



Local Environmental Governance and Cultural Practices in the Karampuang Indigenous Community

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Received: 02-08-2026

Revised: 03-06-2026

Accepted: 03-15-2026

Citation: Ikhsan, S., Naping, H., Gassing, A. Q., Demmallino, E. B., Busthanu, N., & Darhamsyah. (2026). Local environmental governance and cultural practices in the Karampuang indigenous community. *Cent. Community Dev. J.*, 6(1), 40–57. <https://doi.org/10.56578/ccdj060104>.



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Abstract: This study examined how the Karampuang indigenous community in South Sulawesi structured local environmental governance through culturally embedded norms, customary institutions, and collective ecological practices. Despite increasing pressures from modernization, changes in land use, and regional development policies, the community has maintained a resilient governance system that regulates access to land, forests, and water through ritualized decision-making, intergenerational knowledge transmission, and clearly defined customary roles. Drawing on qualitative fieldwork including in-depth interviews, participant observation, and documentation of cultural practices, this research investigated how local governance mechanisms were organized, negotiated, and reproduced within daily social life. The study addressed two core questions: (1) How do cultural values and customary authority shape environmental governance in Karampuang? and (2) In what ways do these practices contribute to ecological sustainability and community cohesion? The findings revealed that customary governance operated as a socio-ecological framework that integrated territorial boundaries, communal resource management, and social obligations, which minimizes ecological degradation and reinforces collective responsibility. This paper contributed to broader debates in environmental anthropology, indigenous studies, and community-based resource management by demonstrating how local cultural systems functioned as effective environmental governance regimes. The Karampuang case highlights the continuing relevance of indigenous institutions for addressing sustainability challenges in the contemporary era.

Keywords: Indigenous environmental governance; Cultural practices; Community-based resource management; Karampuang community; Local knowledge; Sustainability

1. Introduction

Discourses on sustainable development increasingly emphasize the importance of integrating local knowledge systems within contemporary environmental management frameworks. Scholars have argued that community-based values, territorial norms, and traditional ecological practices play a central role in shaping long-term environmental resilience (Delgado-Serrano et al., 2018; Ensor et al., 2018). In many indigenous settings, cultural systems act not only as social institutions but also as mechanisms of ecological regulation. These systems often emerge from centuries of interaction between communities and their surrounding landscapes, resulting in governance traditions that are deeply rooted in local experience and collective memory.

The Karampuang indigenous community in South Sulawesi represents one of these long-standing socio-cultural systems in Indonesia. Recognized through regional regulations including Sinjai Regency Regional Regulation No. 28 of 2012 and Sinjai Regency Regional Regulation No. 1 of 2019, Karampuang maintains a customary territorial structure and cultural practices that guide social relations, resource use, and environmental stewardship (Celeste

et al., 2020). These institutional recognitions affirm the status of the community as a cultural heritage entity with unique knowledge of landscape management, traditional boundaries, and collective decision-making.

The Karampuang community has gradually developed a complex set of norms, rituals, and customary roles that govern interactions with forests, agricultural areas, water sources, and communal land. These practices not only help maintain ecological balance but also reinforce community cohesion, identity, and continuity across generations (Flint, 2013). Customary prohibitions, ritual cycles, and collective responsibilities function as tools to regulate extraction of resources, prevent overuse, and sustain ecological productivity. The long-term survival of a community reflects how local systems adapt to environmental variability and social change.

However, contemporary pressures including land-use transformations, demographic shifts, and regional development agendas pose significant challenges to indigenous governance systems. These external influences often disrupt traditional patterns of territorial management and create tensions between customary norms and modern regulatory frameworks (Ubink & Quan, 2008). Understanding how Karampuang navigates these shifts is essential for evaluating the resilience of local governance mechanisms in the face of rapid socio-environmental change.

Despite these pressures, the Karampuang community continues to maintain a cultural orientation that prioritizes environmental protection, resource conservation, and communal responsibility. Previous studies highlighted the significance of local knowledge for sustaining forest ecosystems, safeguarding water resources, and regulating agricultural activities (Parrotta & Agnoletti, 2012; Parrotta et al., 2016). Such practices demonstrated how indigenous communities contributed to sustainable resource management without relying on formal environmental policies.

Yet, studies on Karampuang tended to focus predominantly on cultural rituals or heritage preservation, while the underlying mechanisms of environmental governance embedded in these practices have not been comprehensively examined. It is necessary to analyze how cultural norms, collective decision-making structures, and customary authorities shape ecological regulation in everyday life (Ebbesson, 2010; van Kerckhoff & Pilbeam, 2017). A more systematic understanding will clarify the broader relevance of indigenous governance models to contemporary sustainability discourse.

This study therefore investigated the cultural foundations and practical dimensions of environmental governance within the Karampuang indigenous community. Through qualitative methods comprising observation, in-depth interviews, and documentation, this research explored how customary authority, intergenerational knowledge transmission, and structure of social norms interacted with the environment. The findings contribute to wider discussions in environmental anthropology, indigenous studies, and community-based resource management by demonstrating the continuing role of local cultural systems in shaping sustainable ecological practices.

This paper is structured as follows. The next section presents the conceptual and theoretical framework on indigenous knowledge and sustainable development, to highlight key debates and perspectives in the literature. This is followed by the methodology section, which explains the research approach, data sources, and analytical procedures. The Results and Discussion sections then elaborate the main findings on how indigenous knowledge contributes to sustainable practices and the challenges of its integration into formal development frameworks. Finally, the conclusion summarizes the key insights and provides recommendations for strengthening the role of indigenous knowledge in the policies and practices of sustainable development.

2. Literature Review: Indigenous Governance and Cultural Practices

Research on indigenous communities has increasingly highlighted the significance of local governance systems in shaping sustainable interactions with the environment. Scholars argued that such governance structures emerged from long-term ecological experiences and collective memory, thus allowing communities to develop adaptive mechanisms for resource management (Berkes, 2017a; Foxon et al., 2009). These systems typically integrate social norms, cultural obligations, and territorial arrangements that regulate access to natural resources. As a result, indigenous governance is recognized as a key contributor to the resilience of socio-ecological systems in many parts of the world (Inaotombi & Mahanta, 2019).

Traditional ecological knowledge (TEK) forms a central component of indigenous environmental governance. TEK includes practices, skills, and local wisdom passed down from generation to generation, and it guides communities in interpreting environmental change and adapting resource use accordingly (Berkes et al., 2000; Selin, 2003). Studies showed that such knowledge often resulted in ecological outcomes that paralleled or exceeded the effectiveness of state-based management strategies, especially in remote and culturally autonomous regions (Lockwood & Davidson, 2010; Sharifian et al., 2022). This highlights TEK as both an epistemological system and a practical tool for sustainability.

Anthropological research emphasizes that cultural values function as regulatory systems that influence environmental behavior within indigenous societies. These values shape community expectations, governance roles, and mechanisms of compliance rooted in social cohesion rather than formal enforcement (Franco et al., 2026). Cultural norms are crucial for preventing ecological degradation as they often determine when, where, and

how resources may be accessed or restricted. In many Indonesian indigenous groups, such values underpin community-based governance frameworks that maintain ecological balance despite external pressures (Aldyan et al., 2025; McCarthy & Warren, 2009).

Local governance institutions such as customary leaders, councils, or ceremonial authorities play an instrumental role in safeguarding traditional ecological systems. These institutions mediate conflicts, enforce communal rules, and administer territorial boundaries according to long-established principles (Connor & Dovers, 2004; Golo et al., 2022). Empirical studies demonstrated that the legitimacy of these institutions was sustained through collective recognition rather than legal authorization, which strengthened their capacity to regulate everyday resource use (van Oosten et al., 2018). As a result, customary governance frequently operates parallel to official government structures.

Recent discussions have emphasized the importance of integrating customary and formal governance systems to address contemporary environmental challenges. Scholars argued that hybrid governance approaches, which combined state regulation with indigenous autonomy, yielded more effective outcomes for conservation and land management (Zhang et al., 2023). In Indonesia, legal recognition of indigenous communities through regional regulations has facilitated such collaborative arrangements, though their implementation varies widely across regions (Seymour et al., 2020). This recognition strengthens indigenous authority in managing forest zones, water sources, and communal land.

Studies on community resilience highlighted that indigenous communities often possessed adaptive strategies rooted in collective identity, social norms, and reciprocal relationships (Thomas et al., 2016). These strategies enable communities to respond effectively to changing environmental conditions, including shifts in land use and availability of natural resources. The resilience perspective underscores how social cohesion and shared cultural frameworks act as stabilizing forces that allow communities to reorganize and innovate without abandoning traditional governance models (Mahmood et al., 2024).

From the perspective of cultural geography, the connection between people and place is essential to understanding indigenous environmental governance. Land and territory are not merely physical space but also social and symbolic domains embedded with meaning, memory, and obligation (Aucoin, 2017). This spatial understanding shapes how indigenous communities conceptualize stewardship, develop territorial boundaries, and maintain cultural landscapes. In Southeast Asia, such connections often manifest in ritual cycles, communal work traditions, and ecological norms tied to specific locations (Chua et al., 2019).

Environmental governance can be understood as an integrated process that links ecological integrity with social and institutional frameworks. The theoretical concept of ecosystem integrity emphasizes the environmental requirements to maintain the structure, function, and resilience of ecological systems (Müller et al., 2000). Within this perspective, environmental regulation is not solely a technical or scientific endeavor but also involves normative structures that guide human interaction with ecosystems. Institutional roles, governance mechanisms, and management practices function as key components in maintaining ecological balance by aligning human activities with environmental limits. Thus, environmental governance could be framed as a dynamic interaction between ecological processes and regulatory systems that support sustainability in the long term.

Research on local institutions in forest management highlighted the important role of both formal and informal rules in regulating use of natural resources, particularly in areas surrounding protected forests. A case study conducted in Central Sulawesi demonstrated that traditional informal institutions, including locally developed norms and sanctions, were often more effective and respected by communities than state-imposed formal regulations (Mehring et al., 2011). These local rules are typically aligned with traditional land-use practices and socio-cultural conditions, thus enabling more adaptive and context-specific environmental governance. However, the study also indicated that mismatches between formal regulations and local realities could reduce the effectiveness of conservation efforts. This suggests that successful environmental governance requires the integration of formal institutional frameworks with locally embedded practices to ensure both ecological sustainability and social acceptance.

While existing literature provided substantial insight into indigenous environmental governance, few studies focused on how these mechanisms operated in the Karampuang community. Current work tended to examine symbolic traditions and cultural rituals, thus leaving a gap in understanding how these practices translate into environmental regulation and community-based management. This study contributed to filling that gap by situating Karampuang within broader theoretical discussions on TEK, customary institutions, and socio-ecological resilience, to highlight its relevance for contemporary sustainability discourse.

Despite extensive research on indigenous environmental governance, traditional ecological knowledge, and customary institutions, there remains a notable gap in understanding how these mechanisms function within specific communities, particularly in translating cultural practices into effective environmental regulation and resource management. While studies have documented symbolic traditions, social norms, and community-based resilience in various Indonesian and Southeast Asian contexts, few have examined the operational dynamics of these governance systems at the local level. Specifically, the Karampuang community has received limited scholarly attention, thus leaving questions about how its customary institutions, territorial arrangements, and

collective ecological knowledge influence day-to-day resource management and environmental sustainability. Addressing this gap is crucial for linking theoretical frameworks on TEK, socio-ecological resilience, and hybrid governance with empirical evidence from a localized context, thereby providing insights that are both culturally grounded and practically applicable for contemporary environmental management.

3. Research Methodology

This study adopted an interpretive research paradigm, which emphasized understanding social phenomena through context-specific meanings rather than fixed laws or universal procedures. Knowledge is generated inductively, moving from particular observations to broader conceptual insights, and ideographically, focusing on descriptive representations of reality. This paradigm provides a foundation for qualitative research, which is suitable for exploring the complex interactions among local governance, cultural practices, and environmental management in the Karampuang community.

The research employed a qualitative approach to gain a comprehensive understanding of environmental governance and cultural practices within the Karampuang indigenous community. This approach allowed in-depth exploration of how local norms, customary institutions, and intergenerational knowledge guided resource management and ecological stewardship. By emphasizing narratives, observations, and context-specific insights, qualitative methods provide a rich and holistic perspective of the community's practices, their social significance, and their contribution to sustainable use of resources.

Fieldwork was conducted in the Karampuang customary area, recognized by regional regulations, between April and December 2024. Informants were selected purposively to include key categories such as government officials, customary leaders, educators, museum staff, and local residents who possessed knowledge of Karampuang cultural practices and environmental governance. This selection ensured access to individuals capable of providing detailed insights into the organization, negotiation, and reproduction of customary governance systems in everyday community life.

Primary data collection involved participant observation and in-depth interviews. Observation included documenting land use, agricultural practices, forests, water sources, and key cultural sites, complemented by photographic and video documentation. Interviews explored how cultural norms, collective decision-making, and customary authority shaped environmental regulation and resource management. Secondary data were obtained from previous studies, local reports, and scholarly literature to contextualize and support primary findings.

Data analysis followed a systematic process of reduction, presentation, and interpretation. Data reduction focused on selecting relevant information related to customary governance, environmental practices, and community-based resource management. Data were then presented through descriptive narratives, visual documentation, and summary tables illustrating key patterns and relationships. Conclusions were drawn by interpreting how cultural practices and local governance mechanisms functioned to sustain ecological balance, manage resources collectively, and reinforce community cohesion. Data validity was ensured through repeated verification with informants to confirm that interpretations accurately reflected local knowledge and governance practices.

To enhance the validity of the findings, data were carefully cross-checked and interpreted through iterative analysis. This process ensured that the emerging themes accurately reflect the relationship between indigenous knowledge and sustainable development practices. To ensure that the findings accurately reflect field conditions, selected excerpts from in-depth interviews with key informants were incorporated into the Results section. These include perspectives from traditional leaders such as the *Pabbicara* and *Sanro*, as well as community members, to provide contextual depth and empirical grounding for the analysis.

4. Sustainable Development Based on the Local Wisdom of the Karampuang Community

To improve clarity and reduce redundancy, the discussion was organized around broader thematic categories that reflect key dimensions of local environmental governance in the Karampuang community. These themes included ecological systems, economic practices, education and environmental ethics, and governance and leadership structures. This thematic approach facilitated a more coherent analysis of how indigenous knowledge contributes to sustainable development, while avoiding repetitive descriptions across subsections.

The findings presented in this section were based on field observations and in-depth interviews conducted within the Karampuang community. Table 1 shows the summary of key informants. To strengthen the empirical basis of the analysis, this section incorporates direct quotations from key informants and contextual descriptions of local practices, including customary rituals and traditional resource management systems.

The implications of sustainable development as practiced by the Karampuang community highlighted the integration of local wisdom into environmental stewardship and social governance. It examined how traditional practices, collective management of natural resources, and community-led rituals contributed to ecological balance, social equity, and long-term resilience. The analysis emphasized the role of indigenous knowledge in shaping

ethical and culturally embedded approaches to sustainability that aligned with global objectives such as resource conservation, climate action, and sustainable livelihoods. By exploring the interplay between local traditions and contemporary sustainability principles, this study underscored the potential of community-based strategies as models for sustainable development in broader contexts.

Table 1. Summary of key informants

No.	Role of Informant	Description
1	<i>Pabbicara</i>	Traditional leader responsible for customary law
2	<i>Sanro</i>	Traditional healer and cultural custodian
3	Community member	Local resident involved in daily resource management

This section presents and discusses the findings of this study by integrating empirical observations with relevant theoretical perspectives. The analysis was organized into several key themes, including the role of indigenous knowledge in supporting environmental sustainability, its socio-cultural significance, and the challenges associated with its incorporation into formal development planning. This thematic structure aims to provide a clearer and more systematic presentation of the data, while highlighting the linkage between indigenous knowledge and sustainable development.

4.1 Sustainable Development from a Global Perspective

This section discusses the ecological knowledge systems of the Karampuang community, to emphasize traditional practices related to land, water, and forest management. These practices demonstrated how indigenous knowledge contributed to environmental sustainability through locally adapted strategies (Celeste et al., 2020; Parrotta & Agnoletti, 2012; Parrotta et al., 2016). The findings were categorized into thematic dimensions derived from the data analysis. Each theme reflected recurring patterns identified from the study and was discussed in relation to existing literature on indigenous knowledge and sustainability (Berkes et al., 2000; Leo et al., 2022).

Sustainable development is an approach that emphasizes not only economic growth but also social and environmental dimensions. It stresses that economic progress must align with social well-being and environmental preservation to prevent inequality and ecosystem degradation. The concept of socio-ecological responsibility serves as a fundamental principle; every development policy is therefore evaluated based on its impacts on both communities and the environment. This enables the formulation of inclusive, equitable, and accountable strategies for development (Flint, 2013; van Kerkhoff & Pilbeam, 2017). Sustainable development is not merely a short-term objective but a long-term vision for maintaining a balance between humans and nature.

From a global perspective, sustainable development emphasizes the simultaneous integration of economic, social, and environmental aspects. Economic growth should not compromise social justice whereas environmental conservation should not hinder community advancement. Consequently, modern development policies promote cross-sectoral synergy and collaboration among governments, private sectors, and local communities. This approach also encourages efficient resource utilization, environmentally friendly technological innovation, and equitable distribution of development benefits. It bridges the gap between present economic needs and the long-term sustainability of resources for future generations (Colding & Folke, 2001; Ostrom, 2009).

Socio-ecological responsibility forms the ethical foundation of sustainable development. Every decision of development should consider its impact on local communities and surrounding ecosystems. Exploitation of resources without long-term planning could lead to environmental degradation, social conflict, and economic losses. This concept promotes community participation in planning and resource management, leading to collective, transparent, and accountable development processes (Flint, 2013; Gibson et al., 2000). Socio-ecological responsibility also emphasizes intergenerational justice, thus ensuring that the current generation preserves the availability and quality of resources for the future (Berkes et al., 2000; Berkes, 2017b).

The implementation of sustainable development occurs not only at the global level but also requires adaptation to local practices and wisdom. Integrating global policies with local practices provides more effective responses to specific environmental and social conditions (Rodríguez et al., 2018; Tarimo et al., 2025). For instance, sustainable forest, water, and agricultural management could combine modern technology with traditional practices that have proven to preserve ecosystems (Leo et al., 2022; Parrotta et al., 2016; Pulhin et al., 2024). This approach strengthens local capacities to cope with climate change, land degradation, and global economic pressures. Moreover, development policies responsive to local contexts encourage active community participation, increase compliance, and enhance social equity (Berkes, 2007; Wong et al., 2020).

Strategies for sustainable development should always account for long-term impacts on humans and ecosystems. This requires evidence-based planning, continuous monitoring, and policy evaluation. Efforts include responsible natural resource management, environmentally friendly infrastructure, and the strengthening of community socio-economic capacities (Flint, 2013; Gibson et al., 2000). The global perspective highlights the importance of international collaboration to achieve sustainable development goals while respecting local contexts.

Through the implementation of a holistic strategy, development could enhance economic welfare, preserve environmental integrity, and strengthen social cohesion across communities (Berkes et al., 2000; Ostrom, 2009).

4.2 Local Wisdom of the Karampuang Community

To strengthen the empirical foundation of this study, samples of visual documentation from field observations are provided to complement the qualitative findings. Photographs were taken during fieldwork to capture key aspects of environmental practices, customary leadership activities, and community interactions with natural resources. These visual data provide contextual evidence of how cultural values and governance mechanisms are manifested in everyday practices within the Karampuang indigenous community (Gadgil et al., 1993; Leo et al., 2022). The inclusion of these images enhances the transparency and credibility of the findings by linking descriptive analysis with observable field conditions. Figure 1 illustrates traditional environmental practices, the role of customary leaders in environmental governance, spatial arrangements of indigenous settlements and natural resources, and cultural rituals related to environmental stewardship (Parrotta & Agnoletti, 2012; Parrotta et al., 2016).



Figure 1. Integrated traditional environmental management system in the Karampuang community: (a) traditional environmental practices; (b) role of traditional leader in environmental governance; (c) spatial arrangement of indigenous settlement and natural resources; (d) cultural rituals related to environmental stewardship

The Karampuang community actively practises traditions that preserve environmental sustainability. Certain forests are protected through strict prohibitions against tree cutting, and any proposed changes of land use are preceded by customary deliberations, which demonstrates the preservation of ecological balance and resource stewardship. By embedding environmental care into daily life and social norms, the community ensures that human activities do not compromise the health of ecosystems. Such traditions serve as preventive measures against overexploitation and environmental degradation.

Traditional rituals, particularly those tied to harvests and seasonal cycles, reinforce awareness of the interdependence between humans and nature (Parrotta & Agnoletti, 2012; Pulhin et al., 2024). These events function not only as cultural expressions but also as educational tools, reminding community members of the importance of sustainable resource management. Through collective participation in rituals, individuals internalize

values of moderation, responsibility, and respect for the environment (Celeste et al., 2020; Leo et al., 2022). The ceremonial aspects strengthen communal bonds while promoting environmental consciousness, which illustrate how culture and ecological knowledge are intertwined.

Local values in Karampuang encourage the judicious and responsible use of resources. Practices such as rationed harvesting, seasonal observances, and selective land use reflect an inherent ethic of moderation. Community members are taught to avoid wasteful consumption and respect natural cycles, ensuring the availability of resources for future generations. This approach minimizes ecological pressure while maintaining subsistence and economic activities, so as to establish a sustainable framework for resource management which is aligned with both ecological and social needs (Berkes et al., 2000; Berkes, 2017b).

Beyond environmental stewardship, local wisdom fosters social cohesion and collective. Decisions regarding resource use or land management are made communally, promoting dialogue, consensus, and shared accountability (Celeste et al., 2020; Parrotta et al., 2016). Such collective governance reduces conflicts, distributes responsibilities fairly, and enhances mutual trust. By integrating ecological care with social cooperation, the Karampuang community demonstrates that sustainable development encompasses both environmental and social dimensions.

Ultimately, the traditional values of the Karampuang community function as an effective social regulatory mechanism, independent of external legal enforcement. These practices guide ethical behaviour, mediate conflicts, and provide frameworks for responsible interaction with the environment. Local wisdom becomes a normative system, in which cultural expectations and moral principles ensure compliance with sustainable practices. In this sense, traditions act as a culturally rooted ethical compass, harmonizing human activity with ecological preservation. As a result, the Karampuang model exemplifies how indigenous knowledge could inform sustainable resource management and serve as a guide for broader development strategies.

4.3 Integration of Traditional Values and Sustainable Development

The traditional values of the Karampuang community embody a framework of environmental respect, responsible resource use, and equitable distribution. These principles represent core components that strongly align with sustainable development goals. Rather than viewing nature as a resource to be mastered or exploited, Karampuang traditions conceptualize land, forests, water, and other natural resources as *shared blessings*—a notion that reflects a combined cultural and spiritual understanding of nature as collectively inherited and morally entrusted to the community. In this sense, “shared blessings” does not merely denote a religious belief in divine provision, but also functions as a normative governance principle, emphasizing collective ownership, ethical responsibility, and intergenerational stewardship. Accordingly, natural resources must be managed with care, moderation, and collective accountability.

This worldview challenges short-term profit maximization and instead promotes long-term ecological balance, social welfare, and intergenerational equity. As a result, a locally grounded governance model emerges in which environmental stewardship is embedded in everyday practices rather than imposed through external regulatory mechanisms.

One hallmark of this integration is the custom of the community to regulate access to resources. Rather than unrestricted individual exploitation, resources are managed collectively and governed by communal deliberation and norms that prohibit overharvesting or destructive use. This approach echoes empirical findings from other indigenous communities in Southeast Asia and the Amazon, where communal resource management is based on TEK. These indigenous communities often outperform state-led or market-driven regimes in maintaining forest cover, soil fertility, and biodiversity. Karampuang’s customary regulations function as informal environmental governance institutions, to enforce ethical resource use without reliance on external legal frameworks (Berkes et al., 2000; Leo et al., 2022).

Moreover, equitable distribution of benefits from natural resources reinforces social solidarity and environmental justice within the community. By ensuring that land, water, forest products, and other natural assets are shared or allocated fairly among members, local wisdom reduces the risk of social inequality or environmental degradation stemming from unequal access (Celeste et al., 2020; Parrotta et al., 2016). Studies of community-based forestry and communal land management in rural Indonesia and similar contexts have documented that equitable governance strengthens cohesion, reduces conflicts about resources, and promotes sustainable livelihoods for all. In Karampuang, equitable distribution fosters a culture of collective responsibility, hence supporting resilient, inclusive, and sustainable development.

Traditional practices in Karampuang also emphasize caution, moderation, and respect for ecological cycles as these are principles that underpin ecological resilience and sustainability (Celeste et al., 2020; Parrotta et al., 2016). Decisions regarding land clearing, forest use, or water management are preceded by deliberation; in this light, communities could avoid practices that lead to soil exhaustion, deforestation, or habitat destruction. This precaution-based approach aligns with the precautionary principle widely recognized in sustainability science. Comparative research showed that communities adhering to precautionary, culturally grounded environmental norms could preserve ecosystem services more effectively than those relying solely on technical or regulatory

interventions (Parrotta et al., 2016; Pulhin et al., 2024). In Karampuang, this fusion of local values and environmental ethics acts as a “bottom-up” conservation strategy, deeply rooted in social practice rather than externally imposed.

Finally, the Karampuang model demonstrates that sustainable development could emerge organically from local cultural frameworks, which offers a viable alternative to “top-down” development paradigms. While many modern development models emphasize rapid growth and infrastructure, Karampuang illustrates that growth, when balanced with respect for natural systems and social equity, could be sustainable, regenerative, and community-centred (Berkes et al., 2000; Pulhin et al., 2024). This aligns with literature advocating for the inclusion of indigenous knowledge and community-based governance in global sustainability planning. In doing so, Karampuang offers a template for integrating tradition and modern sustainability goals: Honoring cultural heritage while contributing to environmental conservation, social justice, and the well-being of the community in the long term.

4.4 Philosophical Dimension and Environmental Ethics

The Karampuang community demonstrates a deeply rooted philosophical awareness of ecological balance, embedding ethical stewardship within their environmental practices (Berkes et al., 2000; Parrotta et al., 2016). Practices such as shifting cultivation—a rotational agricultural system in which land is cultivated for a limited period and then left fallow to allow natural regeneration—along with land zoning and the principle of taking only what is needed, reflect a conservation ethic grounded in restraint, regeneration, and respect for ecological limits. This worldview positions humans as caretakers of the land rather than exploiters, thereby fostering long-term ecological resilience instead of environmental degradation. In everyday life, forests, rivers, and soil are not perceived merely as resources for extraction but as communal heritage that must be managed responsibly for both present and future generations.

This environmentally conscious approach is mirrored in other indigenous communities. For example, buffer communities around Alas Purwo National Park in East Java implement customary rules and taboos to regulate forest use, water, and coastal resources, hence effectively conserving biodiversity and ecosystem health over generations (Leo et al., 2022; Parrotta & Agnoletti, 2012). Similarly, the Samin community in Central Java demonstrates how ancestral moral ecological values guide sustainable agriculture, zero-waste farming, and equitable sharing of natural resources (Celeste et al., 2020; Pulhin et al., 2024). Such parallels confirm that philosophical ethics embedded in indigenous worldviews could serve as culturally grounded mechanisms for conservation.

Moreover, Karampuang’s ethical framework supports collective governance of resources, which enhances social cohesion, shared responsibility, and accountability. Decisions regarding land use, harvesting, and resource access are guided by customary norms rather than individual profit motives (Leo et al., 2022; Pulhin et al., 2024). This communal management reduces the risk of overexploitation, as social norms and mutual oversight act as informal regulatory mechanisms. Similar findings in the literature on community-based resource management indicate that traditional value-driven stewardship often outperforms top-down regulatory approaches in sustaining biodiversity and long-term ecosystem health (Celeste et al., 2020; Gadgil et al., 1993).

The effectiveness of local wisdom-based environmental ethics, however, depends on meaningful community autonomy and legal recognition of customary rights. Empirical studies showed that indigenous communities with secure land tenure and recognized customary governance could effectively manage forests, water, and land sustainably, in order to reduce deforestation and preserve the functions of the ecosystem (Leo et al., 2022; Parrotta & Agnoletti, 2012). Conversely, without such recognition, external pressures such as commercial logging, land conversion, or modern agricultural expansion could undermine traditional practices and trigger ecological degradation (Berkes, 2017b; Pulhin et al., 2024). This highlights the necessity of institutional support and governance frameworks that respect and protect community-based ecological norms.

Finally, integrating Karampuang’s ethical perspective and traditional ecological knowledge into broader sustainability initiatives demonstrates the potential of culture-based approaches. This proposed initiative illustrates that sustainable development does not always require high-tech solutions; sometimes the wisdom embedded in longstanding cultural practices suffices to maintain ecological balance while supporting human livelihoods (Berkes et al., 2000; Parrotta et al., 2016). This approach resonates with the concept of “social-ecological feedback”, where human behavior and ecological responses co-evolve toward sustainable trajectories rather than destructive tipping points (Leo et al., 2022; Pulhin et al., 2024). In this sense, Karampuang serves as a living example of how indigenous values and community governance could contribute meaningfully to global environmental sustainability.

4.5 Role of Traditional Leaders in Environmental Management

Environmental governance in the Karampuang indigenous community is strongly embedded in customary

leadership structures that regulate the interaction between humans and nature. Traditional leaders play a central role in enforcing customary rules, mediating conflicts, and ensuring compliance with ecological norms that have been passed down through generations. These leadership practices are not only administrative but also symbolic, reflecting moral authority and collective responsibility for environmental stewardship. Unlike formal governance systems, decision-making processes that integrate cultural values with practical environmental considerations, are carried out through deliberative consensus. This integrated form of leadership demonstrates how ecological governance is sustained through both institutional roles and culturally embedded practices, and avoiding demarcation between authority and ecological responsibility.

Traditional leaders in the Karampuang community, known as *Pabbicara* or *Sanro*, play a key role in safeguarding cultural values, social norms, and the community's relationship with nature. As commented by one leader, "Our ancestors have taught us that nature is not only a resource but also a living entity that must be respected and protected". The authority of the traditional leaders extends to monitoring resource use, enforcing local regulations, and ensuring that communal practices align with sustainable principles. Leaders act as moral and environmental stewards, mediating between human needs and ecological limits. By guiding resource management, they maintain a balance that prevents overexploitation while supporting local livelihoods, thus demonstrating that leadership is inseparable from environmental responsibility.

In the Karampuang community, traditional practices such as customary land-use arrangements and ritual-based environmental management play a significant role in sustaining ecological balance. For instance, certain areas are designated as protected zones based on customary rules, and community members are bound by collective agreements to preserve these spaces. These practices are reinforced by local institutions and traditional leadership structures, to ensure continuity across generations.

The oversight of natural resources by customary leaders resonates with studies in other indigenous communities. For instance, in the Dayak communities of Kalimantan, local chiefs enforce forest access rules and seasonal restrictions to prevent deforestation and maintain biodiversity (Leo et al., 2022). Similarly, the Maori of New Zealand rely on tribal leaders to oversee fisheries, enforce customary practices, and protect waterways from pollution (Harmsworth & Awatere, 2013). These examples illustrate that traditional leadership structures are often more effective in resource conservation than centralized and external regulations, because the former is embedded in social norms and collective accountability.

Moreover, Karampuang leaders actively mediate conflicts related to resource allocation, land use, and environmental management. Through dialogue and customary councils, these leaders reconcile competing interests while maintaining ecological integrity. This participatory approach strengthens social cohesion and ensures more equitable access to resources, which reduces the risk of environmental degradation caused by unregulated exploitation. Similar patterns have been observed in community-based forest management systems, in which the involvement of local institutions and participatory governance mechanisms contributes to improved social justice and sustainable forest management outcomes (Pulhin et al., 2024). These findings support the argument that the role of customary leadership, such as that in the Karampuang community, is critical in fostering sustainable and inclusive environmental governance.

The leadership model in Karampuang also emphasizes collective accountability. Decisions regarding forest, river, and agricultural management are not solely the responsibility of individual households but are guided by communal norms under the supervision of the leader. This system reduces opportunistic exploitation and reinforces long-term sustainability. To support this notion, literature on community-based resource management indicated that participatory governance under traditional leaders could achieve conservation goals while maintaining cultural cohesion (Berkes, 2007).

Finally, the integration of traditional leadership into environmental management highlights the potential of culturally rooted governance for broader sustainability initiatives. By recognizing the authority of customary leaders, policy frameworks could leverage indigenous knowledge and social structures to enhance conservation effectiveness. The Karampuang case demonstrated that leadership grounded in local ethics and ecological awareness provided a resilient model for balancing human needs and environmental stewardship, thus offering valuable lessons for directing global sustainability efforts.

4.6 Relevance to Contemporary Ecological Crises

The Karampuang community emphasizes living in harmony with nature, social accountability, and sustainable development. Local practices, such as regulated forest use, seasonal harvesting, and communal decision-making, reflect a deep understanding of ecological limits. These values provide an alternative to modern exploitative development models that often prioritize short-term economic gains over environmental health. By emphasizing restraints and promoting careful resource management, the community reduces pressure on natural resources and enhances ecosystem resilience. Such culturally embedded practices are increasingly recognized as critical components of sustainable environmental governance in the context of global ecological crises.

Adaptation is central to Karampuang's environmental management, as the community continuously adjusts

agricultural practices, land use, and water management in response to environmental changes. This reflects a locally grounded understanding of ecological dynamics and climate variability, enabling the community to respond effectively to environmental stress. Such adaptive capacity is consistent with findings from other indigenous communities, where traditional knowledge systems play a crucial role in enhancing resilience to climate change. For instance, studies on Inuit communities in the Arctic showed that indigenous knowledge was actively used to interpret environmental signals, anticipate seasonal changes, and guide decisions of resource use, thereby reducing vulnerability to climate impacts (Ford et al., 2006). These parallels suggest that adaptive strategies rooted in local knowledge, such as those practiced by the Karampuang community, are fundamental to sustaining environmental resilience across diverse ecological contexts. Similarly, in the Amazon, local communities adjust fishing and farming patterns according to ecological cues, thus balancing human needs with conservation goals (Rodríguez et al., 2018). These studies highlighted the practical relevance of traditional adaptive strategies in addressing contemporary environmental challenges.

The Karampuang case also reinforces collective responsibility for resource stewardship. When communal decisions related to land, water, and forests, individual actions should align with long-term ecological interests. This form of collective governance helps reduce the risk of unsustainable exploitation while strengthening social cohesion within the community. The importance of such community-based institutional arrangements has been widely discussed in the literature, which highlighted how local governance systems and collective norms were indispensable to managing common-pool resources effectively (Gibson et al., 2000). Rather than relying solely on centralized approaches, these frameworks emphasize the role of community participation and shared responsibility in achieving sustainable resource management outcomes. This supports the argument that social cohesion and collective accountability, as reflected in the Karampuang community, are fundamental components of ecological resilience.

Integration with modern policy frameworks is another important dimension of the Karampuang practices. While rooted in tradition, the community increasingly aligns its resource management with broader environmental regulations and development planning. This hybrid model combines local ecological knowledge with formal governance structures and could thus potentially enhance both institutional legitimacy and sustainability outcomes. However, evidence from community-based conservation initiatives in Tanzania indicated that such integration was not always straightforward, as challenges related to governance capacity, stakeholder coordination, and top-down policy implementation could limit its effectiveness (Tarimo et al., 2025). These findings suggested that while combining traditional practices with formal policy frameworks implied significant potential, its success depended on inclusive participation, institutional alignment, and adaptive management strategies. It is therefore considered essential to carefully integrate traditional wisdom, such as that in the Karampuang community, with contemporary environmental governance systems to address complex ecological challenges.

Finally, the Karampuang model underscores the broader relevance of community-based approaches to global ecological challenges. By emphasizing harmony between nature, adaptive management, and collective accountability, this research provided a viable framework for mitigating environmental degradation and fostering resilience. Contemporary research increasingly supports such approaches, arguing that indigenous and local knowledge systems are essential for achieving sustainable development and climate adaptation goals (Berkes, 2017b). In this sense, the Karampuang practices offer practical insights for policymakers, conservationists, and development practitioners, who seek locally grounded solutions to pressing environmental problems.

4.7 Education and Environmental Ethics

Environmental values are instilled in the Karampuang community from an early age through non-formal education and traditional practices. Children and adolescents participate in communal activities such as seasonal harvesting, forest care, and ritual ceremonies that emphasize responsible interaction with nature. These practices not only teach practical skills but also embed ethical principles regarding resource use, conservation, and respect for ecosystems. By engaging youth directly in environmental management, the community ensures that ecological responsibility is internalized as part of daily life, rather than being taught only as abstract knowledge. Similar approaches have been observed in indigenous communities in the Amazon, where children learn sustainable practices through hands-on participation in agriculture and forest stewardship (Rodríguez et al., 2018).

Women serve as custodians of ecological knowledge in the Karampuang society. They transmit skills and practices related to agriculture, forest management, and water conservation to younger generations, in order to ensure continuity of local wisdom. This gendered dimension of environmental education aligns with findings in Nepal and sub-Saharan Africa, where women's participation in the education of resource management contributes significantly to community resilience and sustainability (Agarwal, 2010; Tarimo et al., 2025). By emphasizing women's roles, the community integrates ecological ethics into social structures, to strengthen both environmental and social sustainability.

The education system emphasizes the principle of sufficiency in resource consumption. Children learn that exploiting natural resources beyond what is necessary could harm both the community and the ecosystem. This

ethic of moderation mirrors broader sustainable development principles advocated globally, thus reinforcing intergenerational responsibility. Studies on traditional ecological knowledge in Southeast Asia highlighted that communities practicing sufficiency-oriented resource use experienced lower rates of deforestation and biodiversity loss, compared with communities lacking such values (Berkes, 2017b). The Karampuang practices thus offer practical examples of how early education in sustainability could shape long-term environmental outcomes.

Participation in environmental education fosters the development of ecological identity and social responsibility, particularly when individuals are actively involved in decision-making processes related to land and resource management. In this context, youth are not merely passive observers but engaged participants in shaping environmental practices within their communities. This participatory approach contributes to the formation of ethical awareness and strengthens social cohesion, thus reinforcing the idea that environmental stewardship is a shared responsibility. The broader literature on community-based natural resource management emphasizes that collective learning processes, local institutional arrangements, and participatory engagement are critical in promoting sustainable resource use and long-term commitment to environmental governance (Gibson et al., 2000). These perspectives support the effectiveness of culturally grounded and experiential forms of education in fostering sustainability-oriented values and behaviors.

Finally, the Karampuang educational model demonstrates the synergy between traditional knowledge and sustainable development. By embedding environmental ethics into everyday life, the community cultivates a generation that is both environmentally conscious and socially responsible. Such approaches provide valuable lessons for integrating local knowledge into formal education systems, with an aim to contribute to global sustainability goals. Comparative studies highlighted that communities with strong traditional ecological education systems exhibited higher resilience to ecological crises and greater capacity for adaptive management (Ford et al., 2006; Gibson et al., 2000). Karampuang thus represents a practical model for sustaining ecological values through education and socialization.

4.8 Economy and Resource Management in the Karampuang Community

The Karampuang economy is fundamentally based on subsistence, equity, and sustainability, emphasizing the fulfillment of community needs without compromising environmental integrity. Local residents rely on agriculture, fishing, and small-scale forest products, hence carefully balancing resource extraction and ecological conservation. This approach aligns with concepts of sustainable livelihoods, in which economic activities are integrated with ecosystem health to support long-term community resilience (Scoones, 1998). Compared with conventional market-driven economies, Karampuang prioritizes collective well-being over individual profit, highlighting a culturally embedded economic model that promotes both social and ecological stability.

Forest, river, and land management practices in Karampuang demonstrate a strong principle against overexploitation. Community members enforce traditional rules that limit extraction, prohibit destructive practices, and regulate access to natural resources. Such practices mirror findings in other indigenous and rural societies, where customary management systems prevent environmental degradation while sustaining availability of resources (Berkes, 2017b; Gadgil et al., 1993). By embedding environmental ethics into daily economic decisions, Karampuang guarantees that economic activities do not undermine the ecological foundations necessary for subsistence.

Equitable distribution of resources is central to the Karampuang economy, in which products from agriculture, fishing, and forestry are shared according to local norms that emphasize fairness and communal benefit. This approach helps mitigate social inequality and reduces the risk of resource monopolization, which is often associated with more extractive economic systems. The broader literature on community forestry highlighted that inclusive and equitable governance, particularly participation and representation, could improve institutional effectiveness and support more sustainable resource management outcomes (Agarwal, 2010). Rather than focusing solely on distribution outcomes, these perspectives emphasize the importance of fair decision-making processes and collective engagement in managing shared resources. In the context of Karampuang, fairness in resource use reinforces collective responsibility and helps reduce potential conflicts over access and control.

Local economic activities are explicitly designed to cater for ecosystem preservation. The community employs rotational farming, limited harvesting, and seasonal restrictions to maintain soil fertility, forest cover, and water quality. These practices reflect an understanding of ecological thresholds, to be consistent with findings in studies of traditional agricultural systems in Southeast Asia, where local knowledge ensures that resource use remains within regenerative limits (Ramakrishnan, 1992; Wong et al., 2020). By aligning economic practices with ecological cycles, Karampuang fosters sustainable productivity while protecting biodiversity.

Finally, the Karampuang economic model integrates social monitoring mechanisms to prevent environmental harm and reinforce sustainability. Community elders and leaders oversee compliance with customary rules, to ensure that all members adhere to ethical resource use. This system resembles Ostrom's framework of social-ecological governance, in which collective monitoring, enforcement, and shared norms maintain resource sustainability (Ostrom, 2009). Consequently, the Karampuang approach demonstrates that culturally embedded

and community-based economic systems could successfully balance the needs of livelihood, social equity, and ecological integrity, hence offering valuable insights to sustainable development policies.

4.9 Ecological Knowledge and Natural Resource Management

The Karampuang community considers water and land as vital resources that must be preserved to sustain both human life and ecological balance. From early on, community members are taught the significance of these resources, to ensure that their use is guided by responsibility and foresight. This approach mirrors principles found in other indigenous and rural communities worldwide, where water and land are treated as common-pool resources requiring careful stewardship (Ostrom, 2009). In many traditional societies, such stewardship is also reinforced through informal institutions such as social norms and taboos that regulate resource use and contribute to biodiversity conservation (Colding & Folke, 2001). By recognizing the intrinsic value of conservation, the community ensures that exploitation does not compromise the availability of resources for future generations, to align with the broader objective of sustainable resource management.

Ecological awareness in Karampuang emphasizes the prevention of pollution, soil degradation, and resource depletion. Traditional practices such as rotational farming, riverbank protection, and controlled access to water sources demonstrate an insightful understanding of ecosystem dynamics. Similar findings have been reported in studies of customary resource management in Southeast Asia, where local norms regulate water and land use to prevent environmental damage (Berkes, 2017b; Wong et al., 2020). Moreover, the integration of environmental education with indigenous knowledge systems has been shown to strengthen ecological awareness and align local practices with broader sustainability goals, including global frameworks such as the Sustainable Development Goals (SDGs) (Sandoval-Rivera, 2020). These measures highlight that environmental stewardship is embedded in daily life, not merely as regulation but as a cultural ethic.

Resource use in Karampuang is managed collectively, with social norms governing their access and allocation. Community councils and elders play a pivotal role in monitoring and enforcing these practices, to ensure compliance without relying solely on formal state regulations. Research on collective resource management suggested that such community-based governance systems often outperformed top-down approaches in maintaining ecological sustainability (Agarwal, 2010; Ostrom, 2009). However, recent studies have highlighted that assessing the effectiveness of environmental governance systems remains complex, as outcomes depend on multiple interacting social, institutional, and ecological factors (Ayambire et al., 2025). The collective dimension strengthens social cohesion and accountability, as misuse of resources is not only an ecological concern but also a social transgression.

The ethical framework surrounding water and land emphasizes a balance between human needs and environmental preservation. Utilization practices are designed to satisfy immediate requirements while safeguarding ecosystem services, thereby reflecting an adaptive approach to resource management developed and maintained by the Karampuang community. Comparative studies of customary land-use systems in Indonesia and Nepal have similarly shown that ethical considerations embedded in local governance can significantly enhance the sustainability of water and soil resources (Ramakrishnan, 1992; Wong et al., 2020). In Karampuang, this balance ensures that the environment remains productive and resilient, thereby supporting long-term community welfare.

Finally, the community's awareness and practices regarding water and land contribute directly to sustainable development outcomes. By fostering responsible behaviours and integrating ecological ethics into everyday life, Karampuang demonstrates a practical model of sustainability grounded in local knowledge. This approach resonates with contemporary sustainability frameworks, thus highlighting the value of integrating traditional ecological knowledge with modern development goals. Ultimately, the Karampuang case illustrates that culturally informed environmental ethics could be critical in achieving resilient and equitable resource management.

4.10 Ecological Leadership in the Karampuang Community

Ecological leadership in the Karampuang community is primarily carried out by traditional leaders, who coordinate, educate, and oversee environmentally sustainable practices. These leaders are responsible for ensuring that resource use aligns with both ecological balance and community welfare. Their role is not merely administrative but also educational, as they guide the community in understanding the importance of preserving forests, rivers, and agricultural lands. Similar findings have been reported in other indigenous communities, where leadership is a crucial factor in maintaining sustainable resource use (Agarwal, 2010; Berkes, 2017b). By combining oversight with education, leaders help embed ecological consciousness into daily practices.

Traditional leaders emphasize consultation and consensus in decision-making processes, thus reflecting the value of "musyawarah" in local governance. Community meetings and deliberations allow all members to voice concerns about resource management, in order to ensure equitable access and reduce conflicts. This participatory approach mirrors the findings of Ostrom (Ostrom, 2009), who highlighted that effective governance of common-

pool resources required inclusive decision-making mechanisms. By rejecting excessive exploitation and promoting moderation, leaders reinforce social norms that prioritize long-term ecological sustainability over short-term gains.

In addition to governance and consultation, leaders in Karampuang actively mediate conflicts related to resource use. Disputes over land, water, or forest access are addressed through negotiation, guided by shared ethical and cultural norms. Such conflict-resolution strategies align with research on customary environmental governance, in which local leadership often ensures compliance and harmony without heavy reliance on formal legal systems (Golo et al., 2022; Parrotta et al., 2016). Through mediation, leaders maintain social cohesion while safeguarding environmental integrity, thus demonstrating the interdependence of ecological and social sustainability.

The ethics of ecological leadership in the Karampuang community are rooted in local values and norms that strengthen community resilience and collective responsibility. Community leaders model appropriate behavior in resource management by demonstrating restraint, accountability, and adherence to customary rules. Through the integration of cultural values into leadership practices, they cultivate a shared sense of duty and environmental stewardship among community members. Comparative studies have shown that value-based leadership can significantly enhance the effectiveness of local conservation initiatives (Berkes, 2017b; Pretty & Smith, 2004). This ethical dimension ensures that environmental protection is not merely enforced through formal regulations but is sustained as a shared moral commitment within the community.

Finally, ecological leadership in Karampuang encourages active participation from all community members. By promoting community awareness, organizing collaborative activities, and providing guidance, leaders create a participatory governance framework that ensures fair and responsible resource management. Such community-driven approaches have been widely recognized as effective models for sustainable development in rural and indigenous contexts (Agarwal, 2010; Ostrom, 2009). The Karampuang example highlights that leadership, when embedded in local culture and ethics, is a powerful tool for achieving ecological sustainability and social equity.

4.11 Critique of Modern Development

The Karampuang community offers a distinctive critique of modern development models, particularly those that rely on exploitative resource extraction. Local practices emphasize ecological balance, moderation, and long-term benefits over short-term gains. This perspective reflects a holistic understanding of development, in which environmental integrity and social cohesion are integral to progress. Similar critiques have been noted in other indigenous communities, where rapid industrialization and commercial agriculture often lead to environmental degradation and social inequities (Berkes, 2017b; Shiva, 1988). By prioritizing sustainability and community well-being, Karampuang challenges development paradigms that focus solely on economic growth.

Traditional practices in Karampuang also highlight the importance of minimizing negative environmental impacts. Rituals, land-use norms, and collective decision-making processes are designed to prevent overexploitation of forests, rivers, and agricultural land. These approaches resonate with the principles of ecological resilience, which stress the maintenance of ecosystem functionality while meeting human needs (Berkes et al., 2000; Colding & Folke, 2001; Gadgil et al., 1993). Comparative studies showed that communities that integrated environmental ethics into daily practice experienced greater ecological stability and reduced resource conflicts (Lockwood & Davidson, 2010). The Karampuang model underscores the importance of integrating indigenous knowledge into sustainable development frameworks, particularly in balancing between ecological preservation and socio-cultural continuity.

Social and ecological responsibility is another key dimension of the Karampuang critique. Local norms regulate resource access, encourage equitable distribution, and foster collective accountability. This contrasts sharply with modern development approaches, which often prioritize private ownership and market-driven exploitation. Research on community-based resource management confirmed that systems emphasizing social responsibility and local governance achieved more sustainable outcomes than top-down development models (Agarwal, 2010; Ostrom, 2009). The Karampuang approach demonstrates how traditional ethical frameworks could guide contemporary resource management.

Furthermore, the community advocates adaptive strategies rooted in local knowledge and cultural values. Rather than rigidly following external development plans, Karampuang adjusts agricultural, forestry, and water management practices according to ecological conditions and social needs. This aligns with the concept of adaptive co-management, which combines scientific knowledge and traditional practices (Berkes, 2007). Such adaptive mechanisms provide resilience against environmental change and reduce vulnerability to crises, thus highlighting the value of integrating local knowledge into broader development planning.

Finally, the Karampuang critique offers a replicable model for sustainable development in other regions. By emphasizing moderation, social equity, ecological responsibility, and adaptive governance, this approach offers a viable alternative to conventional development paradigms. Comparative research showed that culturally grounded and community-led strategies were often more effective and context-sensitive than imported development models (Berkes, 2017b; Pretty & Smith, 2004). The Karampuang example illustrates that integrating local wisdom into

development planning could enhance both environmental sustainability and social well-being.

4.12 Community-Based Sustainability Systems

The Karampuang community demonstrates a robust system of community-based sustainability, in which resource management is conducted collectively and participatively. Unlike individualistic approaches, ecological responsibilities are shared among all members, to ensure that both human needs and environmental integrity are addressed. Social norms and traditional regulations act as effective monitoring mechanisms, thus reinforcing adherence to sustainable practices. Similar patterns have been observed in other indigenous communities, where collective governance strengthens resilience and reduces resource overexploitation (Berkes, 2017b; Ostrom, 2009). This approach highlights the importance of integrating social cohesion and environmental ethics into sustainable resource management.

Decision-making processes in Karampuang are rooted in deliberation and consensus. Resource allocation, land use, and conservation measures are determined through communal discussions, to balance the interests of individuals with the welfare of the entire community. Such participatory governance aligns with findings in community forestry and fisheries, in which collective decision-making ensures more equitable and sustainable outcomes compared with top-down models (Agarwal, 2010; Pretty & Smith, 2004). By fostering inclusivity, the Karampuang system minimizes conflicts and promotes shared accountability for environmental stewardship.

The community's reliance on traditional norms and social mechanisms reinforces compliance with sustainability principles. Rituals, taboos, and customary sanctions discourage unsustainable exploitation of forests, rivers, and agricultural lands. Research indicated that culturally embedded practices often succeeded when formal regulations failed, particularly in contexts with limited government enforcement capacity (Berkes, 2017b; Pretty & Smith, 2004). Karampuang exemplifies how indigenous knowledge and social structures could function as adaptive governance tools to maintain ecological balance.

Community-based management also strengthens social solidarity. Collective responsibility in resource management promotes cooperation, mutual support, and a shared sense of ecological stewardship. Studies have shown that strong social capital enhanced the effectiveness of communal resource systems and increased resilience against environmental shocks (Berkes, 2007; Pretty & Smith, 2004). In Karampuang, the integration of social cohesion with ecological awareness ensures that sustainability is not only a technical goal but also a social and cultural value.

Finally, the Karampuang model provides lessons for long-term ecological sustainability. By embedding participatory, consensus-driven, and norm-based practices into everyday life, the community maintains a dynamic balance between resource use and conservation. Comparative research demonstrated that community-based sustainability systems could outperform conventional and market-driven models in maintaining biodiversity and ecological functions (Agarwal, 2010; Ostrom, 2009). The Karampuang experience illustrates that collective governance and traditional knowledge are vital components of enduring environmental stewardship.

4.13 Strategic Conclusions on Sustainability Practices

The Karampuang community serves as a model of sustainable development grounded in local wisdom. Their approach emphasizes strengthening traditional institutions to effectively manage natural resources and preserve cultural heritage. Institutional reinforcement ensures continuity in ecological stewardship and maintains the social structures that support sustainability. Similar findings have been reported in studies of indigenous communities in Southeast Asia and Latin America, where robust customary institutions correlate strongly with successful resource management and ecological outcomes (Agarwal, 2010; Berkes, 2007). By formalizing local governance mechanisms, Karampuang demonstrates how traditional structures could complement modern regulatory frameworks.

Formalizing local wisdom in regional regulations is a key strategic direction. Integrating traditional ecological knowledge into official policies helps ensure that resource management aligns with both cultural values and sustainable development goals. Previous research showed that codifying indigenous practices into local law enhanced compliance and reduced conflicts over resource use (Aucoin, 2017; Berkes et al., 2000). In Karampuang, legal recognition of customary practices strengthens legitimacy and accountability, thus allowing local communities to enforce sustainable practices effectively.

Collaboration between environmental education and local cultural knowledge plays a crucial role in cultivating ecological awareness among younger generations. Schools, community programs, and participatory workshops transmit values of conservation, responsible resource use, and social responsibility. Research highlighted that education rooted in local knowledge increased engagement and fostered long-term behavioral change compared with standardized curricula alone (Chua et al., 2019; Lockwood & Davidson, 2010). In Karampuang, youth participation in ecological and cultural activities reinforces community cohesion and ensures the continuity of sustainable practices.

The development of eco-tourism is another strategic initiative that balances economic benefits with environmental protection. By promoting low-impact tourism, Karampuang creates opportunities for income generation while maintaining natural habitats and cultural heritage. Studies of community-based eco-tourism have demonstrated its potential to enhance local livelihoods and incentivize conservation, particularly when local residents retain control over planning and management (Franco et al., 2026, Harmsworth & Awatere, 2013). The Karampuang model illustrates how sustainable economic strategies could align with ecological and social goals.

Finally, systematic documentation and scientific publication of local practices strengthen knowledge sharing and promote evidence-based policy development. Recording traditional ecological knowledge, monitoring resource use, and disseminating findings contribute to broader understanding and replication in other regions. Comparative research indicated that integrating indigenous knowledge with scientific frameworks enhanced resilience, informed adaptive management, and improved policy outcomes (Berkes, 2017b; Connor & Dovers, 2004). To sum up, the Karampuang strategic approach, i.e., institutional reinforcement, formalization of local wisdom, education, eco-tourism, and documentation, offers a replicable model for sustainable development that balances human needs with ecological conservation.

Overall, the thematic organization of the findings highlighted the interconnected nature of ecological, economic, educational, and governance dimensions within the Karampuang community. These elements collectively form a system of local environmental governance that is deeply rooted in indigenous knowledge and cultural practices.

5. Conclusions

The Karampuang community exemplifies a model of sustainable development rooted in local wisdom. It demonstrates how traditional ecological knowledge can guide responsible interaction with the environment. Their practices including collective resource management, rotational farming, and community rituals promote environmental conservation, social equity, and long-term resilience. This study showed that local customs were not remnants of the past but functional and relevant frameworks for addressing contemporary ecological challenges. Similar findings in other indigenous and rural communities around the world indicated that integrating customary practices into development strategies enhanced sustainability outcomes and fostered social cohesion.

The Karampuang approach highlights the importance of community-based governance and participatory decision-making in achieving sustainable development goals. Traditional institutions and norms act as effective mechanisms for regulating resource use, ensuring fairness, and preventing overexploitation. Education and intergenerational knowledge transfer reinforce ecological ethics, to prepare younger generations to continue sustainable practices. Comparative research demonstrated that locally adapted and culturally grounded strategies were often more resilient and effective than top-down approaches, particularly in maintaining biodiversity and ecosystem services. These insights underscore the global relevance of Karampuang as a living laboratory for community-driven sustainability.

Finally, the Karampuang model illustrates that sustainable development does not require the abandonment of cultural heritage; rather, it could thrive when local knowledge and practices are recognized, documented, and integrated into broader policies. Strategic actions such as formalizing local wisdom, promoting eco-tourism, and systematically documenting ecological knowledge could strengthen resilience and replication in other regions. This study concluded that Karampuang provided a replicable paradigm for balancing human needs, social equity, and environmental conservation, offering lessons that extend beyond local and national contexts to inform global sustainability discourses.

Author Contributions

Conceptualization, S.I. and E.B.D.; methodology, S.I.; software, S.I.; validation, H.N., A.Q.G., and E.B.D.; formal analysis, S.I.; investigation, S.I. and N.B.; resources, H.N. and A.Q.G.; data curation, S.I.; writing—original draft preparation, S.I.; writing—review and editing, E.B.D., H.N., and D.; visualization, S.I.; supervision, E.B.D.; project administration, E.B.D.; funding acquisition, E.B.D. All authors have read and agreed to the published version of the manuscript.

Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Acknowledgements

The authors would like to thank the Karampuang Indigenous Community for their openness and participation in this research. Appreciation was also extended to local leaders and institutions who provided valuable support

during data collection. The authors gratefully acknowledged the Graduate School of Hasanuddin University for academic guidance and research facilitation.

Conflicts of Interest

The authors declare no conflicts of interest.

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