



Pro-life

Jurnal Pendidikan Biologi, Biologi, dan Ilmu Serumpun

<https://ejournal.uki.ac.id/index.php/prolife>

Local Wisdom as the Foundation for Sustainable Village Development: A Socio-Ecological Analysis of Arborek, Panglipuran, and Ciptagelar Villages

Andika Nur Hardianto^{1*}, Rita Prihatini², Sabina Ratnawati³, Taufik Mulyana⁴,
Harafik⁵, Wahyu Agustianto⁶

^{1,2,3,4,5,6} Program Studi Magister Biologi, Fakultas Biologi dan Pertanian, Universitas Nasional,
Jakarta Selatan, Indonesia.

*Corresponding author: andikanurhardianto@gmail.com

Article History

Received: 16 May 2026

Approved: 14 July 2026

Published: 15 July 2026

DOI: <https://doi.org/10.33541/pro-life.v13i2.7829>

Keywords

Local knowledge, social-ecological systems, sustainability, environmental conservation, sustainable village development.

ABSTRACT

Sustainable village development in Indonesia cannot be separated from the role of local wisdom as a social-ecological system that regulates the relationships between humans, the environment, and economic activities. This study aims to analyze the role of local wisdom in natural resource governance, particularly customary forests and their supporting ecosystems, in Kampung Arborek in Raja Ampat, Desa Panglipuran in Bali, and Kasepuhan Ciptagelar in West Java. This research employs a qualitative approach using a literature review method of relevant scientific articles, undergraduate theses, and academic journals. Data analysis is conducted through the perspectives of structural functionalism and symbolic theory to understand the social functions and cultural meanings of local wisdom within each community. The findings indicate that local wisdom serves as the primary foundation of social-ecological governance in all three villages. In Kampung Arborek, customary norms governing the use of marine and coastal resources function as mechanisms for ecosystem conservation and adaptation to tourism development. In Desa Panglipuran, customary regulations manage spatial planning, environmental management, and tourism activities, thereby preserving both cultural and ecological sustainability. Meanwhile, in Kasepuhan Ciptagelar, customary systems regulate the management of customary forests and traditional agriculture, contributing to food security and environmental conservation. Symbolically, local wisdom in these three communities shapes collective identity and environmental ethics by internalizing conservation values in everyday life. This study confirms that local wisdom is a strategic element in sustainable village development that is adaptive to modernization and external pressures.

© 2026 The Authors. Published by Christian University of Indonesia.

Licensed under CC BY-SA 4.0: <https://creativecommons.org/licenses/by-sa/4.0/>

INTRODUCTION

Indonesia faces serious challenges in natural resource management and

sustainable village development, particularly due to unclear land tenure rights, land tenure conflicts, weak law enforcement,

and overlapping policies that balance conservation and economic interests (Sutrisno, 2020; Safitri, 2014). Many forest and coastal areas historically managed by indigenous peoples and local communities have not been fully recognized in law by the state. This condition opens a space for conflict between the village community and state and business actors, and gives rise to the local community's position as the guardian of the ecosystem (Berkes, 2012). As a result, natural resources are often considered short-term economic commodities, rather than ecological systems that sustain long-term well-being.

Village development in Indonesia also faces multidimensional challenges along with the acceleration of modernization, economic globalization, and environmental change. Villages are no longer understood solely as agrarian production spaces but as arenas of interaction among market-based economic interests, state policies, and interconnected local socio-cultural systems (Keraf, 2010; Sutrisno, 2020). However, in practice, the direction of village development is still dominated by a top-down approach that focuses on economic growth and physical infrastructure, with relatively little attention to ecological continuity and social resilience in local communities (Keraf, 2010). The impact of this approach can be seen in environmental degradation, the marginalization of local

knowledge, and the weakening of social cohesion, the foundation of rural community life (Berkes, 2012).

The development model that focuses on economic growth tends to encourage excessive exploitation of natural resources and accelerate the trade in village space. Local values that have governed human relations with nature are increasingly marginalized, while the environment's carrying capacity is increasingly neglected (Keraf, 2010). In the long term, these conditions contribute to increased socio-ecological vulnerability, characterized by a decline in environmental quality, resource utilization conflicts, and the erosion of local cultural identity (Berkes, 2012; Sutrisno, 2020). This situation underscores the urgency of shifting the village development paradigm towards a more holistic, contextual, and desire-oriented approach to long-term aspirations.

It is in this context that local wisdom becomes very relevant as an alternative foundation for sustainable village development. Local wisdom encompasses a system of values, norms, knowledge, and social practices that develop through historical experiences in society interacting with the natural environment and its social structure (Koentjaraningrat, 2009). This local knowledge serves as a mechanism for ecological adaptation and as a social-ethical system that regulates the use of natural

resources, economic distribution, and relationships among community members (Berkes, 2012).

Various traditional villages and communities in Indonesia demonstrate that local wisdom can serve as an integrated life management system. Customary institutions serve as a social regulatory mechanism that determines the limits of natural resource utilization, regulates economic production and distribution patterns, and maintains social harmony through customary norms and sanctions (Sutrisno, 2020). Thus, local wisdom is not only a cultural heritage but also a strategic socio-ecological capital in supporting the sustainability of village development. Although various studies have examined the practice of local wisdom in indigenous communities in Indonesia, most remain partial and context-specific to a single location, so they do not provide a comprehensive picture of how socio-ecological systems operate across diverse ecological contexts.

Studies on Arborek Village show that community-based ecotourism management can strengthen the conservation of marine resources while improving the welfare of local communities by combining community support, governance, and market value (Tampubolon et al., 2021). On the other hand, Panglipuran Village is widely studied as a model of a sustainable tourism village that succeeds in maintaining a

balance between tourism economic activities and environmental and cultural preservation through the implementation of strict customary rules, under the auspices of the government, where community-based tourism development not only prospers the local community but also maintains local wisdom (Agoes et al., 2023).

Meanwhile, Kasepuhan Ciptagelar is known as a customary village that has a well-known resilience for food security, besides that this customary village also has a strong socio-ecological through traditional agricultural systems, customary forest management, and customary institutions that are adaptive to changing times (Prabowo & Sudrajat, 2021). However, these studies have generally not been comparatively examined across regions with different ecosystem characteristics, and still tends to place social, economic, and ecological aspects separately.

Addressing these limitations, this study adopts a comparative socio-ecological approach to examine three local communities—Arborek Village, Panglipuran Village, and Kasepuhan Ciptagelar—revealing both shared patterns and context-specific differences in local wisdom across coastal, tourism, and customary forest landscapes. In addition, this study adopts a socio-ecological systems perspective to examine the interrelationships among indigenous institutions,

environmental management practices, and local economic systems in shaping village resilience and sustainability. Thus, this research not only fills the gap in cross-ecological comparative studies but also offers a more holistic analytical approach to understanding village development based on local wisdom.

Despite being in different geographical and cultural contexts, Arborek Village, Panglipuran Village, and Kasepuhan Ciptagelar show fundamental similarities in making local wisdom the foundation of economic, ecological, and social management. The third community argues that technological interventions or state policies do not solely determine the desire for village development, but rather the strength of customary institutions, environmental ethics, and social solidarity within local communities (Keraf, 2010; Berkes, 2012). Therefore, this study aims to comparatively analyze the socio-ecological systems in Arborek Village, Panglipuran Village, and Kasepuhan Ciptagelar, and to examine their influence on the development of sustainable village development models based on local wisdom in Indonesia.

RESEARCH METHODS

Study Design

This study uses a qualitative approach and a literature review. The qualitative

approach was chosen because this research aims to gain a deep understanding of the meaning, value, and practice of local wisdom in customary forest governance and sustainable village development, especially within the framework of socio-ecological systems (Berkes, 2012). A literature review allows researchers to critically examine existing conceptual and empirical findings, enabling them to build a comprehensive understanding without directly collecting field data (Manurung, 2022).

Although this research was not carried out through direct fieldwork, it focused on the literature study related to Arborek village in Raja Ampat, Panglipuran Village in Bali, and Kasepuhan Ciptagelar in West Java, where these three areas illustrate concrete examples of local communities that still maintain local wisdom as the basis for managing economic, ecological, and social life. The selection of this indigenous community is based on its characteristics as an indigenous community that still maintains a local wisdom system in the management of customary forests and traditional agriculture, supports food security through cultural analysis, and applies customary rules in the management of marine resources and coral reefs. This is very relevant as a case study in socio-ecological-based sustainable village development.

Procedure

The research procedure in this literature study was conducted through several stages. The first stage involved identifying the research topic and formulating the focus of the study related to customary forest governance, socio-ecological justice, sustainable ecotourism, and biodiversity conservation. The second stage consisted of searching for literature through scientific databases, namely Google Scholar and Scopus, as well as relevant academic books obtained from libraries and academic publishers.

The collected literature was then selected based on predetermined inclusion and exclusion criteria, including relevance to the research topic, publication quality, year of publication, and availability of full-text documents. Subsequently, the selected literature was classified and grouped into main themes, namely customary forest governance, socio-ecological justice, sustainable ecotourism, and biodiversity conservation. The final stage involved descriptive analysis and synthesis to identify patterns, relationships among themes, research gaps, and their implications for the development of concepts and policies for sustainable customary forest management

Data Collection

The selection of literature sources is carried out systematically with the following

criteria: Publication of scientific literature with inclusion criteria that includes discussions about Arborek village in Raja Ampat, Panglipuran Village in Bali, and Kasepuhan Ciptagelar in West Java, with sources based on articles from national and international scientific journals that discuss local wisdom, customary forest governance, sustainable ecotourism, and socio-ecological systems, academic books and official reports of government agencies, non-governmental organizations, or conservation organizations, as well as publications that are conceptually and empirically relevant with the theme of sustainable village development.

Data Analysis

Data analysis was conducted qualitatively by examining three indigenous communities: Arborek Village in Raja Ampat, Panglipuran Village in Bali, and Kasepuhan Ciptagelar in West Java. This third location is defined as a social-ecological system that combines social structure, local wisdom, and human relations with the natural environment. Structural functionalist approaches are used to understand the role of customary institutions and social rules in maintaining system stability. In contrast, symbolic approaches are used to interpret the underlying cultural meanings of these practices.

RESULTS AND DISCUSSION

Local Wisdom as the Foundation of Socio-Ecological Governance

The results of the literature review show that Arborek Village (Raja Ampat), Panglipuran Village (Bali), and Kasepuhan Ciptagelar (West Java) represent three ecologically distinct models of local wisdom, yet share a common emphasis on making customs the primary foundation of natural resource management and sustainable village development. Local wisdom in the third community functions as a social-ecological system that adaptively regulates relationships among human, natural, and economic activities.

In Kampung Arborek, local wisdom develops strongly in the context of marine and coastal ecosystems. The Arborek community has traditionally applied customary norms governing the use of marine resources, including timing and fishing methods, and has prohibited destructive actions that damage coral reefs (Mardliyah, 2017). These norms function as a social control mechanism while maintaining the continuity of marine ecology, the community's main source of livelihood.

The development of tourism in Arborek brought significant social and economic changes. Increased income and new jobs are positive impacts, but challenges arise in the form of changes in

values and patterns of social interaction (Pongantung, 2018). In this context, local wisdom serves as an instrument of socio-ecological adaptation, allowing a balance between tourism economic interests and the conservation of marine and coastal ecosystems. Marine ecosystems, coral reefs, and coastal mangroves are culturally recognized as forms of "coastal customary forests" protected by community customary norms.

In contrast to Arborek, Panglipuran Village displays local wisdom manifested in its spatial planning, social structure, and daily cultural practices. Panglipuran is positioned as a symbol of the preservation of Balinese local wisdom through the strict application of customary rules governing traditional architecture, environmental cleanliness, and the management of community economic activities (Saputra et al., 2025). The spatial arrangement of the village not only emphasizes the aesthetics of ecological culture but also serves as a control mechanism to prevent land exploitation and environmental degradation.

The custom-based management of Panglipuran Tourism Village has proven to impact the preservation of Balinese culture positively. Pradana et al. (2022) show that tourism controlled by customary institutions can strengthen the community's collective identity while maintaining the sustainability of the village environment. Village forest

areas and green spaces are treated as conservation zones protected by customary norms, although they do not always have formal legal status as customary forests. In practice, the customary rules function similarly to the customary forest management system, where local wisdom serves as a social infrastructure that maintains the carrying capacity of the village environment. At the same time, Kasepuhan Ciptagelar represents indigenous communities with a very strong customary forest governance system that is integrated with traditional agricultural systems. Local wisdom in Ciptagelar regulates forest use through traditional calendars, spiritual rituals, and prohibitions on excessive resource exploitation (Khirudin, 2023). Customary forests are seen not only as an economic resource but also as a sacred space with cosmological significance that supports the balance of people's lives.

The development of ecotourism in Ciptagelar is not directed at resource exploitation but rather serves as a means of cultural and ecological education. The traditional rice farming system, the presence of rice barns (*leuit*), and the ban on the sale of rice are the main pillars of the community's food security and social stability. In this context, local wisdom serves as a filter against external influences and as a foundation for socially and

ecologically sustainable village development (Khirudin, 2023).

Socio-Ecological Analysis in a Structural Functional Perspective

From a structural functional perspective, the third community exhibits customary institutions that maintain the balance of the socio-ecological system. In Arborek Village, customary norms governing the use of the sea help regulate human relations with the coastal environment and prevent the degradation of marine ecosystems (Mardliyah, 2017). Tourism serves as an economic subsystem that improves people's welfare, but it still requires social control to avoid disrupting the stability of customary structures (Pongantung, 2018).

In Panglipuran Village, customary rules serve as a mechanism for social integration and for controlling the negative impacts of tourism. Village spatial arrangement and architectural uniformity not only maintain social harmony but also ensure environmental sustainability and the preservation of Balinese culture (Saputra et al., 2025; Pradana et al., 2022). Customary structures play an important role in ensuring that economic changes do not undermine local values.

Meanwhile, in Kasepuhan Ciptagelar, customary structures regulate agricultural systems, food distribution, and forest management. Traditional leadership serves

to maintain compliance with ecological norms, thereby keeping the socio-ecological system stable despite interactions with the tourism sector and the modern economy (Khirudin, 2023).

Symbolic Analysis: Local Wisdom as Environmental Identity and Ethics

From the perspective of symbolic theory, local wisdom in the three communities functions not only as a practical guideline for environmental management but also embodies symbolic meanings that shape cultural identity and ecological ethics. In Arborek Village, the sea and coral reefs are perceived as ancestral heritage that must be preserved, thereby making environmental conservation an integral part of the community's collective identity (Mardiyah, 2017).

In Panglipuran Village, the spatial layout, traditional architecture, and the culture of maintaining environmental cleanliness symbolize cosmic harmony within Balinese culture. The village is understood as a sacred space that reflects the balance between humans, nature, and spiritual values, thus positioning environmental preservation as an inseparable component of cultural and religious practices (Saputra et al., 2025; Pradana et al., 2022).

Meanwhile, in the Kasepuhan Ciptagelar community, rice and customary forests hold symbolic meanings as sources

of life and sacred spaces. Various customary rituals and ecological prohibitions function as symbols of environmental ethics that internalize conservation values within the collective consciousness of the community (Khirudin, 2023).

These findings are consistent with various studies indicating that local wisdom and indigenous knowledge constitute essential components of knowledge systems transmitted across generations and play a significant role in sustaining environmental sustainability. The integration of local knowledge into biology education has been shown to enhance students' understanding of conservation values while simultaneously preserving cultural identity (Adinugraha, 2024). Furthermore, the utilization of indigenous knowledge through field trip-based learning and video production demonstrates that conservation values, biodiversity awareness, and environmental respect can be contextually transmitted to younger generations (Adinugraha et al., 2024).

Ethnobiological studies on traditional Batak Toba food further emphasize that local cultural practices not only maintain biodiversity but also embody symbolic meanings representing harmonious relationships between humans and nature (Adinugraha, 2026). Similarly, the development of teaching materials based on Betawi traditional food local wisdom

highlights that community cultural knowledge possesses educational value while serving as a medium for preserving cultural and environmental identity (Handani et al., 2025).

In a broader context, the ethnobotanical traditions of the Mentawai community demonstrate that local knowledge not only supports biodiversity conservation but also serves as social and cultural capital in the development of sustainable ecotourism that maintains a balance between environmental preservation and community welfare (Ramadhan, 2017). Therefore, local wisdom functions not only as an adaptive environmental practice but also as a symbol of cultural identity, ecological ethics, and a conservation mechanism that supports socio-ecological sustainability.

Synthesis

Comparatively, Arborek Village, Panglipuran Village, and Kasepuhan Ciptagelar demonstrate that local wisdom serves as the primary foundation for sustainable village development. This is despite the different ecological contexts, the sea and coast, village spatial planning, as well as forests and agriculture, all of which place customs as the main regulators of social, economic, and environmental relations. These findings confirm that the sustainability of village development is not solely determined by economic

interventions or formal policies, but is highly dependent on the strength of indigenous institutions and the symbolic meanings within local communities.

CONCLUSION

Local wisdom has a very important role in supporting socio-ecological governance and sustainable village development in Arborek Village, Panglipuran Village, and Kasepuhan Ciptagelar. Although all three are in different ecological and cultural contexts, local wisdom in each community serves as a system that regulates the relationship between humans, nature, and economic activity.

Local wisdom has been shown to function structurally as a mechanism for social control and environmental conservation, and as a buffer for social stability in the face of changes brought about by tourism and modernization. In addition, symbolically, local wisdom shapes the collective identity of society and environmental ethics that encourage ecological awareness and intergenerational responsibility. Thus, the desire for village development is determined not only by formal policies and economic growth but also by the strength of indigenous institutions and symbolic values within local communities.

This research emphasizes that integrating local wisdom into the planning and implementation of village development is an important strategy for maintaining a balance among social welfare, environmental sustainability, and cultural sustainability. Therefore, recognizing and strengthening the role of indigenous peoples is the key to realizing sustainable and equitable village development.

REFERENCES

- Adinugraha, F. (2024). Indigenous knowledge integrated Biology learning with Project-based Learning to support team communication skills. *Pro-Life*, 11(2), 154-172.
- Adinugraha, F. (2026). Tanggo-Tanggo: An Ethnobiological Study of a Traditional Batak Toba Food for Biodiversity Learning through Educational Videos. *Pro-Life*, 13(1), 43-55.
- Adinugraha, F., Sembiring, G. A., Hutabarat, A. S., & Agustianto, W. (2024). Field trip integrated indigenous knowledge of Betawi Tribe through video-making skills to improve species knowledge. *Pro-Life*, 11(3), 251-267.
- Agoes, A., Gustini, S., & Nadhira, H. A. (2023). Pengelolaan pariwisata berbasis masyarakat di Desa Penglipuran. *Manajemen dan Pariwisata*, 2(1).
- Berkes, F. (2012). *Sacred ecology: Traditional ecological knowledge and resource management* (3rd ed.). Routledge.
- Handani, C. R., Silalahi, M., & Wahyuningtyas, R. S. (2025). Development of E-Handout Based on Local Wisdom of Betawi Traditional Food in Junior High School on Digestive System Materials. *Pro-Life*, 12(2), 179-193.
- Keraf, A. S. (2010). *Etika lingkungan hidup*. Kompas.
- Khirudin, F. (2023). *Kajian geografi pariwisata dalam pengembangan ekowisata di Kasepuhan Ciptagelar Sukabumi* (Undergraduate thesis). Universitas Islam Negeri Syarif Hidayatullah Jakarta.
- Koentjaraningrat. (2009). *Pengantar ilmu antropologi*. Rineka Cipta.
- Manurung, R. (2022). *Metodologi penelitian kualitatif: Teori dan praktik*. Deepublish.
- Mardiyah, U. (2017). Dinamika masyarakat di Pulau Arborek dalam menjaga kearifan lokal. *Jurnal Noken*, 2(2), 43–49.
- Nugraha, A. (2018). Desa adat Panglipuran dan pariwisata berkelanjutan berbasis kearifan lokal. *Jurnal Pariwisata Budaya*, 3(2), 45–58.
- Pongantung, N. V. (2018). Perubahan sosial budaya dan ekonomi masyarakat Kampung Arborek Raja Ampat setelah menjadi kawasan wisata. *Agri-SosioEkonomi Unsrat*, 14(1), 109–116.
- Prabowo, Y. B., & Sudrajat. (2021). Kasepuhan Cipta Gelar: Pertanian sebagai simbol budaya dan keselarasan alam. *Jurnal Adat dan Budaya*, 3(1).
- Pradana, G. Y. K., & Dharma, A. A. P. B. S. (2022). Implikasi penataan Desa Wisata Panglipuran terhadap kelestarian budaya Bali. *Jurnal Pariwisata Indonesia*, 18(1).
- Ramadhan, S. F. (2017). Potensi pengembangan tradisi etnobotani sebagai ekowisata berkelanjutan: Studi kasus suku Mentawai di Pulau Siberut, Kepulauan Mentawai. *Pro-Life*, 4(2), 364-375.
- Safitri, M. A. (2014). *Hukum agraria dan masyarakat adat: Perspektif pluralisme hukum*. HuMa.
- Saputra, A., Sabrina, N. D., Faizah, N., Awaliyah, A., & Mumpuni, A. (2025). Desa Panglipuran sebagai simbol pelestarian kearifan lokal Bali. *Jurnal Media Akademik*, 3(6).

- Satria, A. (2015). *Pengelolaan sumber daya pesisir berbasis masyarakat*. Yayasan Pustaka Obor Indonesia.
- Sutrisno, L. (2020). *Pembangunan desa dan keberlanjutan sosial-ekologis*. Gadjah Mada University Press.
- Tampubolon, N., Marampa, M. M., & Bato, M. (2021). Evaluasi penerapan konsep ekowisata di Kampung Wisata Arborek, Raja Ampat. *Jurnal Sumberdaya Akuatik Indopasifik*, 5(3).