



Integrating local wisdom in environmental conservation: Ecological citizenship in the Leuser ecosystem, Indonesia

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ABSTRACT: Environmental issues today are increasingly complex and challenging, necessitating the use of local wisdom from indigenous communities for effective solutions. This study aimed to: (1) identify local wisdom practices in environmental conservation in the Leuser Pining area of Gayo Lues Regency; (2) examine how ecological citizenship is strengthened through these practices; and (3) identify obstacles in this process. Using a descriptive qualitative approach, data were collected from 10 participants, including local leaders and community members, through semi-structured interviews, participant observation, and document analysis. Findings revealed that local wisdom practices, such as *bur perueren* (cattle raising areas), *bur perempusen* (crop growing areas), *bur perutemen* (firewood collection areas), *blang penjemuren* (agricultural drying areas), and *aih aunen* (bathing and drinking water areas), are crucial for environmental conservation. Strengthening ecological citizenship is facilitated through cultural arts like *didong sesuk*, *saman*, and *bines*, as well as community deliberations and socialization. However, economic challenges hinder the reinforcement of these practices. In conclusion, this study enhances community environmental awareness and serves as a valuable reference for similar communities, illustrating how local wisdom can maintain ecological balance.

KEYWORDS: Ecological citizenship, local wisdom, environmental conservation, traditional knowledge, Lueser ecosystem

Introduction

Many of today's environmental problems are directly or indirectly caused by people's daily behavior (Yusuf et al., 2020). Therefore, environmental education should enhance citizens' understanding of environmental issues and promote pro-environmental behavior (Fajri et al., 2024; Siagian et al., 2023 Yusuf et al., 2022). The worldview includes the concepts of the intrinsic value of nature, the moral responsibility of human activities, and the responsibility of humans to nature (Yu et al., 2019). Thus, scholars hope to understand how environmental issues are reflected in human attitudes and value systems, and what are the key factors in management strategies to support sustainable development such as climate change

and citizenship (Carlton & Jacobson, 2013; Hasan & Kumar, 2019; Wensing et al., 2019). Nature values and species rights are central to environmental debates and should be addressed within an environmental management framework to facilitate the overall protection of nature (Rideout et al., 2005). The rise of ecological and spiritual movements and spontaneous pro-environmental activities seek to establish a new environmental paradigm (Caplow, 2019; Refsgaard & Magnussen, 2009). To measure attitudes towards natural change, people's environmental beliefs and value systems must be effectively and reliably examined. Additionally, those who engage in pro-environmental behavior need to understand the rights of each species, the intrinsic value of

nature, and the moral obligations of organisms in particular (Hasan & Kumar, 2019; Luís et al., 2018; Paço & Lavrador, 2017; Refsgaard & Magnussen, 2009).

We are currently witnessing an unprecedented environmental crisis (Georgiou et al., 2021). This unequal situation is shown by facts that are often seen in everyday life, such as deforestation, climate change and ice melting, pollution, waste disposal, biodiversity loss and resource depletion are just some of the major challenges we have to address (Bulut, 2019; Hadjichambis & Reis, 2020).. According to (Nagra, 2010) the scale of environmental damage that has occurred during this century has crossed the line into a global catastrophe. Programs that support the preservation of nature and the environment in this context must be accompanied by moral concern as a means of preventing ecological crimes. (Budimansyah, 2016). All living things depend on natural resources to survive, the protection of nature and the environment is very important. (Mariyani, 2017). Material changes determine the relationship between organisms and their environment, and the material itself becomes the relationship itself (Foster, 2013). (Foster, 2013). According to (Yuniarto, 2011) the link between citizen behavior and the ecological crisis presents that people are not aware of their obligations to protect the environment. The inability of citizens to understand their obligations to try to maintain a sustainable environment is the main cause of environmental damage in addition to natural causes themselves.

The problems of environmental management and conservation are also experienced by Indonesia and Aceh Province. According to information from the National Disaster Management Agency (BNPB), Indonesia has recorded around 3,397 floods between 2015 and 2020, which caused 600 fatalities and 7.7 million people displaced. In addition, Indonesia experienced 745 land and forest fires between 2015 and 2020. Aceh province also recorded around 237 floods between 2015 and 2020, resulting in 21 fatalities and 1.2 million displaced people (BNPB, 2020). Apart from being

caused by the natural phenomenon itself, these disasters are also caused by human actions against the environment that cause floods, landslides, and forest fires. (Yusuf et al., 2020).

The events described above show evidence of the environmental damage that has occurred. According to a number of researchers, in various previous studies from relevant perspectives related to Local Wisdom and Environmental Preservation (Erna, 2019; Gorda & Anggria Wardani, 2020; Saputri & Setiawan, 2020; Suparmini et al., 2015). In the research (Suparmini et al., 2015) shows how the Baduy tribe is still very dependent on nature and continues to work to maintain its balance. The rule of dividing the area into three areas, namely Reuma area (settlement), Heuma area (mushroom and fertile land) and Leuweung Kolot area (ancient forest) shows the local wisdom of Baduy in managing natural resources.

Further research was conducted by (Saputri, W. E., & Setiawan, A. R, 2020) stated that the internalization of local wisdom values can make a positive contribution to the preservation of the natural environment through the realization of the rights and authorities of indigenous peoples living in the area. Then research from (Suparmini, Setyawati, & Sumunar, 2013) showed that residents of Colo Village, Dawe District, and Kudus Regency play an important role in taking action to stop environmental damage in the Muria Region. In an effort to protect the area that has the potential to become a water catchment area that is useful for the life of the village community, the process of efforts in the form of local wisdom is a form of realization and the role of the community.

Other research conducted by (Gorda, A. N. S., & Wardani, K. D. K. A, 2020) showed how Balinese local wisdom is reflected in a strong ecocentric perspective towards the environment. In addition to valuing the human aspect, this ethic also values non-human aspects (such as plants, animals, and the supernatural). The interconnected web of natural systems is considered to include humans as one strand. Tri Hita Karana is a philosophical idea that unites and identifies human life with nature. (Gorda &

Anggria Wardani, 2020). A healthy environment reflects peaceful human interaction, and vice versa. A number of rituals are also presented in an effort to bring harmony and balance to human life and nature.

Based on some of these studies, there has been no research that examines the study of local wisdom in the law of forest division. The law of forest division in Indonesia, according to the Pining Tiger Forum, involves categorizing forests into specific areas for different uses, such as bur perueren (cattle raising areas), bur perempusen (crop growing areas), and bur perutemen (firewood collection areas). This research aims to fill the gap by focusing on how these local wisdom practices contribute to environmental conservation.

Additionally, the values contained in this local wisdom have not been adequately explored in existing literature. This study aims to highlight the uniqueness and novelty of these values in comparison to previous research. Clearly stating the gap, this research seeks to examine how the division of forest areas based on local wisdom contributes to environmental conservation, which has not been extensively documented before. Therefore, this research is important for the community as it showcases the contribution of local wisdom values in maintaining the balance between nature and humans. These values can serve as guidelines (role models) for other communities with similar ecological settings.

This research seeks to create awareness of local values as guidelines for communities, especially those in mountainous or forest areas, to maintain ecological balance. If we do not pay attention to nature, nature will become indifferent to human needs.

Based on the background of the problem above, the following questions can be formulated: (1) What are the local wisdoms in preserving the environment in the Leuser Pining area of Gayo Lues Regency? (2) How is the process of strengthening ecological citizenship based on local wisdom in environmental preservation applied to the community of the Leuser Pining area of Gayo Lues Regency? (3) What are the obstacles in strengthening

ecological citizenship based on local wisdom in environmental preservation in the community of the Leuser Pining area of Gayo Lues Regency?

Research methods

This research employs a descriptive qualitative method to explore local wisdom in preserving the environment in the Leuser Pining area of Gayo Lues Regency. The study focuses on understanding the phenomena faced by research participants, including their behavior, perceptions, motives, and actions, using data collection methods such as observations, semi-structured interviews, and document analysis.

The qualitative approach is rooted in post-positivist philosophy, emphasizing meaning and context over generalization (Sugiyono, 2016). This research aims to provide a holistic understanding of the subject in its natural setting, employing various naturalistic techniques (Moleong, 2005).

For this study, the specific qualitative research method adopted is ethnography, which is well-suited for exploring cultural phenomena and community practices. The research instruments include:

1. Observations: Conducted to gather firsthand information about the local wisdom practices in environmental conservation.
2. Semi-structured Interviews: Carried out with key informants such as the Chairman and Secretary of the Pining Tiger Forum, the Head and Secretary of Pining Village, a local community police officer, and five members of the Pining Village community.
3. Document Analysis: Involving the review of relevant documents and records to supplement the data obtained from observations and interviews.

The reasoning behind using a descriptive qualitative method is to capture the rich, detailed insights of the local wisdom practices unique to the Leuser Pining area. Deductive reasoning is employed to formulate hypotheses based on the factual data gathered, ensuring the empirical indicators and measurements are

well-grounded in observed reality (Margono, 2014).

Result and Discussion

Local wisdom in environmental conservation in the Leuser Pining area of Gayo Lues Regency

This research has presented data and discussed the findings on the relationship between the concept of ecological citizenship and local wisdom in the Leuser Pining area community of Gayo Lues Regency. This research identified five local wisdom practices of the Pining indigenous community that contribute to shaping ecological citizenship in environmental preservation, namely *Blang Penjemuren*, *Aih Aunen*, *Blang Peruweren*, *Bur Perutemen*, and *Bur Perempusen*.

Blang Penjemuren is a forest area directly adjacent to the village, used jointly by villagers, especially for drying rice. This practice signifies the communal effort in utilizing their energy and resources. The practice also includes a place called "*Keben*," where harvested rice is stored outside the village to protect it in case of village emergencies like fires. This communal effort reflects the Gayo tribe's sense of brotherhood and their approach to preserving resources (Lahudin et al., 2024). This aligns with Sibarani and Robert (2012), who state that local wisdom is integral to societal progress.

Aih Aunen encompasses springs, rivers, and streams, crucial for daily activities such as bathing and collecting drinking water. The practice emphasizes the protection of water sources from contamination, ensuring the availability of clean water for households, including the most vulnerable community members like widows and orphans. The division of river areas into *Aunen Benen* (for women) and *Aunen Rawan* (for men) highlights the cultural significance and the community's commitment to maintaining these resources. This practice reflects the integration of cultural values in environmental conservation as discussed by Mariyani (2017).

Blang Peruweren is a forest area designated for raising livestock, determined by community leaders to ensure that cattle and buffalo do not

disturb other people's gardens. Historical examples include *Blang Nangka* and *Bur Perueren Berang Salam*, reflecting the structured approach to livestock management and the community's effort to balance agricultural activities with livestock raising. This is in line with Nasution et al. (2022), who discuss the role of designated livestock areas in sustainable agricultural practices.

Bur Perutemen is a village forest area used for collecting firewood and other materials. According to local wisdom, the custom stipulates that wood should not be taken carelessly from the forest. The saying "*tebang pilih kayu i uten kati selisih mara bahaya*" (cutting wood in the forest must be selected, not carelessly so that the danger of natural disasters does not occur) highlights the importance of selective logging to prevent environmental degradation and natural disasters. This practice ensures that only certain trees are harvested, maintaining the health and sustainability of the forest ecosystem. The community's approach emphasizes the careful management of natural resources to balance usage with conservation, thereby protecting the environment and reducing the risk of disasters such as landslides and soil erosion. A special ceremony led by forest handlers before cutting down trees demonstrates the community's respect for the forest and its resources. This aligns with Erna (2019), emphasizing the need for integrated and sustainable efforts to manage and preserve the natural environment through local culture. The values contained in local culture can be instilled to achieve this goal.

Bur Perempusen is an agricultural and farming area owned by families, determined through community agreements. This area's management showcases the integration of local wisdom in agricultural practices, supporting sustainable land use and resource management. The area division into *Reuma* (settlement), *Heuma* (moor and fertile land), and *Leuweung Kolot* (old forest) reflects the *Baduy* community's sustainable way of life and their balance in managing natural resources (Suparmini et al., 2015).

According to local wisdom, *Bur Perempusen* is a critical aspect of sustainable agriculture in the Leuser Pining area. By allocating specific areas for different purposes—settlement, agriculture, and forest preservation—the community ensures that land is used efficiently and sustainably. This division helps to prevent overexploitation of any single type of land use, thereby maintaining ecological balance.

The division into *Reuma*, *Heuma*, and *Leuweung Kolot* allows the community to live harmoniously with their environment. *Reuma* provides space for settlement without encroaching on agricultural or forest areas. *Heuma*, being fertile land, is designated for farming, which supports the community's food security. *Leuweung Kolot*, the old forest, is preserved as a natural area, contributing to biodiversity conservation and acting as a carbon sink, which is crucial for mitigating climate change.

These practices align with the views of Sibarani and Robert (2012), who state that local wisdom is an integral part of a community's culture and plays a crucial role in societal progress. By incorporating local wisdom into land management, the community of Leuser Pining is able to create a sustainable model that balances human needs with environmental preservation (Lahudin et al., 2024). This approach not only supports the community's immediate needs but also ensures the long-term health of their environment.

In terms of practical application, the *Bur Perempusen* model demonstrates the effectiveness of community-based resource management. It provides a framework that other communities with similar ecological settings could adopt. The emphasis on community agreements and family ownership of agricultural land fosters a sense of responsibility and stewardship among the community members, which is essential for sustainable land use.

Moreover, this practice highlights the importance of integrating traditional knowledge with modern conservation strategies. It showcases how local wisdom can complement scientific approaches to resource management,

offering insights that are often overlooked in conventional environmental planning. By valuing and utilizing local wisdom, communities can develop more resilient and adaptive strategies to cope with environmental challenges (Ridayani et al., 2024).

Overall, the management of *Bur Perempusen* not only answers the research question about the role of local wisdom in environmental conservation but also provides new insights into the potential of traditional practices to contribute to sustainable development. This finding underscores the need for greater recognition and incorporation of local wisdom in environmental policies and practices.

The process of strengthening ecological citizenship based on local wisdom

The Pining Tiger Forum plays a significant role in reinforcing environmental attitudes and behaviors by educating the community on the importance of nature and environmental protection. Key processes include Gayo art performances, deliberation (*mupakat*), socialization, and campaigning through banners (Lahudin et al., 2024). Cultural arts such as *didong sesuk*, *bines*, and *saman*, which include poetry about the environment, are used to convey environmental conservation messages.

Didong Sesuk is a traditional Gayo performance art that combines poetry, singing, and body movements. This art form is used to communicate important cultural and environmental values, making it an effective tool for spreading awareness about environmental conservation. During significant events, such as the anniversary of the Pining Forest and River Guardians Harimau Forum, *didong sesuk* performances highlight the community's connection to their environment and the importance of preserving it.

Saman is another traditional Gayo dance that involves a group of performers sitting in a row and performing synchronized movements to the rhythm of a traditional song. The dance is characterized by its fast-paced movements and coordination, symbolizing unity and cooperation. In the context of environmental

education, saman performances are used to illustrate the harmony and balance that should exist between humans and nature. The themes of these performances often focus on the interdependence of all living things and the need to protect natural resources.

Bines is a traditional Gayo dance performed by women, which involves graceful movements that reflect the natural beauty and serenity of the environment. *Bines* performances are often accompanied by songs that convey messages about the significance of nature and the community's role in its stewardship. This dance form is particularly effective in engaging the younger generation and instilling in them a sense of responsibility towards the environment.

These cultural arts performances serve as a medium for moral education, as emphasized by Hasmidar et al. (2020). By integrating environmental messages into traditional art forms, the Pining Tiger Forum ensures that these values are communicated in a way that is culturally relevant and resonant with the community. This approach not only reinforces ecological citizenship but also preserves and promotes the community's cultural heritage.

Deliberation (*Mupakat*) involves community members engaging in open discussions to reach consensus on environmental conservation steps. This ongoing governance process ensures continuous community participation in decision-making, monitoring, and maintaining environmental sustainability. Deliberations are a crucial part of community life, allowing for the exchange of knowledge and ideas, and fostering a sense of shared responsibility. Yuliani (2020) supports the use of deliberation as a medium for problem-solving and collective decision-making.

Socialization involves the broader community, including local communities, farmer groups, youth organizations, and other stakeholders. Socialization activities are integrated into existing community events, ensuring widespread dissemination of environmental values (Yusuf, R., Ruslan, R., & Maulana, R. W., 2023). Feedback from participants is used to evaluate and improve socialization methods, as highlighted by Izharyah et al. (2020) in their disaster

mitigation research. Socialization efforts include educational programs, workshops, and community meetings that raise awareness and promote sustainable practices.

Campaigning and Banners involve installing banners with environmental values in strategic locations to raise community awareness and participation in environmental conservation efforts. This method is supported by Erna (2019), who underscores the importance of integrating local culture into sustainable environmental management. Campaigns and visual aids serve as constant reminders of the community's commitment to preserving their natural surroundings.

These processes are vital in fostering a sense of ecological citizenship among the community members, encouraging them to take an active role in protecting their environment (Suhendar et al., 2024). This approach aligns with Berkowitz's perspective, as discussed by Simbolon (2021), on developing ecological citizenship by enhancing people's ability, values, and knowledge to act in accordance with environmental goals.

Barriers to strengthening ecological citizenship

The primary obstacle in strengthening ecological citizenship is the community's weak economic condition. Many Pining villagers live below the welfare line, leading to behaviors such as cutting wood and poisoning fish for daily needs. Economic challenges force some community members to prioritize immediate survival over long-term environmental sustainability. Suroto et al. (2021) highlight that although public awareness of the environment is high, economic limitations hinder effective community participation in river management and other conservation efforts. Addressing these economic challenges is crucial for the long-term success of ecological citizenship initiatives.

Based on the discussion above, it is concluded that economic limitations pose significant challenges to the process of strengthening ecological citizenship based on local wisdom in environmental preservation in the Leuser Pining area of Gayo Lues Regency.

Overcoming these barriers requires targeted interventions that address both the economic needs of the community and the necessity of environmental conservation.

These findings answer the research questions by identifying the specific local wisdom practices in the Leuser Pining area and detailing the processes and obstacles in strengthening ecological citizenship based on these practices. The research provides new insights into how local wisdom can be effectively integrated into environmental conservation strategies, highlighting the importance of cultural values and community engagement in achieving sustainability.

Conclusion

This study underscores the pivotal role of local wisdom in environmental conservation within the Pining Leuser Area. Key practices, including *bur perueren* (forest area for raising cattle), *bur perempusen* (forest area for cultivating crops), *bur perutemen* (forest area for collecting firewood and materials for building housing), *blang penjemuren* (place for drying agricultural products), and *aih aunen* (place for bathing and collecting drinking water), illustrate how traditional knowledge and customs contribute significantly to sustainable resource management and ecological balance. Integrating these practices into environmental conservation strategies effectively enhances community awareness and participation. Key activities such as Gayo art performances (*didong sesuk*, *saman*, and *bines*), deliberation and community agreements, socialization activities (educational programs and community meetings), and campaigns and banners promoting environmental values play a significant role in this process.

Despite these efforts, the primary obstacle in strengthening ecological citizenship is the economic limitations faced by the Pining community. Many residents live below the welfare line, which forces some to engage in environmentally harmful practices for daily survival. Addressing these economic challenges is crucial for the long-term success of conservation initiatives. Future research should

explore strategies to overcome these economic barriers and further integrate local wisdom with modern conservation practices. Overall, this study supports the theory that local wisdom is integral to effective environmental management and sustainable development, demonstrating that combining traditional knowledge with modern practices is essential for achieving sustainable development and ecological balance in the Leuser Pining area.

Disclosure statement

The authors declare no conflict of interest.

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