030 Agenda. *Nat Clim Chang*. 2021;11:656–664. doi:https://doi.org/10.1038/s41558-021-01098-3
6. Vazquez-Brust DA, Sarkis J, editors. *Green growth: managing the transition to a sustainable economy*. Dordrecht: Springer; 2012. doi: https://doi.org/10.1007/978-94-007-4417-2
7. Speck S, Zoboli R. The green economy in Europe: in search of a successful transition. In: Shmelev SE, editor. *Green economy reader: lectures in ecological economics and sustainability*. Cham: Springer; 2017. p. 141–160. doi: https://doi.org/10.1007/978-3-319-38919-6
8. Mundaca L, Neij L, Markandya A, Hennicke P, Yan J. Towards a green energy economy? Assessing policy choices, strategies, and transitional pathways. *Appl Energy*. 2016;179:1283–1292. doi:https://doi.org/10.1016/j.apenergy.2016.08.086
9. Wezel A, Brives H, Casagrande M, Clément C, Dufour A, Vandenbroucke P. Agroecology territories: places for sustainable agricultural and food systems and biodiversity conservation. *Agroecol Sustain Food Syst*. 2016;40(2):132–144. doi: https://doi.org/10.1080/21683565.2015.1115799
10. Perfecto I, Vandermeer J. Biodiversity conservation in tropical agroecosystems: a new conservation paradigm. *Ann N Y Acad Sci*. 2008;1134(1):173–200. doi: https://doi.org/10.1196/annals.1439.011

11. Liere H, Jha S, Philpott SM. Intersection between biodiversity conservation, agroecology, and ecosystem services. *Agroecol Sustain Food Syst*. 2017;41(7):723–760. doi: https://doi.org/10.1080/21683565.2017.1330796
12. Palm C, Blanco-Canqui H, DeClerck F, Gatere L, Grace P. Conservation agriculture and ecosystem services: an overview. *Agric Ecosyst Environ*. 2014;187:87–105. doi: https://doi.org/10.1016/j.agee.2013.10.010
13. Powlson DS, Gregory PJ, Whalley WR, Quinton JN, Hopkins DW, Whitmore AP, et al. Soil management in relation to sustainable agriculture and ecosystem services. *Food Policy*. 2011;36 Suppl 1:S72–S87. doi: https://doi.org/10.1016/j.foodpol.2010.11.025
14. Power AG. Ecosystem services and agriculture: tradeoffs and synergies. *Philos Trans R Soc Lond B Biol Sci*. 2010;365(1554):2959–2971. doi: https://doi.org/10.1098/rstb.2010.0143
15. Schoneveld GC, Weng X. Smallholder value creation in agrifood chains: value network approach. *Land Use Policy*. 2023;131:106676. doi: https://doi.org/10.1016/j.landusepol.2023.106676
16. Bredenkamp H, Bersch J. Commodity price volatility: impact and policy challenges for low-income countries. In: Arezki R, Pattillo CA, Quintyn M, Zhu M, editors. *Commodity price volatility and inclusive growth in low-income countries*. Washington (DC): International Monetary Fund; 2012. doi: https://doi.org/10.5089/9781616353797.071
17. Tröster B. *Commodity price stabilization: the need for a policy mix that breaks the vicious cycle of commodity dependence and price volatility*. Policy Note No. 20. Vienna: Austrian Foundation for Development Research; 2018. link: https://www.oefse.at/fileadmin/content/Downloads/Publikationen/Policynote/PN20-Commodity-Price-Stabilization.pdf
18. Miljkovic D, Olson F. The impacts of futures markets on commodity prices (in)stability. *Choices*. 2023;38(1):1–6. doi: https://doi.org/10.22004/ag.econ.337192
19. Basuki I, Adinugroho WC, Utomo NA, Syaugi A, Tryanto DH, Krisnawati H, et al. Reforestation opportunities in Indonesia: mitigating climate change and achieving sustainable development goals. *Forests*. 2022;13(3):447. doi: https://doi.org/10.3390/f13030447
20. Adnan BA, Dadi D. Tropical forest conservation efforts as climate change mitigation in Indonesia: a review. *Interdiscip Int J Conserv Cult*. 2023;1(2):80–89. doi: https://doi.org/10.25157/iijcc.v1i2.3633
21. Aryapratama R, Schulte S, Pauliuk S. Climate change mitigation potential of producing wood-based materials and energy from restoring degraded land in Indonesia: a nationwide scenario analysis. *Biomass Bioenergy*. 2026;211:109191. doi: https://doi.org/10.1016/j.biombioe.2026.109191
22. Triyanti A, Indrawan M, Nurhidayah L, Marfai MA, editors. *Environmental governance in Indonesia*. Cham: Springer; 2023. doi: https://doi.org/10.1007/978-3-031-15904-6
23. Warren C, McCarthy JF, editors. *Community, environment, and local governance in Indonesia: locating the commonweal*. Abingdon: Routledge; 2012.
24. Sahide MAK, Fisher MR, Sirimorok N, Faturachmat F, Dhiaulhaq A, Maryudi A, et al. Blind spots and spotlights in bureaucratic politics: an analysis of policy co-production in environmental governance dynamics in Indonesia. *Dev Policy Rev*. 2023;41(5):e12693. doi:https://doi.org/10.1111/dpr.12693

25. Aspinall E, Berenschot W, Savirani A, Ruhyanto A. Analyzing and explaining variation in village governance regimes across Indonesia. *South East Asia Res*. 2025;33(1):12–31. doi: https://doi.org/10.1080/0967828X.2025.2483168
26. Clark D, Southern R, Beer J. Rural governance, community empowerment and the new institutionalism: a case study of the Isle of Wight. *J Rural Stud*. 2007;23(2):254–266. doi: https://doi.org/10.1016/j.jrurstud.2006.10.004
27. Ahmad MS, Talib NBA. Empowering local communities: decentralization, empowerment, and community-driven development. *Qual Quant*. 2015;49:827–838. doi: https://doi.org/10.1007/s11135-014-0025-8
28. Angelia N, Batubara BM, Zulyadi R, Hidayat TW, Hariani RR. Analysis of community institution empowerment as a village government partner in the participative development process. *Budapest Int Res Crit Inst J*. 2020;3(2):1352–1359. doi: https://doi.org/10.33258/birci.v3i2.991
29. Landini F, Vargas G, Bianqui V, Mathot y Rebolé MI, Martínez M. Contributions to group work and to the management of collective processes in extension and rural development. *J Rural Stud*. 2017;56:143–155. doi: https://doi.org/10.1016/j.jrurstud.2017.09.014
30. Swanson BE, Bentz RP, Sofranko AJ, editors. *Improving agricultural extension: a reference manual*. Rome: Food and Agriculture Organization of the United Nations; 1997. link: https://www.fao.org/4/w5830e/w5830e00.htm
31. Raynolds LT. Re-embedding global agriculture: the international organic and fair trade movements. *Agric Hum Values*. 2000;17(3):297–309. doi: https://doi.org/10.1023/A:1007608805843
32. Jaffee D, Howard PH. Corporate cooptation of organic and fair trade standards. *Agric Hum Values*. 2010;27(4):387–399. doi: https://doi.org/10.1007/s10460-009-9231-8
33. Antlöv H. Village government and rural development in Indonesia: the new democratic framework. *Bull Indones Econ Stud*. 2003;39(2):193–214. doi: https://doi.org/10.1080/00074910302013
34. Sambodo MT, Hidayat S, Rahmayanti AZ, Handoyo FW, Yuliana CI, Hidayatina A, et al. Towards a new approach to community-based rural development: lessons learned from Indonesia. *Cogent Soc Sci*. 2023;9(2):2267741. doi: https://doi.org/10.1080/23311886.2023.2267741
35. Baum F, MacDougall C, Smith D. Participatory action research. *J Epidemiol Community Health*. 2006;60(10):854–857. doi: https://doi.org/10.1136/jech.2004.028662
36. Ingram M, Gall A, Murrieta L, Guernsey de Zapien J. Community engagement strategies in a participatory action research study with farmworkers. In: Liamputtong P, editor. *Handbook of social inclusion: research and practices in health and social sciences*. Cham: Springer; 2022. p. 1505–1524. doi: https://doi.org/10.1007/978-3-030-89594-5_82
37. Lauri MA. WASP—Write a Scientific Paper: collecting qualitative data using focus groups. *Early Hum Dev*. 2019;133:65–68. doi: https://doi.org/10.1016/j.earlhumdev.2019.03.015
38. Leung FH, Ratnapalan S. Spotlight on focus groups. *Can Fam Physician*. 2009;55(2):218–219. link: https://pmc.ncbi.nlm.nih.gov/articles/PMC2642503/
39. Mishra L. Focus group discussion in qualitative research. *TechnoLearn*. 2016;6(1):1–5. doi: https://doi.org/10.5958/2249-5223.2016.00001.2

40. Boaz A, Hanney S, Borst R, O'Shea A, Kok M. How to engage stakeholders in research: design principles to support improvement. *Health Res Policy Syst*. 2018;16:60. doi: https://doi.org/10.1186/s12961-018-0337-6
41. Maurer M, Mangrum R, Hilliard-Boone T, Amolegbe A, Carman KL, Forsythe L, et al. Understanding the influence and impact of stakeholder engagement in patient-centered outcomes research: a qualitative study. *J Gen Intern Med*. 2022;37 Suppl 1:6–13. doi: https://doi.org/10.1007/s11606-021-07104-w
42. Heiden T, Saia T. *Engaging stakeholders for research impact* [Internet]. Center on Knowledge Translation for Disability and Rehabilitation Research, American Institutes for Research; 2021. link: https://ktdrr.org/products/info-briefs/index.html
43. Rais H, Kersapati MI, Farid M, Aswandi A, Faturohman F, Avicenna M, et al. Living heritage: biocultural conservation on spice cultivation in the Maluku Archipelago, the heartland of clove and nutmeg. *Ethnobiol Conserv*. 2026;15:04. doi: https://doi.org/10.15451/ec2026-02-15-04-1-27
44. Ellen RF. The trade in spices. *Indonesia Circle*. 1977;5(12):21–25. link: https://www.tandfonline.com/toc/cimw19/5/12
45. Thee KW. Colonial extraction in the Indonesian archipelago: a long historical view. In: Frankema E, Buelens F, editors. *Colonial exploitation and economic development: the Belgian Congo and the Netherlands Indies compared*. London: Routledge; 2013. p. 41–59.
46. Dalheimer B, Parikoglou I, Brambach F, Yanita M, Kreft H, Brümmer B. On the palm oil–biodiversity trade-off: environmental performance of smallholder producers. *J Environ Econ Manage*. 2024;125:102975. doi: https://doi.org/10.1016/j.jeem.2024.102975
47. Wang W, Nguyen KTK, Zhao C, Hung HC. Earliest curry in Southeast Asia and the global spice trade 2000 years ago. *Sci Adv*. 2023;9(29):eadh5517. doi: https://doi.org/10.1126/sciadv.adh5517
48. Ghale B, Mitra E, Sodhi HS, Verma AK, Kumar S. Carbon sequestration potential of agroforestry systems and its potential in climate change mitigation. *Water Air Soil Pollut*. 2022;233:228. doi: https://doi.org/10.1007/s11270-022-05689-4
49. Kay S, Graves A, Palma JHN, Moreno G, Roces-Díaz JV, Aviron S, et al. Agroforestry creates carbon sinks whilst enhancing the environment in agricultural landscapes in Europe. *Land Use Policy*. 2019;83:581–593. doi: https://doi.org/10.1016/j.landusepol.2019.02.025
50. Lal R. Soil conservation and ecosystem services. *Int Soil Water Conserv Res*. 2014;2(3):36–47. doi: https://doi.org/10.1016/S2095-6339(15)30021-6
51. Gamage A, Gangahagedara R, Gamage J, Jayasinghe NS, Kodikara N, Suraweera P, et al. Role of organic farming for achieving sustainability in agriculture. *Farming Syst*. 2023;1(1):100005. doi: https://doi.org/10.1016/j.farsys.2023.100005
52. Lee S. Toward a just green economy transition. *Veolia Institute Review—FACTS Reports*. 2022;(24):38–43. link: https://www.institut.veolia.org/sites/g/files/dvc2551/files/document/2022/11/38%20Toward%20a%20just%20green%20economy%20transition.pdf