Local Knowledge-Based Forest Management and the Sustainable Development Goals: Lessons from *Pawang Uteun* Tradition in Aceh

Mudassir[1]
[1]Doctoral Program in Social Science Education, Universitas Syiah Kuala, Indonesia
Corresponding email: mudassir25@mhs.usk.ac.id

Abstract

Pawang Uteun represents an important form of indigenous knowledge in Aceh that reflects local communities' relationships with forests, nature, and cultural values. However, rapid social and environmental changes have challenged the continuity and relevance of this traditional knowledge in contemporary forest management. This study aims to examine the values, practices, and potential contributions of the *Pawang Uteun* tradition to sustainable forest management and the achievement of the Sustainable Development Goals (SDGs). This study employs a qualitative approach using digital ethnography and document analysis. Digital sources are examined to explore the representations, narratives, values, and practices associated with the *Pawang Uteun* tradition, while relevant academic publications, cultural documents, policy documents, and materials on forest management and the SDGs are analyzed. The data are analyzed thematically to identify key indigenous knowledge and practices and to examine their relevance to sustainable development, particularly SDG 13 and SDG 15. The study concludes that revitalizing and integrating *Pawang Uteun* values into contemporary forest governance and education can strengthen cultural resilience and provide locally grounded pathways toward sustainable development in Aceh.

Keywords: Aceh; cultural resilience; indigenous knowledge; *Pawang Uteun*; sustainable forest management;

I. INTRODUCTION

Forests are increasingly understood not simply as physical spaces containing timber and biodiversity, but as socio-ecological systems in which ecological processes, livelihoods, institutions, cultural meanings, and knowledge practices are interconnected. This perspective is particularly important in regions where communities have developed long-term relationships with forests and have accumulated practical knowledge about seasonal change, resource use, ecological limits, and collective rules. Research on local and scientific ecological knowledge shows that different knowledge systems can shape how communities perceive protected areas, ecosystem services, biodiversity, and environmental vulnerability (Cebrián-Piqueras et al., 2020). In this context, forest sustainability cannot be reduced to technical conservation measures alone; it also involves the legitimacy of institutions and the cultural practices through which communities understand and regulate their relationship with nature.

In Indonesia, customary and local knowledge remains an important component of community-based environmental governance. Customary forests are often governed through rules that define access, resource extraction, responsibilities, sanctions, and collective decision-making. Studies of customary forest governance demonstrate that local institutions may contribute to biodiversity protection and social order, although their effectiveness is affected by legal recognition, institutional capacity, and relationships with state agencies (Budiman et al., 2021; Wibowo et al., 2021). The literature therefore suggests that the sustainability of customary forest governance depends not only on the existence of local rules but also on the capacity of institutions to adapt, communicate, and negotiate with external actors.

Aceh provides a particularly significant context for studying these relationships because customary institutions have historically been incorporated into the province's social and legal arrangements. One of the institutions associated with forest governance is Pawang Uteun, also referred to in some contexts as Panglima Uteun or related local terms. The institution is associated with the organization and supervision of customary practices concerning forests. Recent studies indicate that Pawang Uteun has functions related to forest protection, customary regulation, monitoring of resource use, and the resolution of disputes associated with forest utilization (Yulia & Herinawati, 2022; Yulia, 2022). These functions position Pawang Uteun at the intersection of ecological knowledge, customary authority, community governance, and environmental practice.

The importance of Pawang Uteun is also reflected in research examining local wisdom values in Aceh. Muslihin et al. (2022) found that the local wisdom associated with Pawang Uteun includes conservation, religious, collective, and deliberative values. Their study further indicates that these values have educational potential because they can be used to strengthen environmental awareness and concern. This educational dimension is important for a seminar theme that connects arts, humanities, education, and cultural resilience because local ecological knowledge is not only a resource-management mechanism but also a cultural text that carries values from one generation to another.

Recent scholarship has further demonstrated that the role of Pawang Uteun should not be interpreted as static. Mahmuddin et al. (2024a) describe revitalization as necessary because customary forest management holds potential as social capital for sustainable forest management in Aceh Besar. Their study shows that institutional revitalization involves restoring functions, strengthening social legitimacy, and adapting customary institutions to contemporary governance conditions. Similarly, Mahmuddin et al. (2024b) show that social communication is central to the identity and operation of Panglima Uteun, particularly when customary authority encounters state institutions and economic interests.

At the same time, the literature identifies substantial challenges. Yulia and Herinawati (2022) report that customary forest management in North Aceh has not been implemented optimally in all areas, partly because some local authorities and community leaders have limited understanding of the forest Pawang institution and because institutional capacity, infrastructure, and cooperation remain inadequate. More recent research by Hatta et al. (2026) indicates that although Pawang Uteun is recognized within Aceh's legal framework, existing provisions do not provide sufficient authority for effective participation in forest law enforcement. This finding is significant because it reveals a gap between normative recognition and practical institutional capacity.

The problem becomes more complex when forest degradation, illegal logging, land conversion, and changing economic interests are considered. The persistence of these pressures demonstrates that customary institutions operate within a wider political, economic, and regulatory environment. The literature on customary forest governance in Indonesia similarly shows that recognition of customary rights does not automatically produce effective governance. Institutional fragmentation, unclear authority, and difficulties in securing recognition can weaken collective action and forest protection (Sembiring et al., 2021; Helmi et al., 2023). Thus, examining Pawang Uteun requires attention to both its internal cultural logic and its relationship with formal governance.

The cultural dimension is equally important. Cultural resilience refers here to the capacity of cultural knowledge, institutions, practices, and identities to continue, adapt, and generate meaning under changing social and environmental conditions. In the Pawang Uteun context, resilience is not simply the preservation of an old institution. It involves the capacity to transmit ecological values, maintain social legitimacy, respond to environmental pressures,

and negotiate new institutional conditions. The recent emergence of Mpu Uteun initiatives involving women in forest protection also demonstrates that Acehnese forest-related knowledge and institutions can take new forms and involve new social actors. Fatia and Alfina (2025) document how women in Damaran Baru developed a community-based forest protection initiative in response to forest degradation and ecological risks.

This process of adaptation is relevant to the concept of cultural resilience because it shows that local environmental knowledge can be reproduced through changing institutional forms. It also challenges a narrow understanding of customary knowledge as something belonging only to older male customary leaders. The participation of women and community groups indicates that the cultural system surrounding forest protection can be reinterpreted and mobilized by different generations and social actors. Such transformation is important for the long-term continuity of local knowledge.

The educational implications are substantial. A systematic review by Druker-Ibáñez and Cáceres-Jensen (2022) demonstrates growing scholarly interest in integrating Indigenous and local knowledge into sustainability and environmental education. Their review emphasizes that such integration can address epistemological justice and strengthen the relevance of education to learners' cultural and environmental contexts. Similarly, research on place-based Indigenous education indicates that incorporating local and traditional ecological knowledge can strengthen students' sense of place and their understanding of sustainability issues (2023). These findings provide a conceptual basis for interpreting Pawang Uteun as a potential educational resource rather than only a customary governance institution.

For Social Science Education, the significance of Pawang Uteun extends beyond environmental content. The tradition provides a context for learning about institutions, collective action, social norms, legal pluralism, community participation, cultural identity, and the relationship between citizens and the environment. Students can encounter questions about how authority is constructed, how communities establish rules, how conflicts are resolved, and how cultural values influence environmental behavior. Local wisdom can therefore become a bridge between social science concepts and lived community experience. This educational application is also illustrated by Mudassir et al. (2026), who discuss integrating Panglima Laot values into school co-curricular programs to nurture ecological citizenship in Aceh.

The relationship between Pawang Uteun and the Sustainable Development Goals also requires careful interpretation. The most direct connections are with SDG 15, concerning life on land, because customary forest rules may support conservation, biodiversity protection, and sustainable use of terrestrial ecosystems. There is also a potential relationship with SDG 13 through local ecological knowledge and community responses to environmental change; with SDG 4 through environmental and intergenerational education; and with SDG 16 through customary institutions, deliberation, conflict resolution, and community governance. These connections should not be assumed automatically. They need to be demonstrated by examining specific practices and institutional functions.

Previous studies have made important contributions, but they generally emphasize particular dimensions of the phenomenon. Some focus on the legal status of Pawang Uteun and customary forest law (Yulia, 2022; Yulia & Herinawati, 2022), while others examine local wisdom values (Muslihin et al., 2022), social communication and cultural capital (Mahmuddin et al., 2024b), institutional revitalization (Mahmuddin et al., 2024a), or illegal logging and empowerment (Hatta et al., 2026). Related research in Aceh also examines local wisdom as a surveillance mechanism in protected forest conservation (Nirzalin et al., 2023) and local ecological knowledge in sustainable forest-related development (Yunanda et al., 2024). These

studies provide a strong foundation, but they remain relatively fragmented across legal, sociological, environmental, and educational perspectives.

The research gap addressed by this study is therefore the limited integration of these dimensions into a single analytical framework. Existing literature provides evidence about what Pawang Uteun does, but less attention has been given to how its ecological knowledge, customary authority, cultural resilience, educational significance, and SDG relevance can be interpreted as parts of one socio-cultural system. This study addresses that gap by synthesizing recent literature through a framework linking local ecological knowledge, customary forest governance, cultural resilience, environmental education, and sustainable development.

Table 1. Mapping Pawang Uteun Practices to the Sustainable Development Goals.

Pawang Uteun Practice	Local Value	Governance Function	SDG	Potential Contribution
Forest protection	Environmental stewardship	Resource protection	SDG 15	Biodiversity conservation
Customary forest rules	Collective responsibility	Forest regulation	SDG 15	Sustainable forest management
Ecological knowledge	Environmental awareness	Resource-use regulation	SDG 13	Local climate adaptation
Knowledge transmission	Intergenerational learning	Cultural continuity	SDG 4	Environmental education
Customary deliberation	Collective decision-making	Conflict resolution	SDG 16	Inclusive institutions

The novelty of this study lies in conceptualizing Pawang Uteun as a living socio-ecological knowledge system rather than merely as a customary office or traditional leadership position. The concept emphasizes three characteristics: first, knowledge is embedded in ecological practice; second, knowledge is maintained through institutions, norms, communication, and collective action; and third, the system changes in response to social, legal, and environmental pressures. By connecting these dimensions with Social Science Education and the SDGs, the study extends the discussion from conservation and customary law toward cultural resilience and educational transformation.

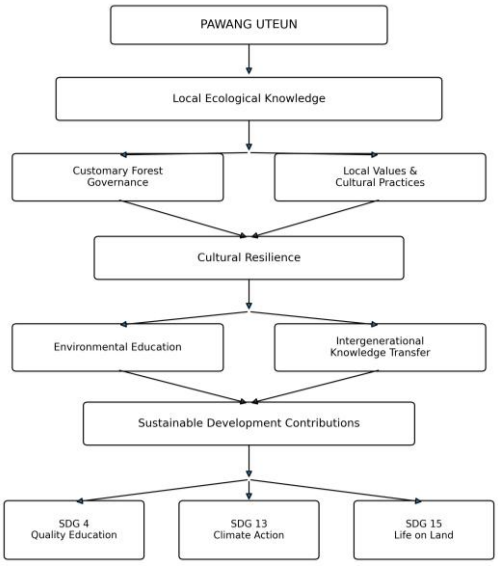

Figure 1. Conceptual Framework of Pawang Uteun-Based Sustainable Forest Governance.

Table 2. Research Gap and Contribution of the Present Study.

Previous Research Focus	Main Contribution	Remaining Gap
Pawang Uteun and customary law	Explains legal and customary dimensions	Limited integration with SDGs and education
Forest conservation	Highlights environmental protection	Limited cultural-resilience perspective
Institutional revitalization	Examines customary institutional continuity	Limited integration with ecological knowledge
Social communication	Explains community interaction and participation	Limited SDG-oriented synthesis
Local wisdom	Documents cultural and ecological values	Limited integrated governance framework
Present study	Integrates knowledge, governance, resilience, education, and SDGs	Provides an interdisciplinary synthesis

Based on this background, the study aims to examine the role of Pawang Uteun as a local ecological knowledge system in customary forest governance, cultural resilience, environmental education, and the Sustainable Development Goals in Aceh. The study addresses three research questions: (1) How is Pawang Uteun's local ecological knowledge represented in recent literature on forest management in Aceh?, (2) How does the Pawang Uteun tradition contribute to customary forest governance and cultural resilience?, and (3) How can the tradition contribute to the Sustainable Development Goals, particularly SDG 4, SDG 13, SDG 15, and SDG 16?.

II. METHOD

This study employed a qualitative research design combining digital ethnography and qualitative document analysis. The design was selected because the research questions concern meanings, cultural practices, institutional relations, and representations of local ecological knowledge rather than the measurement of numerical variables. Qualitative document analysis is suitable for systematic interpretation of pre-existing textual materials, particularly when documents contain information about institutional practices, policies, social relations, and cultural meanings (Bowen, 2009; Morgan, 2022). Digital ethnography was used in a focused sense to examine how Pawang Uteun and related customary forest knowledge are represented in digitally accessible scholarly and institutional materials.

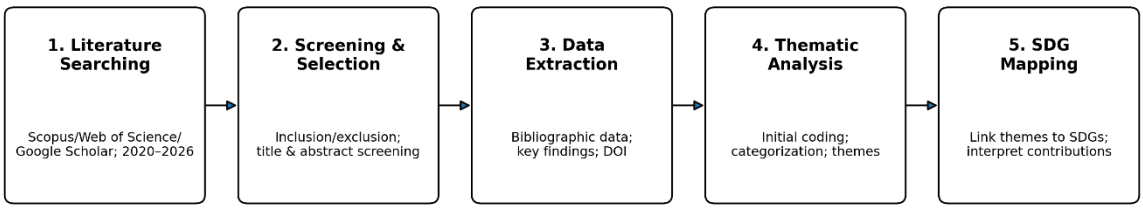

Figure 2. Research Procedure for Documentary Analysis and Thematic Synthesis.

The research did not treat online materials as automatically representative of all Acehnese communities. Instead, digital sources were approached as situated documentary traces whose meanings depend on their authorship, publication context, institutional purpose, and relationship to other sources. This approach is consistent with contemporary digital ethnographic practice, which emphasizes contextual interpretation of digital materials rather

than simply counting online occurrences (Jensen et al., 2022). The study therefore combined digital source tracing with conventional document analysis.

The documentary corpus consisted of peer-reviewed journal articles, conference proceedings with identifiable publication information, legal and policy documents, university repository materials, government or institutional publications, and credible digital sources. The primary focus was on publications from 2020 to 2026. Earlier publications were considered only when necessary to establish historical or conceptual foundations. The corpus emphasized sources that directly discussed Pawang Uteun, Panglima Uteun, Mpu Uteun, customary forest governance in Aceh, local ecological knowledge, forest conservation, cultural resilience, or sustainability education.

Data were collected through systematic searching using combinations of the keywords Pawang Uteun, Panglima Uteun, Mpu Uteun, customary forest, Aceh forest management, local ecological knowledge, customary forest law, cultural resilience, environmental education, and Sustainable Development Goals. Each potentially relevant source was screened for publication identity, relevance, methodological clarity, and availability of bibliographic information. Sources were retained when they provided direct or substantial evidence relevant to the research questions. Duplicate, unverifiable, and substantively unrelated materials were excluded.

The main documentary instrument was a structured data-extraction table. The table recorded the title, author, year, publication venue, DOI or stable link, study location, research method, key findings related to Pawang Uteun, institutional or ecological themes, educational implications, and potential SDG connections. The extraction procedure followed the principle that documentary analysis should make the relationship between source material and interpretation transparent (Bowen, 2009). The study also distinguished primary evidence reported by previous researchers from the secondary interpretation made in the present study.

Data analysis followed thematic analysis. The process involved five stages: familiarization with the documents, initial coding, categorization, theme development, and interpretation. Initial codes included local ecological knowledge, forest protection, customary rules, community monitoring, customary sanctions, institutional legitimacy, legal recognition, state–customary relations, cultural identity, institutional revitalization, intergenerational transmission, environmental education, and SDG relevance. The codes were then grouped into broader themes that corresponded to the research questions. Reflexive thematic analysis was selected because it allows patterns of meaning to be interpreted in relation to context rather than treated as mechanically objective categories (Braun & Clarke, 2021).

The first analytical theme was Pawang Uteun as a local ecological knowledge system. The second was customary forest governance, including rules, monitoring, sanctions, and deliberation. The third concerned customary–state institutional relations and the difference between formal recognition and practical authority. The fourth addressed cultural resilience and institutional adaptation. The fifth examined educational significance, especially intergenerational transmission and place-based environmental learning. The sixth concerned the relationship between these findings and selected SDGs.

The SDG analysis was conducted through qualitative mapping rather than quantitative scoring. Evidence concerning forest protection, biodiversity, and sustainable terrestrial resource use was considered in relation to SDG 15. Evidence concerning ecological adaptation and environmental change was examined in relation to SDG 13. Evidence concerning intergenerational learning and environmental education was connected with SDG 4. Evidence concerning customary institutions, deliberation, dispute resolution, and

participatory governance was examined in relation to SDG 16. A connection was included only when it was supported by documentary evidence.

Trustworthiness was strengthened through source triangulation, comparison of findings across disciplines, bibliographic verification, and analytical transparency. Direct studies of Pawang Uteun were distinguished from comparative studies of customary forest governance elsewhere in Indonesia. The study did not present interviews, observations, or fieldwork reported in other publications as if they had been conducted by the current researcher. Such materials were treated as secondary evidence. Ethical considerations included accurate citation, respect for customary knowledge, avoidance of decontextualization, and careful representation of community practices.

The main limitation of the method is that digitally accessible documents cannot fully represent the diversity of customary practices across Aceh. The study therefore does not claim to measure the current effectiveness of every Pawang Uteun institution. Instead, it provides a qualitative synthesis of documented evidence and interprets the potential contribution of the tradition to forest governance, cultural resilience, education, and sustainable development.

III. RESULTS AND DISCUSSIONS

A. Result

The documentary synthesis shows that recent scholarship on Pawang Uteun has expanded from descriptions of customary forest rules toward broader questions of institutional revitalization, social communication, legal recognition, gendered participation, and sustainable development. The sources reviewed in this study can be grouped into four broad evidence clusters: (1) local ecological knowledge and customary rules; (2) institutional and legal governance; (3) cultural and social adaptation; and (4) educational and sustainability implications.

Table 3. Characteristics of the Documentary Evidence Used in the Synthesis.

Source Cluster	Representative Sources	Main Evidence	Research Orientation	Key Limitation	SDG Link
Local ecological knowledge	Muslihin et al. (2022); Nirzalin et al. (2023)	Conservation values, ecological norms, collective practices	Local wisdom and environmental studies	Limited integration with institutional analysis	SDG 13; SDG 15
Customary forest law	Yulia (2022); Yulia & Herinawati (2022)	Customary rules, Pawang roles, implementation constraints	Empirical legal research	Focus mainly on legal/institutional implementation	SDG 15; SDG 16
Institutional revitalization	Mahmuddin et al. (2024a, 2024b); Hatta et al. (2026)	Social capital, communication, empowerment, legal authority	Sociology, communication, legal studies	Need stronger educational synthesis	SDG 16; SDG 15
Cultural adaptation and participation	Fatia & Alfina (2025); Yunanda et al. (2024)	Community initiatives, women's participation,	Anthropology and community studies	Context-specific cases	SDG 4; SDG 13; SDG 15

		local ecological knowledge			
Comparative customary governance	Budiman et al. (2021); Wibowo et al. (2021); Helmi et al. (2023)	Recognition, collective action, local wisdom, governance	Forestry and socio-legal studies	Not specific to Aceh in every case	SDG 15; SDG 16
Sustainability education	Rahayu et al. (2022); Anas et al. (2025); place-based education study (2023)	Local knowledge, ecoliteracy, sense of place	Education and sustainability studies	Limited direct linkage to Pawang Uteun	SDG 4; SDG 13

Table 3 indicates that the literature already provides substantial evidence for each component of the proposed framework, but the components are rarely analyzed together. The strongest direct evidence concerns customary forest governance and local wisdom, while the educational and cultural-resilience dimensions remain less integrated with institutional analysis. This distribution of evidence provides the basis for the thematic synthesis below.

Pawang Uteun as a Local Ecological Knowledge System

Across the literature, Pawang Uteun is represented not simply as an individual responsible for forests but as part of a knowledge system linking ecological observation with social norms. Muslihin et al. (2022) identify conservation, religious, collective, and deliberative values within Pawang Uteun local wisdom. The importance of these values lies in the fact that ecological behavior is connected to social expectations. Forest protection is therefore not presented only as a technical requirement but as a moral and communal responsibility. This pattern is consistent with research on local ecological knowledge, which demonstrates that community knowledge can shape perceptions of ecosystem services, protected areas, and environmental vulnerability (Cebrián-Piqueras et al., 2020).

Pawang Uteun as a Local Ecological Knowledge System

The documented knowledge includes rules about what can be harvested, how resources may be used, which areas require protection, and how community members should behave when entering forest areas. Yulia (2022) describes customary forest management in North Aceh as involving warnings and restrictions concerning which trees may or may not be cut. Yulia and Herinawati (2022) further indicate that the Pawang forest institution is formally associated with customary forest law, although its implementation is uneven. The results therefore suggest that local ecological knowledge operates through normative rules as much as through practical knowledge of the forest.

Table 4. Thematic Coding of Pawang Uteun Knowledge and Practices.

Initial Code	Category	Main Theme	Description	Example Evidence
Forest protection	Ecological practice	Local ecological knowledge	Knowledge-based conservation practices	Rules protecting forest areas
Customary sanctions	Institutional practice	Customary forest governance	Community regulation and enforcement	Customary sanctions for violations
Forest monitoring	Governance practice	Collective action	Community-based control mechanisms	Collective monitoring

Knowledge transmission	Cultural practice	Cultural resilience	Intergenerational learning	Knowledge passed from elders to youth
Spiritual beliefs	Cultural practice	Environmental ethics	Sacred values and taboos	Rules for sacred forest areas
Youth participation	Educational practice	Environmental education	Youth engagement in conservation	Youth participation in conservation
Biodiversity protection	Conservation outcome	SDG relevance	Protection of species and habitats	Forest rules protect biodiversity
Climate adaptation	Ecological response	SDG relevance	Local strategies for resilience	Traditional knowledge supports adaptation

Customary Forest Governance and Community Regulation

The results also reveal that customary governance is most effective when rules are understood and socially legitimate. In North Aceh, however, Yulia and Herinawati (2022) identify gaps in institutional capacity and cooperation. The existence of a customary institution in law does not necessarily mean that its personnel possess sufficient resources, knowledge, infrastructure, or inter-institutional networks to perform all expected functions. This finding is consistent with broader research on customary forest governance in Indonesia, where formal recognition can remain difficult to translate into effective collective action (Sembiring et al., 2021; Budiman et al., 2021).

Institutional Authority and State–Customary Relations

Mahmuddin et al. (2024b) add a communication dimension to this institutional issue. Their study shows that social communication based on cultural capital forms part of the identity and role of Panglima Uteun, while economic interests can erode the social power of customary forest institutions. The results suggest that governance is not simply a matter of legal jurisdiction. It is also a matter of whose knowledge is heard, whose authority is socially recognized, and how institutions communicate across customary and formal boundaries.

Cultural Resilience and Institutional Adaptation

The emergence of Mpu Uteun as a women-led community forest protection initiative further demonstrates this adaptive capacity. Fatia and Alfina (2025) document how women in Damaran Baru responded to ecological degradation and forest-related risks by organizing a community-based protection initiative. Although Mpu Uteun is not identical to the institutional history of Pawang Uteun, the case illustrates how forest-related cultural knowledge can be reactivated through new forms of participation. This is important for understanding resilience as transformation rather than simple continuity.

Educational Significance

In the context of Social Science Education, Pawang Uteun can support learning about institutions, social norms, collective action, legal pluralism, community participation, and environmental citizenship. The knowledge system can be used to ask how communities construct rules, why rules are obeyed, how authority is negotiated, and what happens when formal and customary institutions overlap. This makes local forest knowledge relevant not only to environmental science but also to civic and social education. Recent work on local-wisdom-based ecoliteracy in Indonesian higher education further supports the possibility of connecting ecological literacy with cultural knowledge (Anas et al., 2025).

SDG Relevance

Third, SDG 4 is relevant through intergenerational knowledge transmission and place-based environmental education. The value of local knowledge in education is strengthened when students can connect abstract sustainability concepts with local institutions, cultural narratives, and environmental experience (Rahayu et al., 2022). Fourth, SDG 16 is relevant because customary governance involves institutions, norms, deliberation, dispute resolution, and relationships between communities and authorities. The institutional challenges identified in Aceh show that achieving this potential requires stronger mechanisms for coordination and recognition.

B. Discussion

The findings support a conceptual shift from viewing Pawang Uteun as a traditional occupation toward understanding it as a living socio-ecological knowledge system. This distinction is important because an occupational perspective emphasizes what a customary forest handler does, whereas a knowledge-system perspective examines the relationships among ecological observation, social norms, cultural values, institutional authority, communication, and education. The evidence from Aceh demonstrates that Pawang Uteun operates through precisely these relationships. The institution becomes meaningful because ecological knowledge is embedded in rules and social expectations, and because those rules are communicated and interpreted within community life.

This interpretation is consistent with the broader literature on local ecological knowledge. Cebrián-Piqueras et al. (2020) demonstrate that local and scientific ecological knowledge can shape perceptions of protected areas and ecosystem services in different but complementary ways. The implication for Aceh is that Pawang Uteun knowledge should not be treated as a romantic or static cultural artifact. It can be analyzed as situated environmental knowledge that has developed through long-term interaction between people and forest landscapes. Its value therefore lies partly in the relationships it creates between ecological observations and collective action.

The second implication concerns the nature of customary forest governance. The evidence suggests that Pawang Uteun governance is not simply rule enforcement. It includes social communication, community monitoring, moral expectations, deliberation, and conflict management. Mahmuddin et al. (2024b) show that social communication is central to the institutional identity of Panglima Uteun, while Yulia and Herinawati (2022) demonstrate that implementation depends on institutional capacity and cooperation. This suggests that strengthening customary forest governance cannot be reduced to issuing new regulations. It requires strengthening the social infrastructure through which rules become legitimate and actionable.

The distinction between normative recognition and operational authority is particularly important. Hatta et al. (2026) identify a gap between recognition of Pawang Uteun in the legal framework and its practical ability to participate in law enforcement. Similar patterns are visible in comparative customary forest research. Budiman et al. (2021) show that recognition of customary forests in Indonesia has developed alongside continuing institutional challenges, while Sembiring et al. (2021) demonstrate that collective action for customary forest recognition can fail when institutional and strategic conditions are weak. The Aceh case therefore reflects a wider governance problem: legal recognition is necessary but not sufficient for effective customary forest management.

The third implication is that cultural resilience should be understood as institutional adaptation. A resilience framework that only emphasizes preserving traditional practices risks freezing culture in the past. The Pawang Uteun literature instead points toward revitalization,

communication, new forms of participation, and adaptation. Mahmuddin et al. (2024a) describe revitalization as a means of strengthening the institution's contribution to sustainable forest management. Fatia and Alfina (2025) provide an additional example of how women can create new community-based forms of forest protection. These developments suggest that cultural resilience is produced when communities are able to reinterpret inherited knowledge in response to new ecological and social conditions.

This adaptive understanding also changes how local wisdom should be approached in education. Rather than teaching local wisdom as a list of cultural values to memorize, educators can use Pawang Uteun as a case through which students investigate social institutions and environmental problems. Students can analyze customary rules, compare customary and formal governance, examine conflicts over resource use, and evaluate how cultural values influence environmental behavior. Such learning would align with the broader movement toward integrating Indigenous and local knowledge into sustainability education (Rahayu et al., 2022). It would also support place-based learning by connecting curriculum content to the social and ecological environment in which students live.

For Social Science Education, this has a specific methodological implication. The Pawang Uteun tradition can become a local case for teaching systems thinking. A forest is simultaneously an ecological space, an economic resource, a cultural landscape, a legal object, and a site of political negotiation. Students who examine Pawang Uteun therefore encounter the interdependence of geography, sociology, civics, history, law, communication, and environmental studies. This interdisciplinary potential fits the seminar's focus on arts, humanities, education, and cultural resilience.

The SDG implications should also be interpreted as relationships rather than as claims of direct achievement. Pawang Uteun can contribute to SDG 15 when customary practices protect forests and regulate extraction, but the existence of the institution alone does not prove improved biodiversity outcomes. It can contribute to SDG 13 when ecological knowledge supports adaptation and environmentally responsible practices, but the literature reviewed here does not provide a quantitative estimate of climate mitigation. It can contribute to SDG 4 when knowledge is deliberately incorporated into meaningful learning, and to SDG 16 when customary institutions strengthen participatory governance and conflict resolution. This cautious mapping avoids treating local wisdom as automatically sustainable.

The findings also suggest that cultural resilience and forest sustainability are mutually reinforcing. When customary institutions lose legitimacy, ecological knowledge may become disconnected from practice. Conversely, when communities can demonstrate that inherited knowledge remains useful for addressing contemporary problems, cultural practices may gain renewed legitimacy. The relationship is therefore dynamic: ecological effectiveness can support cultural continuity, while cultural legitimacy can support environmental governance.

A practical implication is the need for a hybrid governance model in which customary institutions and formal agencies have clearly defined but complementary roles. Such a model should not simply transfer state enforcement powers to customary actors. Instead, it can establish mechanisms for information sharing, joint monitoring, referral of violations, conflict mediation, community education, and recognition of customary ecological indicators. The literature on institutional synergy in customary forest governance suggests that hybrid arrangements can combine social legitimacy with administrative and technical capacity (Rahmilija et al., 2026).

Another implication concerns documentation and knowledge transmission. If Pawang Uteun knowledge remains primarily oral and localized, its continuity may depend heavily on the availability of active customary practitioners and intergenerational interaction.

Educational institutions can contribute by documenting local histories, vocabulary, ecological indicators, customary rules, and community narratives in collaboration with knowledge holders. Such documentation should be participatory and should avoid extracting sensitive knowledge without community consent. The objective should be cultural continuity and educational use, not simply archiving.

The role of communication is equally important. Mahmuddin et al. (2024b) indicate that the social communication dimension of Panglima Uteun is connected to cultural capital. This means that institutional resilience depends partly on the ability of customary leaders to communicate with village government, forest agencies, police, educational institutions, and community members. Strengthening this communication can help translate customary ecological knowledge into forms that are understandable within formal policy settings while maintaining the cultural meanings that give the knowledge legitimacy.

The research also points to an underexplored gender dimension. The Mpu Uteun case documented by Fatia and Alfina (2025) demonstrates that women can become active initiators of forest protection. This expands the analytical field beyond traditional male-centered accounts of customary authority. Future research should investigate how women, youth, teachers, and community organizations participate in transmitting and transforming forest-related knowledge. Such research would deepen the cultural-resilience perspective by identifying who carries knowledge forward and under what conditions.

Despite these contributions, the documentary approach has limits. The reviewed literature is shaped by the questions, locations, and methods of individual studies. Some studies focus on legal institutions, others on social communication, environmental values, or community initiatives. As a result, the synthesis should not be interpreted as a comprehensive ethnographic description of all Pawang Uteun practices in Aceh. Field research would be necessary to examine how rules are currently practiced in specific mukim or villages, how younger generations understand the institution, and how Pawang Uteun interacts with contemporary forest management agencies.

The main theoretical contribution of the study is therefore integrative rather than causal. It proposes a framework in which local ecological knowledge provides the knowledge base; customary governance provides institutional mechanisms; cultural resilience explains continuity and adaptation; education provides a pathway for intergenerational transmission; and the SDGs provide a global framework for interpreting potential contributions. This framework offers a way to connect a local Acehnese institution with broader debates on sustainability without reducing the institution to a generic example of indigenous wisdom.

The practical contribution is a proposed direction for strengthening Pawang Uteun through four connected strategies: institutional recognition with clear operational mechanisms; participatory environmental education; intergenerational documentation and knowledge transmission; and collaborative monitoring between customary and formal institutions. These strategies are not presented as a single universal model. They should be adapted to local social and ecological contexts and developed with community participation. Their value lies in creating a stronger interface between cultural knowledge and contemporary governance.

IV. CONCLUSION

This study concludes that Pawang Uteun is a living socio-ecological knowledge system connecting local ecological knowledge, customary governance, and cultural values. Although it contributes to forest conservation and community governance, its effectiveness faces institutional and socio-economic challenges. Strengthening its role requires collaboration,

environmental education, and intergenerational knowledge transmission. Its strongest relevance is SDG 15, with potential contributions to SDGs 13, 4, and 16. Future research should include field observations and interviews to explore its practices across Aceh.

ACKNOWLEDGEMENT

The authors acknowledge the academic support of the Graduate School and the Doctoral Program in Social Science Education, Syiah Kuala University. Appreciation is also extended to scholars, customary knowledge holders, and institutions whose published works provide the documentary basis for this study.

REFERENCES

Anas, M., Al-Muhdhar, M. H. I., & Rahayu, S. E. (2025). Development and validation of a local wisdom-based ecoliteracy instrument for Indonesian university students. *PPSDP International Journal of Education*, 4(2), 497–516. https://doi.org/10.59175/pijed.v4i2.754

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27–40. https://doi.org/10.3316/QRJ0902027

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Budiman, I., Fujiwara, T., Harada, K., & Sato, N. (2021). Customary forest managements and its challenges in East Nusa Tenggara, Indonesia: An implication of Constitutional Court Decision 2012. *Jurnal Manajemen Hutan Tropika*, 27(2), 69–78. https://doi.org/10.7226/jtfm.27.2.69

Cebrián-Piqueras, M. A., Filyushkina, A., Johnson, D. N., Lo, V. B., López-Rodríguez, M. D., March, H., Oteros-Rozas, E., Peppler-Lisbach, C., Quintas-Soriano, C., Raymond, C. M., Ruiz-Mallén, I., van Riper, C. J., Zinngrebe, Y., & Plieninger, T. (2020). Scientific and local ecological knowledge, shaping perceptions towards protected areas and related ecosystem services. *Landscape Ecology*, 35(11), 2549–2567. https://doi.org/10.1007/s10980-020-01107-4

Druker-Ibáñez, S., & Cáceres-Jensen, L. (2022). Integration of Indigenous and local knowledge into sustainability education: A systematic literature review. *Environmental Education Research*, 28(8), 1209–1236. https://doi.org/10.1080/13504622.2022.2083081

Fatia, D., & Alfina, M. (2025). Mpu Uteun: The role and challenges of female initiators in preserving forest functions. *Aceh Anthropological Journal*, 9(1), 148–160. https://doi.org/10.29103/aaj.v9i1.21608

Hatta, M., Subaidi, J., Afrizal, T. Y., Ramadhan, A. F., & Novtika, N. (2026). Empowering Pawang Uteun (local forest handlers) as customary institutions to combat illegal logging in North Aceh District. *UUM Journal of Legal Studies*, 17(1), 61–77. https://doi.org/10.32890/uumjls2026.17.1.4

Helmi, H., Pebrianto, D. Y., Hafrida, H., Kusniati, R., & Saputra, B. (2023). Local wisdom in Indonesia: Assessing its legal status and role in forest protection. *Jambe Law Journal*, 6(2), 125–141. https://doi.org/10.22437/jlj.6.2.125-141

Jensen, L. X., Bearman, M., Boud, D., & Konradsen, F. (2022). Digital ethnography in higher education teaching and learning—A methodological review. *Higher Education*, 84, 1143–1162. https://doi.org/10.1007/s10734-022-00838-4

Li, W.-T., & Shein, P. P. (2023). Developing sense of place through a place-based Indigenous education for sustainable development curriculum. *Environmental Education Research*, 29(5), 692–714. https://doi.org/10.1080/13504622.2022.2098933

Mahmuddin, M., Januar, E., & Mansari, M. (2024a). Revitalisasi Panglima Uteun dalam pengelolaan hutan di Kabupaten Aceh Besar. *Jurnal Sosiologi USK: Media Pemikiran & Aplikasi*, 18(2), 199–213. https://doi.org/10.24815/jsu.v18i2.40190

Mahmuddin, M., Januar, E., Mansari, M., & Salmawati, S. (2024b). Social communication Panglima Uteun in forest management at Aceh Besar Regency. *Proceedings of the 1st International Conference Da'wah and Communication Disruptions Era 5.0*, 87–93. https://doi.org/10.2991/978-2-38476-285-9_11

Mudassir, M., Wardani, H. K., Putri, A. R., Pramudita, D. P., & Andriningrum, H. (2026). Nurturing ecological citizenship: Integrating Panglima Laot values into school co-curricular programs in Aceh. *Journal of Aceh Studies*, 4(1), 371–386. https://doi.org/10.63924/joas.v4i1.299

Muslihin, M., Maryani, E., & Yani, A. (2022). Pawang Uteun local wisdom values in managing Aceh forest. *IOP Conference Series: Earth and Environmental Science*, 1089(1), 012050. https://doi.org/10.1088/1755-1315/1089/1/012050

Nirzalin, N., Zainal, S., Yunanda, R., Fakhrurrazi, F., & Ilham, I. (2023). Local wisdom and conservation of protected forest in Aceh, Indonesia: Myth as surveillance of action. *Journal of Law and Sustainable Development*, 11(8), e588. https://doi.org/10.55908/sdgs.v11i8.588

Rahmilija, F., Mandala, B., Yandi, W. N., Nahlunnisa, H., & Darsono, B. S. (2026). Tata kelola berkelanjutan hutan adat Datuk Rangkayo Mulio melalui sinergi kelembagaan dan kearifan lokal. *Jurnal Silva Tropika*, 10(1). https://doi.org/10.22437/jurnalsilvatropika.v10i1.57578

Sembiring, F. R., Sundawati, L., & Nugroho, B. (2021). The failure factors of collective action in promoting the recognition of customary forest: Case of Kenegerian Rumbio customary forest in Riau Province. *Jurnal Manajemen Hutan Tropika*, 27(2), 110–121. https://doi.org/10.7226/jtfm.27.2.110

Trundle, C., & Phillips, T. (2025). Ethnographic document analysis: A guide to dwelling with documents. *Qualitative Research*, 26(4). https://doi.org/10.1177/14687941251359069

Wibowo, A., Palijama, M. L., Kutanegara, P. M., Cahyono, E., & Tillah, M. (2021). The grassroots innovation of customary forest management: A case study of Kulawi-Marena community in Sigi Regency, Central Sulawesi. *Sodality: Jurnal Sosiologi Pedesaan*. https://doi.org/10.22500/9202135204

Yulia, Y. (2022). The concept of forest management based on customary forest law in North Aceh Regency. *Asian Research Journal of Arts & Social Sciences*, 16(1), 43–52. https://doi.org/10.9734/arjass/2022/v16i130277

Yulia, Y., & Herinawati, H. (2022). Customary law of the forest in North Aceh Regency. *Diponegoro Law Review*, 7(2), 328–343. https://doi.org/10.14710/dilrev.7.2.2022.328-343

Zainal, S., Nirzalina, Fakhrurrazi, Yunanda, R., Ilham, I., & Badaruddin. (2024). Actualizing local knowledge for sustainable ecotourism development in a protected forest area: Insights from the Gayonese in Aceh Tengah, Indonesia. *Cogent Social Sciences*, 10(1), 2302212. https://doi.org/10.1080/23311886.2024.2302212