Agriekonomika

Volume 15, Issue 2 – October 2026
ISSN (Print): 2301-9948 | ISSN (Online): 2407-6260
Page: 289-301

OPEN ACCESS

Article

Cultural Ecology and Local Wisdom of Dieng Agrarian Traditions in Sustainable Agriculture

*[A-F]Agung Wibowo, [A, D, E]Sapja Anantanyu, [C, E, F]Arip Wijianto, Suwarto, [C, D]Diwi Acita Irawati, [B-E]Putri Permatasari

Faculty of Agriculture, Universitas Sebelas Maret Jl. Ir. Sutami 36 A, Surakarta, Indonesia

A – Research Concept and Design, B – Collection and/or Assembly of Data, C – Data Analysis and Interpretation, D – Writing The Article, E – Critical Revision of The Article, F – Final Approval of Article

ARTICLE INFO

Article History
Received: May 2026
Accepted: June 2026
Published: October 2026

Keywords
Agrarian;
Cultural;
Dieng;
Socio-ecological;
Sustainable

DOI:
10.21107/agriekonomika.v15i2.34575

© 2026 by the authors.
This is an open access article under the CC-BY license.

ABSTRACT

This study aims to analyze forms of traditional agrarian wisdom practiced by the Dieng community, the socio-ecological functions of local traditions in supporting sustainable agriculture, and the dynamics of agricultural modernization on the sustainability of local agrarian culture. The study used a qualitative approach with a phenomenological and cultural ecology perspective. Data were collected through in-depth interviews, participatory observation, documentation, and literature review, were analyzed using thematic and interpretative techniques The results show that the traditions of earth thanksgiving ritual, pre harvest thanksgiving ceremony), mutual cooperation, and protection of water sources serve to strengthen social cohesion, community resilience, ecological awareness, and environmental conservation in agrarian communities. On the other hand, agricultural modernization through market orientation and production intensification encourages the transformation of agrarian culture while increasing ecological pressures in mountainous areas. This research confirms that revitalizing local agrarian traditions is important as a strategy to strengthening socio-ecological and promoting sustainable agriculture based on local wisdom in highland areas.

How to Cite:
Wibowo, A., Anantanyu, S., Wijianto, A., Suwarto, Irawati, D. A., Permatasari, P. (2026). Cultural Ecology and Local Wisdom of Dieng Agrarian Traditions in Sustainable Agriculture. *AGRIEKONOMIKA, 15*(2), 289-301. https://doi.org/10.21107/agriekonomika.v15i2.34575.

***Corresponding author:**
Email : agungwibowo@staff.uns.ac.id
Address : Jl. Ir. Sutami 36 A, Surakarta, Jawa Tengah.

INTRODUCTION

The transformation of global agriculture in the modern era has generated various complex socio-ecological issues. agricultural intensification, mechanization, the use of chemical inputs, and market oriented production have been widely recognized for enhancing atau are widely recognized as effective in improving food productivity and strengthening global food security (Singh et al., 2022; Smaldone et al., 2025; Uçkun, 2025). However, agricultural modernization also triggers soil degradation, erosion, water pollution, biodiversity loss, and declining environmental carrying capacity (Ekka et al., 2023; Mishra, 2025; Padhiary & Kumar, 2024). The agrarian modernization paradigm tends to frame agricultural development within the framework of economic rationality and production efficiency, while the socio-cultural dimensions of local communities are often marginalized. In this context, local knowledge is frequently regarded as a traditional practice that is considered less relevant than modern scientific approaches, even though various studies show that local communities have ecological knowledge systems developed through long-term historical experience and intergenerational adaptation to environmental change (Bethel et al., 2022; Leal Filho et al., 2022; Sharifian et al., 2022).

This debate becomes has become increasingly relevant in the context of highland agriculture in the Dieng Plateau, Central Java, Indonesia, which a region characterized by both ecological fragility and a rich agrarian cultural heritage. The Dieng community not only relies on horticultural crops such as potatoes, cabbage, and carica, but also preserves traditional agrarian practices such pre harvest thanksgiving ceremony, mutual cooperation, and respect for water sources. According to cultural ecology theory these traditions as mechanisms for the community's socio-ecological adaptation to the mountainous environment. However, the development of intensive agriculture in Dieng has increased the exploitation of steep terrain, the use of chemical inputs, and the land conversion in conservation areas, which has increased the risks of erosion, landslides, sedimentation, and environmental degradation (Anata & Anata, 2025; Widiawati, 2025). This condition demonstrates the paradox of agrarian development, where increased economic productivity has increased while ecological sustainability has become increasingly vulnerable.

On the other hand, the agrarian traditions of the Dieng community community's embody conservation values relevant to the concept of sustainable agriculture. Earth thanksgiving ritual represents respect for nature as a source of life, while in agricultural activities reflects strong social capital in the collective management of agrarian resources. Local norms related to protecting water sources and the regulation of land use also demonstrate the existence of a community-based conservation system rooted in local culture. This perspective is consistent with the sustainability approach, which emphasizes the integration of ecological, social, and cultural dimensions in agricultural development (Abadi & Khakzand, 2022; Adefila et al., 2024; Adisa et al., 2024). However, most studies on sustainable agriculture are still dominated by technocratic approaches that focus on productivity, technological innovation, and economic efficiency. Research examining local agrarian traditions with a cultural ecology perspective in sustainable agricultural systems, particularly in mountainous regions, are still relatively limited.

Based on these considerations, this study fills an important research gap concerning the relationship between local culture, ecological knowledge systems, and the sustainability of highland agriculture. This study formulates three main questions: (1) how does the traditional agrarian wisdom of the Dieng community take shape in the highland agricultural system; (2) how does the socio-ecological function of agrarian traditions contribute to the sustainability of community based agriculture; and (3) how do the dynamics of agricultural modernization influence the sustainability of local agrarian traditions in Dieng. This study aims to analyze the forms and meanings of the agrarian traditions of the Dieng community, explain their socio-ecological functions in a sustainable agricultural system, and identify the impacts of agricultural modernization on the sustainability of local agrarian culture. Theoretically, this study contributes to the advancement of cultural ecology and social-ecological systems perspectives by conceptualizing agrarian traditions as an integral part of ecological adaptation, community resilience, and sustainable agricultural governance grounded in local culture. In addition, this study provides practical insights in supporting the development of sustainable agricultural policies that are not only oriented towards economic productivity, but also towards environmental protection and the socio-cultural sustainability of highland communities.

RESEARCH METHOD

This study employed a qualitative approach with an interpretative paradigm to explore the meanings embedded in the local wisdom embodied in the agrarian of the Dieng Plateau community in a the context of sustainable highland agriculture. The interpretive paradigm was chosen because it allows researchers to

understand social reality based on the lived experiences, cultural practices, and local knowledge of agrarian communities in in their interactions with the natural environment (Fenetiruma & Kamakaula, 2023; Sarkar & Kalita, 2026). This study adopted a phenomenological approach with a cultural ecology perspective to explore the community member's lived experiences related to agrarian traditions, human-nature relationships, and the dynamics of social resulting from agricultural modernization (Magda et al., 2022). The cultural ecology perspective is used to analyze how agrarian traditions have evolved as socio-ecological adaptation mechanisms of the community to the the mountainous environment (Fenetiruma & Kamakaula, 2023; Viñals et al., 2023).

The study was conducted in the Dieng Plateau, a mountainous region characterized by intensive horticultural agriculture characterized by ecological fragility and strong agrarian traditions. The research site was purposively selected because it reflects the close interrelationships among local culture, agricultural practices, and environmental sustainability. The region has experienced increasing ecological pressures due to the intensification of highland agriculture, making it relevant to examine the relationship between agrarian traditions and the socio-ecological sustainability of highland communities.

Research informants were selected using purposive and snowball sampling techniques (Pahwa et al., 2023). The informants comprised horticultural farmers, traditional leaders, community leaders, farmer group representatives, agrarian ritual practitioners, agricultural extension workers, village government officials, and young farmers based on their knowledge of and involvement in local agrarian traditions. Data collection was conducted through in-depth semi-structured interviews, participant observation, document analysis, and a literature review. The interviews were conducted to explore the meaning of agrarian traditions, cultural ecological values, local agricultural practices, and participants' perspectives of agricultural modernization (Chand, 2025). Participant observation was conducted to understand agricultural activities, agrarian rituals, mutual cooperation, and community interactions in natural resource management. Meanwhile, documentation and literature review were used to complement the primary data by examining village archives, cultural documents, photographs of agricultural activities, scientific articles, research reports, and policy documents related to cultural ecology and sustainable agriculture.

Data were analyzed interactively using the interactive model developed by Miles, Huberman, and Saldaña, the stages of data condensation, data display, and conclusion drawing and verification (Miles et al., 2018). Data from interviews, observations, and documentary data were transcribed, then coded and categorized into major themes such as agrarian traditions, ecological values, agricultural modernization, cultural adaptation, and environmental sustainability. The data were interpreted through the lens of cultural ecology, using a cultural ecology perspective to explain the relationships between local cultural practices and sustainable agricultural systems in highland communities. Credibility was maintained through source and methodological triangulation, member checking, and prolonged engagement to strengthening the consistency of interpretations and depth of understanding of the community's socio-cultural context (McKim, 2023). This study also adhered to the principles of established research ethics principles through informed consent, confidentiality of participants' identities, and respect for local cultural norms to ensure the research process was conducted ethically and in a participatory manner,

RESEARCH RESULTS AND DISCUSSION

The Wisdom of the Dieng Community's Agrarian Traditions in Highland Agriculture

The findings indicate that the Dieng Plateau community continues to preserve a variety of traditional agrarian practices to the highland agricultural system. These traditions not only function as cultural rituals but constitute an integral part of the community's ecological knowledge system in managing the mountainous agricultural environment. Some forms of agrarian traditions still practiced by the community include earth thanksgiving ritual, traditional pre-harvest ritual, mutual cooperation, respect for water sources, and traditional farming practices based on local ecological knowledge.

Table 1
Agrarian Traditions of the Dieng Community in the Highland Agricultural System

Focus Findings	field findings	Cultural Ecology Analysis	Theoretical Contributions
Earth Thanksgiving Ritual	The Sedekah Bumi ritual continues to be practiced as an expression of gratitude for agricultural harvests and as a symbol of respect for nature.	This tradition represents the harmonious relationship between humans and nature through cultural mechanisms that helps maintain ecological balanceof highland agriculture.	Strengthening the theory of cultural ecology that local cultural practices are a form of ecological ecological adaptation of local communities while expanding the concept of sustainable agriculture based on social-ecological conservation.
Pre-Harvest Thanksgiving Ceremony	The "wiwitan" tradition is carried out before the first harvest through prayers and symbolic rituals to seek safety and blessings for agriculture.	This ritual serves to strengthen social solidarity and collective awareness of the community towards the sustainability of the agricultural environment.	Developing a cultural ecology perspective by showing that agrarian rituals have a socio-ecological function in strengthening the resilience of agricultural communities.
Mutual Cooperation	Mutual cooperation is carried out in land cultivation, irrigation construction, and harvesting activities as a form of collective labor by the farming community.	This practice reflects the strength of social capital in maintaining the sustainability of the agricultural system of highland communities	Strengthening the theory of social capital and agroecology that agricultural sustainability is determined by social solidarity and collective relations of local communities.
Protection of Water Resources	Communities have local norms regarding the protection of water sources and restrictions on land conversion in certain areas.	Local traditions function as a social control mechanism in maintaining the ecological balance of highland agricultural areas.	Developing theories of cultural ecology and community-based resource management through affirming the role of cultural norms in local environmental conservation.
Agrarian Tradition as Ecological Adaptation	Agrarian traditions developed as a form of community adaptation to the ecological conditions of the highlands which are vulnerable to environmental risks.	The local cultural value systems functions to maintain the balance between humans and the environment in the highland agricultural system.	Strengthening the social-ecological systems approach that agricultural sustainability is not only determined by technical aspects, but also by the cultural sustainability nd local knowledge of agrarian communities.

Source: Data Processed, 2026

Earth thanksgiving ritual is an agrarian cultural practice that remains dominant in the lives of the Dieng Plateau community, as an expression of gratitude for the harvest and respect for nature as a source of livelihood for the agrarian community. The ritual involvesa procession of communal prayer and the distribution of agricultural produce such as potatoes, cabbage, and other horticultural commodities. One informant stated, "*Sedekah Bumi* is not merely a harvest thanksgiving ritual it is also an expression of respect for nature.", but a form of respect for nature. My parents always said that the land must be protected because it is the source of life for the Dieng community" (Interview with Mr. Muhklis, May 2026). Furthermore, the community also maintains before the harvest season as a symbol of prayer for safety and agricultural blessings. This tradition not only has a spiritual dimension but also serves to strengthen social solidarity among farmers in the highland agricultural system. Furthermore, the practice of mutual cooperation remains a collective practice for the community in land cultivation, irrigation construction, and harvesting activities. These findings are consistent with previous studies indicating that farmers' work culture is based on local values and agrarian spirituality, part of traditional agricultural practices (Anisah et al., 2021; Jumali et al., 2026). A community leader explained, "If a farmer has difficulty cultivating the land, the community usually helps together. This has always been our tradition. So farming here isn't a individual endeavor, but a collaborative effort" (Interview with Mr. Munawir, January 2026).

The findings indicate that the agrarian traditions of the Dieng community are closely associated with to a cultural ecology perspective, which views culture as a means of socio-ecological adaptation to the mountainous ecological environment. Local traditions have evolved as a socio-ecological mechanism to maintain the balance between humans and nature in highland agricultural systems. The findings are consistent with previous studies that local wisdom plays a vital role in the sustainable management of natural resources and also contributes to the development of cultural ecology and social-ecological systems theory (Li et al., 2023). This research confirms that agrarian traditions are not merely symbolic heritage but are an integral part of a component of ecological adaptation, community resilience, and sustainable agricultural governance grounded in local culture. Thus, the sustainability of highland agriculture is depends on not only by technological innovation and economic productivity, but also by the preservation of cultural values, social capital, and ecological knowledge of local agrarian communities.

The Socio-Ecological Functions of Agrarian Traditions in Supporting Sustainable Agricultural

The findings reveal that the agrarian traditions of the Dieng community perform important socio-ecological functionsin supporting the sustainability of highland agriculture. Local traditions not only serve to maintain the community's cultural identity but also function as social mechanisms for fostering ecological awareness, community solidarity, and promoting environmental conservation.

Socially, the agrarian traditions of the Dieng community serve to strengthen social cohesion, community solidarity, and collective relations among farmers responding to the ecological challenges of highland agriculture. Earth thanksgiving ritual and the practice of mutual cooperation create a spaces for social interaction that strengthens the resilience of the agrarian community. A member of a farmer group stated, "Traditions here keep the community united. If there are landslides or crop failures, residents usually help each other. So, traditions are not just cultural, but also maintain social relations in the community" (Interview with Mr. Rahman, January 2026). In this context, social solidarity is crucial for sustaining the resilience and well-being of highland communities of highland communities. In addition to its social function, agrarian traditions also have an ecological function through various local norms related to protecting water sources and the regulation of land use. A senior farmer explained, "In the past, my parents always reminded me not to clear land indiscriminately near water sources. If the springs are damaged, farming activities will also suffer" (Interview with Mr. Syahlan, January 2026). These findings indicate that local culture functions as an effective mechanism of social control in maintaining the ecological balance of highland agricultural areas.

Table 2
Social Mechanisms, Highland Communities, Mechanism of Social Control

Dimension Analysis	Field Findings	Socio-Ecological Functions	Theoretical Analysis and Contributions
Social Cohesion	Earth thanksgiving ritual and mutual cooperation is still a space for social interaction among the Dieng farming community.	Local traditions strengthen social cohesion and collective relationships among farmers in coping with the risks of highland agriculture.	A cultural ecology perspective suggests that agrarian traditions serve to maintain community stability in vulnerable ecological environments. This finding reinforces the social capital theory that agricultural sustainability is determined by community solidarity and local social relations.
Community Resilience	Communities help each other when landslides, crop failures, and agricultural crises occur through the practice of mutual cooperation.	Agrarian traditions serve as a social adaptation mechanism to increase community resilience to ecological and economic pressures.	The social-ecological resilience perspective asserts that community resilience is built through collective social and cultural networks. This finding expands the social-ecological systems approach by positioning local traditions as an instrument of resilience in highland farming communities.
Environmental Conservation	Communities maintain local norms regarding the protection of water sources and restrictions on land conversion.	Local traditions function as a mechanism of social control in maintaining the ecological balance of highland agricultural areas.	The cultural ecology perspective views local norms as a form of ecological adaptation in highland communities. This finding strengthens the theory of community-based resource management through the role of local culture in sustainable environmental conservation.
Ecological Awareness	The community believes that environmental damage has a direct impact on the sustainability of agriculture and social life.	Agrarian traditions foster collective ecological awareness regarding the importance of a harmonious relationships between humans and nature.	The agroecological perspective places local culture as part of a community's ecological knowledge system. This finding develops the concept of sustainable agriculture based on local culture and knowledge.
Agricultural Sustainability	Agrarian traditions support agricultural sustainability through social empowerment, environmental conservation, and local resource management.	Local traditions maintain socio-ecological balance in the agricultural system of the Dieng people.	Cultural ecology views agricultural sustainability as a the outcome of interactions of culture, society, and the environment. This finding extends the theory of sustainable agriculture by positioning agrarian traditions as an integral part of the socio-ecological systems of highland communities.

Source: Data Processed, 2026

The findings of this study support previous research that suggest that agricultural sustainability is determined not only by technological innovation but also by the active participation of local communities and social networks (Gutiérrez Cano et al., 2023; Redclift, 2023). These findings also are consistent with Wang (2022), which emphasizes the importance of land carrying capacity management in to ensure the long-term sustainability of food production systems. However, this unlike the agricultural modernization paradigm of

agricultural modernization, which emphasizes economic productivity over the socio-ecological sustainability of local communities. Theoretically, this study contributes to the development of cultural ecology and social-ecological systems theory by demonstrating that agrarian traditions function not merely as symbolic expressions of community identity but as mechanisms of ecological adaptation, strengthening community resilience, and fostering environmental governance culturally grounded environmental governance. This study also expands the concept of sustainable agriculture by positioning social capital, cultural norms, and local ecological knowledge as fundamental elements in maintaining the sustainability of highland agricultural systems.

The Dynamics of Agricultural Modernization and the Sustainability of Local Agrarian Traditions

The findings indicate that agricultural modernization has resulted in significant socio-ecological transformations among agrarian communities in the Dieng Plateau region. The intensification of horticultural production, market integration, the use of chemical inputs, and a growing commercial orientation have not only transformed agricultural production systems but also influenced social structures, cultural relationships, and the continuity of local agrarian traditions. While modernization increases productivity and household income, it also creates ecological pressures, environmental degradation, and has contributed to a gradual decline in the intergenerational transmission of agrarian cultural values between generations.

Agricultural modernization in the Dieng Plateau represents a socio-ecological transformation characterized by the intensification of horticultural production, the use of chemical inputs, and market integration. Within the highland agricultural system. This transformation increases community economic productivity, but simultaneously increases dependence on intensive production systems and commercial markets. A traditional leader stated, "Nowadays, young people are more focused on harvests and markets. Many are starting to consider traditions outdated. In fact, traditions used to be an important part of community agricultural life" Interview with Mr. Kromo, traditional leader, April 2026. This statement reflectss a shift in value orientation from a collective agrarian culture to a more individualistic and market-oriented economic rationality. These findings are consistent with demonstrating that agricultural modernization influences changes in local social values (Fauzan, 2025; Nain et al., 2025). From the perspective of agrarian modernization and cultural change, this study extends cultural ecology theory by demonstrating that rural economic transformation has significant implications for the long-term sustainability of local agrarian culture.

On the other hand, the the intensification of agricultural activities on steep slopes for commercial horticultural production increases the risk of erosion, landslides, and environmental degradation in highland agriculture. An agricultural extension worker explained, "Agriculture is now more technologically advanced, but the environmental impacts are also increasingly felt. Much of the land that was previously protected is now has now been converted into agricultural land" (Interview with agricultural extension worker Mr. Haryono, April 2026). A political ecology perspective views this condition as a consequence of the increasing influence of market-oriented economic systems into the ecological governance of local agrarian communities. However, the Dieng community has not experienced complete cultural disintegration, but rather has engaged in adaptive responses through the integration of agrarian traditions with environmentally friendly farming practices and cultural tourism. These findings are consistent with previous studies that emphasize the importance of community participation in sustainable development and reinforce the adaptive culture perspective, which argues that local cultures have a dynamic capacity to respond to socio-economic changes (Djafar et al., 2025; Järvelä, 2023; Oluwatoyin & Mardikaningsih, 2022; Suryawan et al., 2025). Theoretically, this study strengthens the social-ecological systems approach by emphasizing that the sustainability of highland agriculture is the emerges from dynamic interactions between culture, society, economy, and the ecological environment. This research also expands the concept of sustainable agriculture by positioning agrarian traditions, social capital, and local ecological knowledge as fundamental elements in the sustainability of highland agricultural systems.

Overall, the findings indicate that the agrarian traditions of the Dieng community play a pivotal role in supporting socio-ecological sustainability of highland agriculture. Local traditions not only function not only as heritage but also as an ecological knowledge system that helps communities maintain a balanced

relationship between humans and the environment. Amid the pressures of agricultural modernization, revitalizing local agrarian traditions is crucial as a strategy to enhancing sustainable agriculture based on local culture.

CONCLUSION

This research demonstrates that the traditional agrarian wisdom of the Dieng Plateau community is embodied invarious local cultural practices such as Earth Thanksgiving Ritual, pre-planting ritual, mutual cooperation, water source protection, and land management practices based on local ecological knowledge. These traditions not only represent the cultural identity of the agrarian community but also reflect the ecological adaptation of highland communities to the fragile highland environment which is vulnerable to ecological risks. In this context, local agrarian culture functions as a socio-ecological knowledge system passed down through generations to maintain the sustainability of the agricultural system of the Dieng community. This study also found that agrarian traditions perform significant socio-ecological functions in strengthening social cohesion, community solidarity, ecological awareness, and conservation of the highland agricultural environment. Local traditions serve as a social mechanism in enhance community resilience to ecological and economic pressures and serve as an mechanism of social control in maintaining a balanced relationship between humans and the environment. Furthermore, agricultural modernization through horticultural intensification, market integration, and the use of modern agricultural inputs has driven socio-ecological transformations that affect the sustainability of local agrarian traditions. Although modernization increases the agricultural productivity and household incomes, this process also weakens the intergenerational transmission of agrarian cultural values and increases ecological pressures on the highland environment. However, the Dieng community has not completely abandoned local traditions, but rather has engaged in adaptive responses by integrating agrarian traditions into environmentally friendly farming practices and reinforcing local cultural identity.

AI DISCLOSURE STATEMENT

During the preparation of this manuscript, the authors used Grammarly to assist with grammar checking, language editing, translation, and improving academic English writing. All outputs generated by these tools were carefully reviewed, verified, and revised by the authors to ensure the accuracy, clarity, and appropriateness of the content. The authors take full responsibility for the integrity, originality, and final content of this manuscript.

DATA AVAILABILITY

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

This research was funded by the research project of Sebelas Maret University (PNBP UNS Nomor : 462/UN27.22/PT.01.03/2026).

REFERENCES

Abadi, A., & Khakzand, M. (2022). Extracting The Qualitative Dimensions of Agritourism for The Sustainable Development of Charqoli Village in Iran: The Promotion of Vernacular Entrepreneurship and Environment-Oriented Preservation Perspectives. *Environment, Development and Sustainability, 24*(11), 12609–12671. https://doi.org/10.1007/s10668-021-01958-0.

Adefila, A. O., Ajayi, O. O., Toromade, A. S., & Sam-Bulya, N. J. (2024). Integrating Traditional Knowledge with Modern Agricultural Practices: A Sociocultural Framework for Sustainable Development. *World Journal of Biology Pharmacy and Health Sciences, 20*(2), 125–135. https://doi.org/10.30574/wjbphs.2024.20.2.0850.

Adisa, O., Ilugbusi, B. S., Adelekan, O. A., Asuzu, O. F., & Ndubuisi, N. L. (2024). A Comprehensive Review of Redefining Agricultural Economics for Sustainable Development: Overcoming Challenges and Seizing Opportunities in A Changing World. *World Journal of Advanced Research and Reviews, 21*(1), 2329–2341. https://doi.org/10.30574/wjarr.2024.21.1.0322.

Anata, R. R., & Anata, R. R. (2025). Analisis Kerusakan Lingkungan Akibat Praktik Pertanian Kentang Intensif terhadap Objek Wisata di Kawasan Dataran Tinggi Dieng. AGROMEDIA: Berkala Ilmiah Ilmu-Ilmu Pertanian, 43(1), 57–68. https://doi.org/10.47728/ag.v43i1.588.

Anisah, A., Muhaimin, A. W., & Maulidah, S. (2021). Strategy of Risk Adaptation for Local Maize Farmers Based on Livelihood Assets in Madura. *AGRIEKONOMIKA, 10*(2), 125–136. https://doi.org/10.21107/agriekonomika.v10i2.10439.

Bethel, M. B., Braud, D. H., Lambeth, T., Dardar, D. S., & Ferguson-Bohnee, P. (2022). Mapping Risk Factors to Climate Change Impacts Using Traditional Ecological Knowledge to Support Adaptation Planning with A Native American Tribe in Louisiana. *Journal of Environmental Management, 301*, 113801. https://doi.org/10.1016/j.jenvman.2021.113801.

Chand, S. P. (2025). Methods of Data Collection in Qualitative Research: Interviews, Focus Groups, Observations, and Document Analysis. *Advances in Educational Research and Evaluation, 6*(1), 303–317. https://doi.org/10.25082/AERE.2025.01.001.

Djafar, F., Akibu, R. S., & Namdech, P. (2025). Strengthening Local Government Organisation Capacity for Adaptive Development Policy Responsive to Community Needs. *Journal of Contemporary Governance and Public Policy, 6*(2), 135–156. https://doi.org/10.46507/jcgpp.v6i2.715.

Ekka, P., Patra, S., Upreti, M., Kumar, G., Kumar, A., & Saikia, P. (2023). *Land Degradation and its Impacts on Biodiversity and Ecosystem Services*. Land and Environmental Management through Forestry.WILEY https://doi.org/10.1002/9781119910527.ch4.

Fauzan, A. (2025). The Transformation Of Traditional Culture In Responding To The Challenges Of Globalization In Local Indonesian Communities. *The Journal of Academic Science*, *2*(3), 1021–1030.

Fenetiruma, O. A., & Kamakaula, Y. (2023). Ecological and Cultural Balance In Traditional Agriculture: An Environmental Anthropological Approach. *Global International Journal of Innovative Research*, *1*(2), 68–77.

Gutiérrez Cano, L. F., Zartha Sossa, J. W., Orozco Mendoza, G. L., Suárez Guzmán, L. M., Agudelo Tapasco, D. A., & Quintero Saavedra, J. I. (2023). Agricultural Innovation System: Analysis From The Subsystems of R&D, Training, Extension, and Sustainability. *Frontiers in Sustainable Food Systems, 7*, 1176366. https://doi.org/10.3389/fsufs.2023.1176366.

Järvelä, M. (2023). Dimensions of Cultural Sustainability—Local Adaptation, Adaptive Capacity and Social Resilience. *Frontiers in Political Science, 5*, 1285602. https://doi.org/10.3389/fpos.2023.1285602.

Jumali, M. A., Kristina, A., & binti Kamsin, K. (2026). The Labor Culture of Madurese Siwalan Farmers: Morality and Attitude. *AGRIEKONOMIKA*, *15*(1), 39–50. https://doi.org/10.21107/agriekonomika.v15i1.31193.

Leal Filho, W., Barbir, J., Gwenzi, J., Ayal, D., Simpson, N. P., Adeleke, L., Tilahun, B., Chirisa, I., Gbedemah, S. F., & Nzengya, D. M. (2022). The Role of Indigenous Knowledge in Climate Change Adaptation in Africa. *Environmental Science & Policy, 136*, 250–260. https://doi.org/10.1016/j.envsci.2022.06.004.

Li, J., Han, F., Chen, Z., & Cai, Y. (2023). Synergizing A Socio-Ecological System: Reflections on Community-Based Natural Resource Management at The World Heritage Site of Mount Huangshan, China. *Journal of Environmental Planning and Management, 66*(4), 861–881. https://doi.org/10.1080/09640568.2021.2007060.

Magda, D., Lamine, C., & Billaud, J.-P. (2022). Considering The Diverse Views of Ecologisation in The Agrifood Transition: An Analysis Based on Human Relationships with Nature. *Environmental Values, 31*(6), 657–679. https://doi.org/10.3197/096327121X16387842836940.

McKim, C. (2023). Meaningful Member-Checking: A Structured Approach To Member-Checking. *American Journal of Qualitative Research*, *7*(2), 41–52.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2018). *Qualitative Data Analysis: A Methods Sourcebook*. Sage Publications.

Mishra, H. (2025). *Environmental Degradation and Impacts on Agricultural Production: A Challenge to Urban Sustainability*. Sustainable Urban Environment and Waste Management: Theory and Practice. Springer. https://doi.org/10.1007/978-981-96-1140-9_3.

Nain, U., Faisal, M., Amin, N. I., & Nahruddin, Z. (2025). The Impact of Modernization on Social Change in Rural Communities in South Sulawesi, Indonesia. *Journal of Cultural Analysis and Social Change, 10*(2), 611–619. https://doi.org/10.64753/jcasc.v10i2.1657.

Oluwatoyin, F., & Mardikaningsih, R. (2022). Community Adaptation Strategy to Climate Change Based on Socio-Cultural Perspective. *Journal of Social Science Studies*, *2*(1), 167–172.

Padhiary, M., & Kumar, R. (2024). *Assessing The Environmental Impacts of Agriculture, Industrial Operations, and Mining on Agro-Ecosystems*. In Smart Internet of Things for Environment and Healthcare. Springer. https://doi.org/10.1007/978-3-031-70102-3_8.

Pahwa, M., Cavanagh, A., & Vanstone, M. (2023). Key Informants in Applied Qualitative Health Research. *Qualitative Health Research, 33*(14), 1251–1261. https://doi.org/10.1177/10497323231198796.

Redclift, M. (2023). *The Role of Agricultural Technology in Sustainable Development*. In Technological Change and The Rural Environment. Routledge. https://doi.org/10.4324/9781003394624-4.

Sarkar, R., & Kalita, L. (2026). *Positivist, Interpretive, and Constructivist Approaches: Research Paradigms*. In Innovative Approaches to Social Research Challenges. IGI Global Scientific Publishing. https://doi.org/10.4018/979-8-3373-6410-0.ch004.

Sharifian, A., Fernández-Llamazares, Á., Wario, H. T., Molnár, Z., & Cabeza, M. (2022). Dynamics of Pastoral Traditional Ecological Knowledge: A Global State-of-the-art review. *Ecology and Society, 27*(1), 14. https://doi.org/10.5751/ES-12918-270114.

Singh, R. B., Paroda, R. S., & Dadlani, M. (2022). *Science, technology and innovation. In Indian Agriculture Towards 2030: Pathways for Enhancing Farmers' Income*. Nutritional Security and Sustainable Food and Farm Systems. Springer. https://doi.org/10.1007/978-981-19-0763-0_8.

Smaldone, N., Kansanga, M., & Ledermann, S. (2025). Over A Decade Into The New Green Revolution for Africa: A Systematic Review of Key Outcomes. *African Geographical Review*, 1–19. https://doi.org/10.1080/19376812.2025.2563335.

Suryawan, I. W. K., Sianipar, I. M. J., Lee, C.-H., Rahman, A., & Sofiyah, E. S. (2025). Community Attitudes, Adaptive Capacity, and Competitive Performance in Sustainable Tourism Development in A Small Town. *Asia-Pacific Journal of Regional Science*, *9*(4), 1053–1079. https://doi.org/10.1007/s41685-025-00399-1.

Uçkun, A. A. (2025). Enhancing Climate Resilience and Sustainability Through Agroecology: A Review of Key Principles and Recent Advances (2020–2025). *World Journal of Advanced Research and Reviews, 26*(3), 2189–2209. https://doi.org/10.30574/wjarr.2025.26.3.2358.

Viñals, E., Maneja, R., Rufí-Salís, M., Martí, M., & Puy, N. (2023). Reviewing Social-Ecological Resilience for Agroforestry Systems Under Climate Change Conditions. *Science of the Total Environment, 869*, 161763. https://doi.org/10.1016/j.scitotenv.2023.161763.

Wang, X. (2022). Managing Land Carrying Capacity: Key to Achieving Sustainable Production Systems for Food Security. *Land, 11*(4), 1-21. https://doi.org/10.3390/land11040484.

Widiawati, Y. (2025). Pengaruh Sistem Pertanian Organik terhadap Kesehatan Tanah dan Keanekaragaman Hayati di Lahan Hortikultura Dataran Tinggi Dieng. *ARMADA: Jurnal Penelitian Multidisiplin, 3*(6), 194–200. https://doi.org/10.55681/armada.v3i6.1668.

Appendix 1. The Dynamics of Agricultural Modernization and the Sustainability of Local Agrarian Traditions

Dimensional Analysis	Field Findings	Socio-Ecological Impacts	Theoretical Analysis and Contributions
Agricultural Modernization	The intensification of horticultural production, increased use of chemical fertilizers, and greater market integration have transformed the agricultural practices and livelihoods of the Dieng community.	Modernization increases economic productivity, but increases dependence on intensive agricultural systems and commercial markets.	The agrarian modernization perspective demonstrates the transformation of production systems toward a market orientation. This finding supports the political ecology perspective by demonstrating that agricultural modernization creates tensions between economic accumulation and the ecological sustainability of highland regions.
Changes in the Agrarian Generation	The involvement of the younger generation in local agrarian traditions has decreased due to changing economic aspirations and cultural values	Agrarian traditions are weakening as a system for transmitting cultural values and ecological knowledge between generations.	The cultural change perspective suggests that modernization drives a shift in the social values of agrarian societies. This finding extends cultural ecology theory by demonstrating that the sustainability of local culture is shaped by economic transformation and shifts in the orientation of the younger generation.
Environmental Exploitation in Agriculture	The intensive cultivation of steep slopes increases the risk of erosion, landslides and environmental degradation in the Dieng area.	Economic pressures drive ecological exploitation that reduces the ecological carrying capacity of the highland agricultural environment.	A political ecology perspective emphasizes that market pressures and productivity influence changes in environmental governance in agrarian communities. This finding reinforces the concept of social-ecological vulnerability in mountain agricultural systems.
Negotiating Tradition and Modernity	The community did not completely abandon agrarian traditions, but made adjustments to the demands of the modern economy.	Local traditions are transformed into more dynamic socio-ecological adaptation mechanisms.	The adaptive culture perspective demonstrates that local cultures are flexible and adaptive to socioeconomic changes. This finding advances the theory of social-ecological adaptation by demonstrating that agrarian traditions persist through a process of cultural negotiation.
Revitalization of Agrarian Traditions	Some communities are starting to integrate agrarian traditions with environmentally friendly farming and cultural tourism.	Revitalizing traditions strengthens cultural identity while supporting the socio-ecological sustainability of agricultural communities.	The culture-based perspective of sustainable development positions local traditions as instruments for strengthening community sustainability. This finding expands the concept of sustainable agriculture by integrating local cultural, ecological, and economic dimensions.

Dimensional Analysis	Field Findings	Socio-Ecological Impacts	Theoretical Analysis and Contributions
Socio-Ecological Sustainability	Agrarian traditions continue to play a role as an ecological knowledge system in maintaining the balance between humans and the environment.	Local traditions become a socio-ecological mechanism in maintaining the sustainability of highland agriculture amidst the pressures of modernization.	The social-ecological systems perspective emphasizes that agricultural sustainability is the result of interactions between culture, society, and the environment. This finding reinforces a sustainability approach grounded in local wisdom in mountain agricultural systems.

Source: Data Processed, 2026