

RESILIENCE OF CUSTOMARY LAW IN FACING THE ECOLOGICAL CRISIS IN PAYA NIE

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Abstract

This study employs a qualitative socio-legal approach to examine the role of customary law in addressing climate change and ecological challenges in the Paya Nie wetland ecosystem. Customary law is understood not only as written norms but also as living practices embedded in community life. Thus, the ecological crisis in Paya Nie marked by recurrent drought, flooding, and ecosystem degradation cannot be analyzed solely through normative legal perspectives but requires a broader socio-ecological framework. Research data were obtained from two main sources. Secondary data came from academic journals, legal documents, government reports, and research publications, providing the conceptual foundation to situate customary law within environmental governance. Primary data were collected through participatory observation and in-depth interviews with customary leaders, local stakeholders, and surrounding communities to capture social dynamics, communal solidarity, and unwritten customary mechanisms that remain influential in daily practice. Data were analyzed using a descriptive-analytical method. The analysis first mapped ecological problems in Paya Nie, then linked them to customary and formal legal instruments, including *qonun gampong*. Finally, the findings were interpreted through the lens of socio-ecological resilience theory to reveal how communities adapt, transform, and innovate in response to climate change. The study shows that customary law in Paya Nie functions not only as a set of traditional rules but also as an adaptive mechanism that strengthens community resilience. It plays a critical role in regulating land use, fostering solidarity, and sustaining ecological balance. These findings contribute to the broader discourse on how living customary law can serve as a local strategy for ecological resilience in the face of global environmental change.

Keywords: *Resilience, Customary Law, Ecological Crisis*

Introduction

The issue of climate change has become a major global concern due to its widespread impacts on human life and ecosystem sustainability (Hayatulah et al., 2023). Phenomena such as rising global temperatures, changing rainfall patterns, flooding, drought, and wetland ecosystem degradation are increasingly being felt in various parts of the world. (Humas Universitas Al Azhar Indonesia, 2024) *The Intergovernmental Panel on Climate Change (IPCC)* report emphasizes that climate change is not only an ecological threat, but also a complex social, economic, and political challenge, especially for communities whose lives are highly dependent on natural resources (Aldi & K Putri, 2021). In Indonesia, climate change presents a serious problem, reflected in the increasing frequency of hydrometeorological disasters, such as floods, landslides, and droughts (Rahmawati & Fariz, 2024). The Meteorology, Climatology, and Geophysics Agency (BMKG) has recorded an increase in these extreme events over the past two decades, which has a direct impact on the agriculture, fisheries, and food security sectors (Hendra & Ginting, 2023). This condition not only affects the economic system, but also shakes the social structure of society, especially indigenous communities who have a close bond with nature (Ningsih uci et al., 2024).

Similar phenomena are also occurring in various other regions in Indonesia. For example, coastal communities in Demak, Central Java, face the threat of tidal flooding, which is causing the loss of residential and agricultural land. (Adnan et al., 2025) In Central Kalimantan, peatland fires almost every year trigger ecosystem damage and a public health crisis due to haze. Meanwhile, communities in East Nusa Tenggara (NTT) often face prolonged droughts that disrupt food production and force them to change their livelihood patterns (Subair et al., 2014). These conditions demonstrate that the ecological crisis faced by indigenous communities is multidimensional, not only a matter of environmental degradation, but also closely related to the loss of living space, the erosion of

local knowledge, and the potential weakening of social cohesion. (Anawagis et al., 2024) These cases demonstrate that adaptation to climate change is not only an environmental issue, but also concerns survival, cultural identity, and (Firnadi, 2025) the environment. and social cohesion of indigenous communities (Saputra, 2025). One community facing the real impacts of climate change is the Paya Nie area. As a wetland ecosystem that functions as an environmental buffer, Paya Nie is now experiencing serious pressure due to ecological degradation and climate uncertainty. Floods, droughts, and environmental degradation pose challenges that threaten the survival of the local community. In this situation, adaptation strategies are urgently needed, not only through technological interventions or formal policies, but also by exploring the local wisdom that has long been embedded in the lives of indigenous communities (Wulandari et al., 2024). Customary law, which exists within the community to protect the Paya Nie ecosystem, serves as a normative framework governing the relationship between humans and nature. The values of mutual cooperation, deliberation, and risk-sharing mechanisms embedded within it have fostered communal solidarity, which plays a crucial role in maintaining socio-ecological balance. Furthermore, social capital, in the form of trust networks, collective norms, and social ties, serves as the primary resource for indigenous communities in navigating climate uncertainty. However, the dynamics of environmental change demand a transformation: are traditional solidarity and social capital still sufficient, or do they need to be strengthened with new, more inclusive forms through integration with external networks (Ismunandar, 2020)?

This study is important because customary law is often positioned as merely a static traditional heritage, when in reality it is dynamic and adaptive. Customary law can form collective mechanisms relevant to contemporary conditions, including the context of climate change (Regita et al., 2023). For example, customary rules regarding prohibitions on destroying forests or wetlands are essentially community-based conservation instruments, which, if strengthened, can underpin local adaptation strategies. Thus, this study not only captures past wisdom but also examines the potential of customary law as a future instrument in addressing the ecological crisis. Furthermore, global experience demonstrates that the role of indigenous peoples in addressing climate change is widely recognized. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) emphasizes the importance of recognizing and protecting traditional knowledge. In Canada and Australia, for example, local customary laws serve as the foundation for forest fire mitigation and peatland management strategies. This demonstrates the universal relevance of indigenous approaches to climate adaptation. By linking the Paya Nie experience to global practices, this study will enrich academic discourse and provide an empirical basis for policymakers.

However, the position of customary law in Indonesia faces serious challenges. Although recognized in the constitution and several laws and regulations, its implementation is often weak due to the dominance of state law, which is oriented towards economic development. Agrarian conflicts, overlapping land use, and the marginalization of indigenous communities are clear evidence that customary law often lacks adequate space. In the context of Paya Nie, this means that customary values that maintain ecosystem balance can be marginalized by policies that prioritize the exploitation of natural resources. Therefore, this research is crucial in demonstrating that customary law is not an obstacle to development, but rather a normative asset that can strengthen climate adaptation policies. From an academic perspective, this research contributes to the enrichment of socio-legal studies literature by placing customary law within the framework of climate adaptation. Most climate change research (Yuridis et al., 2025a) in Indonesia still focuses on technical aspects (Anindhita et al., 2025) such as technological engineering (Handayani, 2020), mitigation policies (Muliawan et al., 2021), and spatial planning, while studies on the role of (Tarigan & Hafandi, 2024) local law (Desyalika Putri, 2025) are still limited. By combining customary law and ecological perspectives, this research offers an interdisciplinary approach that can broaden the horizons of legal studies in Indonesia.

Furthermore, this research also has strategic value for sustainable development. The Sustainable Development Goals (SDGs), particularly goals 13 (addressing climate change) and 15 (terrestrial ecosystems), emphasize the importance of local community involvement in ecosystem maintenance. By examining the resilience of Paya Nie customary law, this research can provide practical recommendations for designing an inclusive, community-based, and ecologically just environmental governance model. Based on the description above, this study aims to examine two important issues regarding the Collective System in Responding to the Ecological Crisis in Paya Nie, as well as related issues. The Reliability of Customary Norms in Responding to the Ecological Crisis. With this focus, the research is expected to provide both academic and practical contributions in strengthening the resilience of indigenous communities by strengthening local legal values that are aligned with climate change mitigation and adaptation efforts.

Method

This study is a qualitative study using a socio-legal approach. This approach was chosen because customary law is understood not only as written norms but also as a living social practice practiced daily by the community. Therefore, the issues of climate change and the ecological crisis in Paya Nie cannot be analyzed solely through a normative legal lens but need to be examined within a broader and more complex socio-ecological context to uncover how customary law operates in social reality. The research data was obtained from two main sources. First, secondary data derived from literature studies in the form of academic journals, research reports, legal documents, and reports from government agencies and environmental organizations. This data provides a theoretical foundation and analytical framework for understanding the dynamics of customary law in the management of the Paya Nie ecosystem. Second, primary data was obtained through participatory observation and in-depth interviews with customary leaders, local stakeholders, and the surrounding community. Through this primary data, researchers were able to explore the practices of communal solidarity and customary law mechanisms that the community actually uses to respond to climate change and the ecological crisis. Data analysis was conducted using a descriptive-analytical method. In the first stage, researchers mapped various ecological crisis phenomena occurring in Paya Nie, such as drought, flooding, and wetland ecosystem degradation. Next, these phenomena were linked to the dynamics of prevailing customary law, both in the form of unwritten rules and formal regulations such as village regulations (*qanun gampong*). In the final stage, all findings were interpreted through the framework of socio-ecological resilience theory, thus demonstrating the extent to which customary law functions as an adaptation mechanism. In this way, the research not only describes the role of customary law descriptively but also examines the adaptive capacity of the Paya Nie community in surviving, transforming, and innovating in the face of increasingly uncertain climate change.

Results and Discussions

Collective Systems in Responding to the Ecological Crisis in Paya Nie

Global climate change has significantly impacted the sustainability of wetland ecosystems, particularly the Paya Nie area. Climate change manifests itself in extreme rainfall fluctuations that trigger seasonal flooding, prolonged periods of drought, and progressive environmental degradation, posing a multidimensional threat to the survival of communities dependent on these ecosystem resources (Malhi et al., 2020). In responding to these challenges, communal solidarity structured through the institutionalization of customary legal norms has proven to be a crucial adaptive instrument in maintaining the social, economic, and ecological resilience of local communities. The manifestation of this communal solidarity is implemented through various traditional mechanisms, including the practice of mutual cooperation as a collective work system in resource management, customary deliberation mechanisms as a platform for participatory decision-making, and communal risk distribution and mitigation systems that have developed and been maintained intergenerationally through the transmission of local knowledge. This framework of communal solidarity based on local wisdom not only functions as a survival mechanism but also plays a role as a sustainable adaptation strategy that integrates socio-cultural dimensions with ecosystem management in facing the dynamics of climate change (Pakidi & Tambaip, 2025).

Customary law around Paya Nie primarily serves as a collective guideline for regulating the use of natural resources (Ariyani, 2024). These norms not only determine who has the right to access land or waters but also establish boundaries to ensure that use does not disrupt the ecosystem's balance. For example, there are rules prohibiting the felling of certain trees in swamp areas, determining fish harvest times, and customary sanctions for violators. These provisions emphasize that the sustainability of the ecosystem is a shared interest, and therefore every individual is obligated to maintain its sustainability. This fosters ecological solidarity, based not only on economic interests but also on moral and social responsibility (Fajar & Susilo, 2023). Furthermore, the wisdom of the Paya Nie community is also rooted in local spirituality and cosmology (Efendi et al., 2022). Swamps are often viewed as "tanoh inong" or motherland, possessing a sacredness of their own (Ridwan & Ribawati, 2023). The prohibition against damaging swamps is not only based on ecological considerations but is also believed to be a moral and religious taboo that, if violated, can bring disaster.

This spiritual dimension demonstrates the existence of symbolic capital (Bourdieu) that strengthens the legitimacy of customary law, so that communal solidarity is not merely a socio-economic practice, but also a form of respect for the cosmos and religious teachings that guide collective behavior. Mutual cooperation is a fundamental pillar of communal solidarity that plays a strategic role in building community resilience to the impacts of climate change. The implementation of mutual cooperation practices demonstrates high adaptability to various manifestations of climate change faced by communities. In the face of flood disasters, collective mobilization is realized through various mitigation and emergency response activities, including participatory strengthening of traditional

embankment infrastructure, repair and maintenance of drainage systems and communal water channels, and implementation of evacuation and rescue operations for residents affected by floods (Hidayat et al., 2024). This collective work coordination enables a rapid and effective response to the increasingly unpredictable threat of flooding. During drought periods, collective adaptation strategies are implemented through the construction of shared water infrastructure in the form of communal wells and rainwater harvesting systems, the development of *equitable and sustainable irrigation water distribution mechanisms*, and the diversification of agricultural systems through the introduction of food commodities that have high tolerance to drought stress. These collective efforts ensure community food security amidst uncertain water availability. In the context of wetland ecosystem degradation, ecological restoration initiatives are carried out collectively through revegetation programs for native swamp species and the maintenance of traditional canal systems that function to regulate the hydrology of the area (Triadi, 2020). These restoration activities not only aim to restore ecological functions but also maintain ecosystem services that are the basis of community livelihoods. Within the mutual cooperation system and risk-sharing mechanisms, the role of gender cannot be ignored. Women make significant contributions through the management of food barns, food arisan (a social gathering), (Henny Puspita Sari, 2024) and the regulation of household water distribution (Bakri Zulfikarni et al., 2024). Furthermore, women also play a role in traditional rituals related to soil fertility and swamp sustainability (Rauf, 2025). This gender perspective demonstrates that the resilience of the Paya Nie community is inextricably linked to the active participation of women, even though their roles are often perceived as marginalized within formal structures. Thus, communal solidarity in Paya Nie is inherently inclusive, involving all elements of society in climate change adaptation strategies.

The practice of mutual cooperation in the context of climate change adaptation produces multidimensional impacts. Instrumentally, collective work produces effective, practical solutions to address various environmental challenges. Socially, this practice strengthens community cohesion, consolidates social capital, and enhances collective adaptive capacity, essential for community sustainability in the face of future climate uncertainty (Lesmana Tera & Sulandjari Kuswarini, 2023). In addition to mutual cooperation, customary deliberations play a crucial role in maintaining ecosystem sustainability (Karjanto, 2022). These forums serve as a forum for deliberation to discuss various environmental and social issues and produce binding collective decisions. For example, customary deliberations are used to determine planting schedules aligned with swamp water cycles, establish no-fishing zones during certain seasons, (Randi et al., 2024) and formulate sanctions for violations of customary rules. (Hasan, 2024) This mechanism reflects adaptive local democracy, where traditional knowledge blends with contemporary needs. Through deliberation, decisions are more readily accepted by all parties, preventing conflict and strengthening the legitimacy of customary rules.

However, communal solidarity in Paya Nie does not operate entirely independently, but interacts with external interventions. Support from NGOs, universities, and corporate social responsibility programs such as PIM has strengthened the community's capacity for swamp conservation. The local government has also begun incorporating customary law into flood mitigation and wetland conservation programs. This interaction demonstrates that customary law is not marginalized but rather strengthened when recognized and integrated with formal policies. Climate change often creates uncertainty that threatens community survival. To anticipate this, the Paya Nie community has developed risk-sharing mechanisms as a social safety net. These include a communal food barn accessible during times of famine, a food arisan system that allows for the redistribution of harvests, and the practice of mutual assistance between families affected by disasters. (Chairunisa, 2023) For example, families who lose land due to flooding may receive labor assistance from other residents during the recovery process or receive temporary food assistance. In this way, the burden of the disaster is not borne solely by individuals or families but is shared collectively. This mechanism has proven effective in reducing socioeconomic vulnerability while strengthening community resilience.

The sustainability of this communal solidarity depends heavily on intergenerational dynamics. Local knowledge about swamp cycles, natural signs for flood mitigation, and customary rules is passed down through oral tradition and direct practice. However, the migration of younger generations to cities poses the risk of a regeneration crisis. If this knowledge transmission process is interrupted, the communal solidarity system could weaken in the future. Therefore, the regeneration of indigenous cadres and the integration of local knowledge into the school curriculum are crucial steps to maintain the continuity of communal solidarity in Paya Nie. However, communal solidarity is not always harmonious. There is the potential for internal conflict, such as struggles over land access between villages, differing interests in resource utilization, or tensions between customary legal norms and formal state law. Another challenge arises when external economic interests, such as land clearing for plantations, clash with customary conservation principles. This situation demonstrates that communal solidarity is dynamic, full of negotiation, and inextricably linked to broader power structures. This critical analysis is crucial to ensure that

solidarity is viewed not merely as a normative concept but as an arena for complex socio-ecological struggles. Compared to other communities, Paya Nie's communal solidarity shares similarities with indigenous communities in Kalimantan who protect peat swamps through customary prohibition systems, or with indigenous Papuans who protect sago forests through collective rituals. However, Paya Nie exhibits a unique characteristic: the integration of ecological solidarity with community-based ecotourism practices. This comparison demonstrates that Paya Nie does not stand alone but is part of a national and global discourse on how local communities develop climate change adaptation models based on local wisdom. Communal solidarity, manifested through customary law, mutual cooperation, customary deliberation, and risk-sharing mechanisms, has a dual impact. On the one hand, this solidarity maintains the balance of the Paya Nie ecosystem, thus maintaining the wetland's ecological functions, such as water supply, carbon storage, and biodiversity habitat. On the other hand, communal solidarity strengthens the community's socio-economic resilience by providing a safety net, strengthening social ties, and increasing adaptive capacity to climate change. Thus, communal solidarity is not only a short-term survival strategy but also a model for sustainable ecosystem governance based on local wisdom (Hafsyim & Murlianti, 2025).

However, communal solidarity in Paya Nie does not operate entirely independently, but interacts with external interventions. Support from NGOs, universities, and corporate social responsibility (CSR) programs such as PIM has strengthened the community's capacity for swamp conservation. The local government has also begun incorporating customary law into flood mitigation and wetland conservation programs. Furthermore, the community has initiated various concrete steps to strengthen the sustainability of Paya Nie through the development of community-based *ecotourism*. This practice is not only oriented towards improving the local economy but also serves as an ecological strategy, making conservation part of the tourist attraction. Similarly, several villages around Paya Nie have formulated *village regulations (qanun gampong)* containing specific regulations regarding ecotourism governance, water resource utilization, and wetland preservation mechanisms. These efforts demonstrate the ability of customary law to transform and be institutionalized within a formal legal framework at the local level.

Not stopping at the village level, nine villages within the Paya Nie area also agreed to a collective agreement to protect rare endemic birds and to reinforce the prohibition on land conversion in the area. This cross-village agreement strengthens the reach of customary law, making it not merely a cultural instrument but also a regulatory instrument with social and ecological legitimacy. With this agreement, the management of Paya Nie is no longer understood fragmentarily by each village, but rather as a communal ecological system that must be jointly maintained for the sustainability of future generations. This interaction demonstrates that customary law is not marginalized, but rather is strengthened when recognized, synergized, and institutionalized in formal policies and collective agreements between communities.

The Rationality of Customary Norms in Responding to the Ecological Crisis

Customary law in Paya Nie has continuously played a fundamental role as a social instrument in maintaining the balance of swamp and wetland ecosystems. The prevailing system of traditional norms, including prohibitions on felling certain tree species with strategic ecological functions, temporal restrictions on fishing activities adjusted to the reproductive cycles of aquatic biota, and cropping patterns based on the periodicity of the hydrological cycle, are manifestations of ecological regulation formed through the accumulation of the community's collective experience in interacting with its natural environment (Husaini et al., 2024). These customary norms simultaneously reflect socio-ecological adaptation strategies that have been internalized in community life in response to the fluctuating and complex dynamics of the ecosystem (Cintya Lauren, 2023). The existence of this traditional regulatory system indicates a deep understanding of the local community regarding the interconnectedness between anthropogenic activities and ecosystem stability, which is then translated into sustainable natural resource management practices that are adaptive to the variability of environmental conditions.

Direct field findings also indicate that the Paya Nie community has strengthened these customary norms by establishing a *village law (qonun gampong)*. This regulation explicitly prohibits land conversion for oil palm plantations, prohibits the practice of fish bombing, and emphasizes the prohibition on hunting rare endemic species. The presence of this *qonun gampong* demonstrates a formal effort at the local level to strengthen traditional wisdom and strengthen the position of customary law to gain clearer social and political legitimacy. Thus, customary law functions not only as an unwritten norm but also provides a communal regulatory umbrella that supports the sustainability of the swamp and wetland ecosystems in the area. In the context of facing the challenges of global climate change, these traditional norms are undergoing a significant revitalization process as a form of adaptive response by local communities. As a concrete illustration, customary regulations governing the periodicity of planting and harvesting seasons, which were historically based on interpretations of natural phenological indicators, are now being strengthened and refined through more intensive customary deliberation mechanisms to accommodate shifting

weather patterns that are increasingly unpredictable due to climate anomalies (Gustaman, 2020). A similar phenomenon also occurs in the practice of implementing customary prohibitions, particularly in the designation of prohibited forests or conservation areas based on local wisdom, which are experiencing reactivation and strengthening of enforcement as a mitigation strategy in anticipating hydroclimatological risks in the form of increasingly frequent and intense floods and droughts. (Neltje Saly et al., 2023).

The process of revitalizing these traditional norms empirically demonstrates that customary legal systems possess high levels of adaptability and flexibility, enabling them to self-adjust to dynamic ecological and climatological changes. This adaptive capacity indicates that customary law functions as a living law that can respond responsively to changing environmental conditions while maintaining the essence of historically proven conservation principles in maintaining the sustainability of local ecosystems (Hardiyanti Marzellina & Sugiyanto, 2023). In facing the challenges of climate change, the customary legal system in the Paya Nie area has undergone an adaptive evolution that has not only revitalized existing traditional norms but also developed new *governance mechanisms* responsive to contemporary environmental dynamics (Yuridis et al., 2025b). The institution of customary deliberation, as a forum for communal decision-making, has undergone a substantial expansion in its functions and scope. This transformation is evident in the expansion of the deliberation agenda, which previously focused on conventional issues such as land allocation and resource conflict resolution, to now encompass various aspects of climate crisis management.

In the context of drought mitigation, customary deliberations have developed irrigation water distribution protocols that integrate principles of distributive justice with consideration of priority community needs (Fakhriyah et al., 2021). This resource allocation system is operationalized by comprehensively considering various socio-economic parameters, including the level of household economic dependency on natural resources, a social vulnerability index that includes demographic aspects and financial capacity, and the level of adaptive capacity possessed by each household unit in responding to changing environmental conditions. This multifactorial approach allows for a more equitable and proportional distribution according to the specific needs of each household entity within the community (Rahmadhani, 2023).

In response to the hydrometeorological threat of flooding, the customary deliberation forum has institutionalized the formation of structured and systematic collective work units, based on the principle of mutual cooperation as communal social capital. These work units are organized hierarchically and functionally to optimize the implementation of flood mitigation infrastructure strengthening activities based on local technology, with a primary focus on the construction and maintenance of traditional embankments and the development of integrated communal drainage systems. (Khotimah & Fitri, 2025) This workforce mobilization is regulated through a rotation mechanism and *equitable division of tasks* based on the capabilities and resource availability of each community member. This institutionalization mechanism reflects the transformation from spontaneous and situational mutual cooperation practices to a more organized and sustainable collective work system, thus making a more effective contribution to disaster risk reduction efforts at the local community level.

In anticipation of the increasing risk of crop failure due to climate variability, customary deliberations have developed a collective risk management system that includes the establishment of communal food reserves, economic sharing mechanisms to support affected families, and strategies for diversifying alternative livelihoods (Auliya et al., 2024). These institutional adaptations demonstrate the flexibility and responsiveness of customary legal systems in the face of environmental change, while maintaining the basic principles of communal solidarity that underpin the community's socio-ecological resilience. Another innovation is seen in the integration of local knowledge with modern knowledge. Some indigenous communities have begun adopting weather forecast information from the government or research institutions and then combining it with traditional natural signs. (Kusnanik & Burhan, 2025) As a result, customary rules regarding planting schedules and water use patterns have become more accurate. This demonstrates the ability of customary law to create new mechanisms relevant to contemporary climate challenges.

Despite its adaptive flexibility, customary law also has limitations when faced with more extreme ecological crises. First, indigenous peoples' knowledge capacity is limited in understanding new ecological phenomena, such as peatland fires or groundwater degradation, which require technological intervention and more in-depth scientific studies. Second, the scale of the problems caused by climate change often exceeds the reach of local communities. For example, prolonged droughts caused by land degradation due to large-scale conversion cannot be fully addressed by customary law. Furthermore, there is the potential for the legitimacy of customary law to weaken as younger generations become more influenced by modern values and less bound to traditional norms (Andini Putri Eka Nabila, 2025). If not addressed, this could reduce the effectiveness of customary law in regulating the use of shared resources.

To strengthen adaptation strategies, customary law in Paya Nie has a significant opportunity to be integrated with formal policies. First, through legal recognition by the state, as stipulated in Law Number 32 of 2009 concerning Environmental Protection and Management, and Law Number 6 of 2014 concerning Villages, which provide space to strengthen the role of indigenous communities. This formal recognition is crucial so that customary rules apply not only internally but also have external legitimacy to withstand pressure from external parties, such as companies or development policies that threaten wetlands (Bayo et al., 2023).

Second, the implementation of this integration can be realized through the establishment of an institutional collaboration framework involving multiple stakeholders in a synergistic partnership system. Local governments, academic research institutions, and civil society organizations can play a role as supporting institutions for strengthening customary legal systems by providing credible and validated scientific data, disseminating appropriate technology appropriate to the local context, and facilitating access to funding sources necessary for implementing climate change adaptation programs based on local wisdom (Rahman et al., 2023).

Through this institutional collaboration scheme, customary legal systems no longer operate exclusively relying on traditional knowledge alone, but are strengthened through the convergence of indigenous knowledge systems with scientific-based approaches, and receive structural support from various formal institutions. This integration model enables the creation of a hybrid governance system that combines traditional wisdom with the technical and financial capacity of modern institutions, resulting in more robust and sustainable adaptation strategies. This collaborative approach also facilitates a knowledge co-creation process between local communities' empirical knowledge and scientific methodology, ultimately optimizing the effectiveness of climate change mitigation and adaptation efforts at the community level.

Third, strategic opportunities for implementing this integration can be realized through the development of a co-management mechanism or shared governance system that configures a proportional division of authority between indigenous communities as traditional custodians and government institutions as formal regulators in regulating and managing the Paya Nie ecosystem (Manik & Juwono, 2024). This co-management model is operationalized through the establishment of a collaborative governance structure, in which both entities have legitimate authority and shared responsibility in the decision-making process related to natural resource management.

The implementation of this co-governance model facilitates the creation of constructive synergy between historically proven local wisdom systems and formal policy instruments with legal legitimacy and structural support, resulting in a more comprehensive and adaptive management framework. Through this co-management approach, climate change adaptation processes can be implemented with optimal effectiveness by combining local ecological knowledge with scientific-based policy instruments.

Furthermore, this mechanism also ensures that adaptation efforts can be carried out in a participatory manner by involving community ownership, while also being sustainable through the support of a formal institutional framework, thereby creating a more robust resilience system in facing future climate variability and uncertainty. Concrete efforts The community's role in maintaining the sustainability of Paya Nie is not only achieved through traditional norms passed down through generations, but also through modern, institutionalized institutional innovations. (Sukuryadi et al., 2021) One form of this innovation is the development of community-based *ecotourism*. (Azmi et al., 2025) Ecotourism is seen not only as a means of improving the community's economic well-being but also as a conservation instrument capable of internalizing ecological values into productive economic activities. In Paya Nie, ecotourism initiatives are developed by involving the local community as the primary actors, both in providing tourism services, managing the conservation area, and determining regulations for spatial use. (Pudyatmoko et al., 2020) By making the swamp and its biodiversity a valuable tourist attraction, the community is encouraged to maintain the ecosystem's sustainability, as ecological damage will directly impact the reduction of tourist attractions and the loss of communal economic potential.

Ecotourism practices in Paya Nie also have a significant legal dimension. Several villages in the surrounding area have drafted *village regulations (qanun)* specifically governing ecotourism governance. These regulations contain rules regarding the division of authority in managing tourist destinations, licensing mechanisms for visitors, procedures for equitable distribution of profits to all levels of society, and prohibitions against actions that could damage the swamp ecosystem, such as illegal logging, waste disposal, and destructive fishing practices. The existence of these regulations demonstrates that customary law does not remain unwritten norms but has transformed into written regulations with formal legitimacy. Thus, *village regulations* function as hybrid instruments, combining aspects of customary law with formal village-level legal instruments, while simultaneously strengthening the binding power of ecological norms for all community members. Furthermore, a significant development occurred in the form of a collective agreement between nine villages within the Paya Nie area. This agreement was driven by the realization that the swamp ecosystem cannot be viewed as the exclusive property of one village, but rather as a

common-pool resource whose sustainability can only be maintained through cross-border management. One of the agreement's provisions is the protection of rare endemic birds inhabiting the swamp area. These birds not only have ecological value as indicators of ecosystem health but also hold high symbolic value in local cosmology. Through this agreement, the nine villages committed to prohibiting the hunting, capture, and trade of rare bird species, while also requiring the community to participate in monitoring and reporting any violations. In addition to protecting endemic wildlife, the inter-village agreement also affirms a ban on land conversion in the Paya Nie area. The threat of converting wetlands to oil palm plantations, fish ponds, or intensive agricultural land has been proven to have serious ecological impacts in various other areas, including water quality degradation, biodiversity loss, and an increased risk of peatland fires. By prohibiting land conversion, the Paya Nie community collectively asserts their position as an ecological bulwark against destructive capitalist expansion. This agreement also serves as a communal legal instrument that expands the reach of customary law, as it applies across villages and involves collective enforcement mechanisms.

The process of establishing an agreement between nine villages also demonstrates how customary deliberations have transformed into multi-level deliberative forums. Not only functioning to resolve internal conflicts within a single community, deliberations have now expanded into a forum for inter-community negotiations to formulate collectively binding rules. This deliberative mechanism demonstrates the capacity of customary law to evolve from a micro-system to a meso-system that spans regions, enabling it to address broader ecological challenges. In the context of climate change, this is crucial because ecological risks such as flooding, drought, and ecosystem degradation transcend administrative boundaries, necessitating a cross-village and collaborative management framework. The integration of ecotourism, village bylaws, and agreements between nine villages demonstrates a dynamic and progressive process of local legal development. First, customary law is not only revitalized but also expanded into a new, hybrid realm: customary law institutionalized through bylaws and cross-village collective agreements. Second, this legal development demonstrates efforts to build a *hybrid governance framework* that combines local wisdom with formal legal instruments. Third, this process strengthens the community's position as a key actor in environmental conservation, while demonstrating the ability of indigenous communities to respond to global issues such as climate change in ways appropriate to the local context.

From a climate change adaptation perspective, the Paya Nie community's actions can be understood as a community-based strategy for strengthening socio-ecological resilience. Ecotourism serves as an economic diversification mechanism that reduces the community's dependence on destructive resource exploitation practices. The village law serves as a local legal instrument that strengthens customary rules and ensures collective compliance. Meanwhile, the agreement between nine villages serves as a cross-regional coordination instrument that expands the reach of customary regulations in the face of large-scale ecological threats. The combination of these three instruments demonstrates that customary law is not a static entity, but rather a legal system that continues to evolve and adapt to ecological and socio-political dynamics. Furthermore, the above phenomenon also illustrates the convergence process between customary law and formal environmental policy frameworks. For example, the Paya Nie ecotourism area has begun to receive support from the local government in the form of infrastructure facilitation and tourism promotion. The village bylaws (*qanun gampong*) governing ecotourism have also gained formal legitimacy through recognition within the village legal framework, as stipulated in the Village Law. Similarly, the agreement between nine villages has received moral support from academic institutions and environmental NGOs, which assist with monitoring and providing scientific data. This convergence process creates a hybrid governance model that combines the power of customary law with formal institutional support, resulting in a more comprehensive and sustainable climate change adaptation system.

From a social perspective, the development of local law also has implications for strengthening community cohesion. Ecotourism encourages the formation of collaborative networks among residents in providing tourism services. The village law strengthens communal solidarity by regulating the equitable distribution of profits. Meanwhile, the agreement between the nine villages extends solidarity across communities, strengthening their collective identity as guardians of Paya Nie. This collective identity is crucial for building adaptive capacity, as communities who feel ownership of the ecosystem tend to be more committed to preserving it. From an ecological perspective, these three legal instruments strengthen protection of Paya Nie's ecological functions. Ecotourism promotes conservation as an added economic value. The village law (*Qanun Gampong*) creates regulatory mechanisms that curb destructive practices. Meanwhile, an agreement between nine villages protects endangered species and prevents land conversion. The combination of these three ensures that Paya Nie continues to function as an ecological buffer zone, providing essential ecosystem services, from carbon storage and flood control to clean water supply and biodiversity habitat.

Thus, the Paya Nie community's experience demonstrates how customary law can transform into a more complex and integrated climate change adaptation strategy. Beyond relying solely on traditional norms, the community also developed new legal instruments tailored to contemporary ecological challenges. This model can serve as an example for other indigenous communities in Indonesia in managing vulnerable ecosystems, while also providing a reflection for the government in formulating more participatory, inclusive, and locally-based environmental policies.

Conclusion

This study shows that the resilience of customary law in facing the ecological crisis in Paya Nie is an important strategy in responding to the increasingly complex impacts of climate change. Communal solidarity built through the practice of mutual cooperation, deliberation, and risk sharing has become a social foundation that enables communities to survive amidst the threats of floods, droughts, peatland fires, pollution, and loss of biodiversity. These customary values strengthen social cohesion and regulate collective resource management to ensure sustainability. Customary law not only functions as a normative instrument that regulates community behavior towards the environment, but also as an adaptation strategy that facilitates the transformation of local values and knowledge to align with changing ecological dynamics. Thus, customary law in Paya Nie has a dual resilience: maintaining ecosystem sustainability while protecting the cultural identity of the indigenous community. However, this continued role requires strengthening through integration with formal policies and external support, so that customary law not only survives as local wisdom but is also recognized as a crucial pillar within the broader climate change adaptation framework.

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