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Local wisdom of the Aceh community in nature conservation and disaster mitigation: A systematic review

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Abstract: The local wisdom of the Acehnese people has long been a key factor in nature conservation and disaster mitigation efforts in this region. Aceh, as a province rich in biodiversity and vulnerable to natural disasters, has relied on local knowledge and values passed down from generation to generation to mitigate the negative impacts caused by natural changes and disasters. This literature review aims to explore and analyze various aspects of the local wisdom of the Acehnese people related to nature conservation and disaster mitigation. This study found 7 local wisdoms of the Acehnese people that contribute to nature conservation and disaster mitigation, including; Smong, Keuneunong, Perueren, Dedesen, Kejruen Blang, Khanduri laot, Adat Pula U. This literature review concludes that the local wisdom of the Acehnese people has a vital role in nature conservation efforts and disaster mitigation. Involving local communities in the planning and implementation of conservation and mitigation initiatives will further increase the success and sustainability of these efforts. In facing global challenges and climate change, recognizing and preserving local wisdom is a strategic step to achieve sustainability of nature and human life in Aceh and the surrounding region.

Keywords: ecological citizenship; local wisdom; environmental conservation

Introduction

Disasters have a huge impact on humans in various areas such as socio-economic, environmental, health and personal well-being (Bogdan et al., 2021). Southeast Asia, Indonesia is a disaster-prone area. According to information provided by the United Nations Agency for the International Strategy for Disaster Risk Reduction (UNISDR), Indonesia is an archipelagic country located at the intersection of four tectonic plates: the Asian Continental Plate, the Australian Continental Plate, the Indian Ocean Plate, and the Pacific Ocean Plate and has nicknamed Ring of Fire (Mardiatno et al., 2017). Therefore, it is the most tectonically active area on Earth (Cummins & Meilano, 2017). In the southern and eastern parts of Indonesia there is a volcanic arc that extends from the islands of Sumatra, Java, Nusa Tenggara and Sulawesi, the sides of which are old volcanic mountains and lowlands, some of which are dominated by swamps. This situation has a high potential for disasters such as landslides, floods, earthquakes, tsunamis and volcanic eruptions (Hu et al., 2018). Apart from that, because of its location close to the equator which has two seasons (rainy and dry), as well as demographic factors that make it vulnerable to social disasters, it is also vulnerable to climate change disasters. Earthquakes, tsunamis, volcanic eruptions, floods, drought, erosion and disease outbreaks are the main natural disasters that occur (Hu et al., 2018). The tsunamis that hit Sumatra in 2004 and 2010 both left a lot of

damage and loss of life (Sutton et al., 2021); the 2006 earthquake in Yogyakarta (Diambama et al., 2019); Palu experienced liquefaction and tsunami after being hit by an earthquake (Wei et al., 2020); active volcanic eruptions with different eruption patterns and types (Umin, 2019).

According to BNPB statistics, there have been 28,671 natural and social disasters in Indonesia over the last 20 years (Syaodih, 2009). Almost every region experiences disasters, and some places are more vulnerable than others. In addition, the risks and types of disasters vary by region. 13 disasters hit 12 districts and cities in Indonesia between January 2020 and February 2020 (Syaodih, 2009). It is critical to intensify mitigation efforts to lower the likelihood of increased casualties. Actions aimed at improving safety in the event of a disaster are considered part of disaster preparedness.

One strategic approach that can be taken is to revive local wisdom and traditional knowledge that has been eroded and neglected, and integrate it with modern science and knowledge-based technical approaches in order to reduce the risk of casualties, potential damage and loss through increasing and understanding community awareness and awareness. creating an environment that supports disaster preparedness and safety for the Indonesian people (Ngongo et al., 2022). Learning has a significant impact on local wisdom capabilities in disaster mitigation, and can be used as a source of information for learning (Rudina, 2019). Local knowledge is a type of local culture in the form of skills, goods and activities related to survival that have been adapted to their place from generation to generation. Local wisdom has philosophical principles which are considered as rules (thoughts, attitudes and behavior) for daily activities in maintaining the survival of individuals and groups. For example, the people of Aceh Simeulue, Indonesia used local wisdom "Smong" to escape the tsunami and seek higher ground from the coast (D. Safitri Muzan et al., 2020; Gadeng et al., 2019; McAdoo et al., 2006). When a tsunami struck the Sanriku region in northeastern Japan, tsunami-tendenko was a type of survival maneuver on a hill (Kodama, 2015), Additionally, in Basey Samar, Philippines, a traditional skill called magbabaja was used to interpret the signs of approaching Typhoons Haiyan (Cuaton & Su, 2020).

Based on the above, local wisdom values can be an invaluable resource in efforts to preserve the environment and mitigate disasters, so their contribution to maintaining ecological balance and mitigating disasters is very important. Local knowledge and practices for managing the environment and natural resources are referred to as local wisdom values and are passed down from one generation to the next. Especially in disaster risk reduction, the use of local wisdom as knowledge is a form of contextual approach that brings people closer to actual problems. Several relevant research results regarding local wisdom values play an important role in maintaining ecological balance and mitigating disasters, including (Abas et al., 2022; Gama & Agustina, 2022; Nasution et al., 2021). As a study conducted (Gama & Agustina, 2022) shows how important traditional knowledge is for the resilience of biocultural systems. Efforts to revitalize, disseminate, respect, and implement these policies are critical to protecting biodiversity, preserving cultural heritage, maintaining global ecological health, and mitigating climate change. This research (Triastari et al., 2021) shows how strongly the Simeulue people still adhere to their beliefs and customs. Simeulue Island had very few fatalities due to the 2014 Aceh tsunami. In dealing with the Simeulue tsunami disaster, the community has developed its own local wisdom mitigation. Semong is one of the local wisdoms. Semong, according to the Seimeuleu people, is a sea wave that breaks after an earthquake. This story has been passed down from generation to generation in the Simeulue Semong community for hundreds of years.

Subsequent research conducted by (Abas et al., 2022) shows that indigenous peoples have very useful and effective nature conservation methods that can be adapted to existing techniques. To ensure the security of our future relationship with nature, it is time to take inspiration from those who have adapted to it for generations. In terms of content analysis,

this study is divided into seven broad categories: (a) forest management, (b) flora and fauna conservation, (c) food security, (d) water management, (e) land management, (f) weather forecasting , and (g) others. Recent research conducted by (Nasution et al., 2021) shows how farmers in Timor can adapt to the island's harsh environment by practicing agriculture based on local knowledge. In terms of crop diversification through mixed farming models and raising livestock using livestock systems, they follow environmentally friendly agricultural practices. Despite their general skepticism towards newly introduced agricultural innovations, they are actually open to adopting whatever works for their household and environment.

From several studies conducted in the last few years to explore the local wisdom of indigenous communities in maintaining ecological balance and mitigating disasters. However, there has been no research that analyzes the contribution of local wisdom values of the Acehnese people in maintaining ecological balance and managing disasters. Apart from that, trends and patterns of studying local wisdom of indigenous peoples in conservation are also not answered. So it is important for this research to be adopted by the community to maintain ecological balance and mitigate disasters, especially among communities in mountainous and coastal areas. Therefore, this research aims to explore and analyze various aspects of the local wisdom of the Acehnese people related to nature conservation and disaster mitigation.

Method

This research uses literature and literature studies. What is meant by "library research" is research that involves library data collection techniques or research in which the research object is researched using various library information, bibliography of all types of references, including books, journal papers, articles, dissertations, theses, handouts, laboratory manuals and other scientific works (Syamsidik et al., 2020). Data from reviewing various references that are relevant to the problems faced and research objectives are used to conduct a literature review. The methodology used aims to identify theories that are appropriate to the problems examined in the research to serve as reference material for discussing research results.

Result and discussion

Smong, in Simeulue

The people of Simeulue today live and lead a simple life, still upholding their beliefs and customs, and living each day with wisdom. The Semong and Nandong cultural approaches to disasters and disaster mitigation are a type of local wisdom that is quite common in the Simeulue community. According to information from the Simeulue community, the earthquake caused damage to buildings in tsunami-prone and earthquake-prone areas on Simeulue Island. The local wisdom possessed by the Simeulue community is used as a disaster management strategy, especially in the form of semong tu, which is used to communicate between Simeulue neighbors in the event of a tsunami (Triastari et al., 2021). Simeulue Island is known as an example of community-based risk communication and DRR activities as a result of managing the collective memory of "smong", the local Simeulue term for the 100-year earthquake/tsunami phenomenon. Using the results of a grounded theory study, this study examines the importance of specific natural disaster terms for the success of DRR and what can be learned from the Simeulue example (Suarmika et al., 2022).

Knowledge of the Smong story is perceived at different levels depending on who the participant learns it from. This study also found that after the 2004 tsunami, the Smong story was preserved in traditional oral channels and developed in various cultural channels. Community resilience can be strengthened when local communities incorporate lessons learned from the Smong story into their ongoing efforts to mainstream tsunami risk management (Rahimah et al., 2019).

earthquake that triggered the Indian Ocean tsunami in December 2004. The 15 meter high tsunami waves destroyed 171 schools, 60 bridges, 41 health centers and left 85% of the population homeless on all but two islands, but only 7 of 80,000 residents died (Sutton et al., 2020). Music and songs have been identified as

an important part of the success of Simeulue PRB (Sutton et al., 2020). This article examines the nature of Simeulue songs and considers the socio-cognitive processes through which music was co-opted to incorporate information about tsunami risk and avoidance into Simeulue residents' sense of coherence (SOC). The research results show that the Simeulue community uses techniques that are well understood to optimize learning.

Keuneunong, in Aceh Jaya and Southwest Aceh

Residents of Pulo Aceh Regency have experienced or are currently experiencing a number of hydrometeorological disasters and climate change. To ensure survival and meet their needs, the community has developed LINK (Local and Indigenous Knowledge) to overcome hydrometeorological disasters. The keuneunong calendar is a type of LINK. By referring to the constellation conjunction with the moon's orbit at the conjunction of the Big Dipper Star (Libra), the Lhee star (Orion), and other stars, this calendar which has been used for generations in the fields of agriculture and fisheries can be understood. This study aims to determine the benefits of community adaptation and community adaptation initiatives in facing climate change in Pulo Aceh Regency. (Zulchaidir et al., 2015) show how people follow keuneunong as a guide for all daily activities, including determining the best time for fishing, harvesting rice, planting crops, and dealing with storms and other extreme natural conditions. The residents of this subdistrict have modified agricultural techniques and fishing gear used in the fishing industry to adapt to changes in weather and climate.

Perueren, in Central Aceh, Bener Meriah, and Gayo Lues

The tradition of raising buffalo, which is the identity of many tribes, is now marginalized by development. In fact, there are various best practices for traditional buffalo cultivation that can be identified as local wisdom. This is also found in the practice of buffalo farming by the Gaye Lues community, Aceh Indonesia. It is important to research local wisdom in these communities in order to increase the buffalo population as a guarantee of regional and national food security. This is intended to give consideration to local livestock regulations. (D. N. Pascapurnama et al., 2017) shows how the domains of livestock systems and management patterns are separated in local knowledge about livestock. There are six different livestock patterns that are used chemically. The way to raise buffalo is similar to the way social networks are managed. Local livestock policies, especially those relating to work schedules and livestock business plans by local governments, can benefit from a number of insights derived from local wisdom. The free range livestock model which is planted in a pen in the morning and evening, fencing on grazing land is the dominant livestock method used in the Blang Paku and Uber-Uber areas (Akhyar Nasution et al., 2023).

Dedesen, Aceh Tengah

This research aims to determine the local fishing knowledge possessed by Gayo ethnic fishermen, the existence of this knowledge, and the influence of fishing with local knowledge on the environment around the lake. Research results (Cahyani, 2022) show that Gayo ethnic fishermen have skills in creating fishing tools and techniques, such as dedesen, penyakulen, serue, traps, jangki, and doran. However, due to environmental damage and low catches, such as the reduced use of dedesen, sanggkulen, and cerue in fishing, Gayo ethnic fishermen are gradually starting to abandon some of this local wisdom. Fish traps, jangki, and doran are still used by Gayo fishermen as examples of local wisdom that is still widely adhered to. Although the use of fishing gear benefits fishermen economically, it also has a negative impact on freshwater lakes ecologically. As a result of using coconut dregs as bait, this damage is manifested by a decrease in the depik fish population and pollution of the lake water.

Kejruen Blang, Seluruh Aceh

A traditional organization called Keujreun Blang is tasked with overseeing rice farming and running businesses there. This traditional institution is in accordance with the authority of Article 98 paragraphs (1) and (4) of Law Number 11 of 2006 concerning Aceh Government (UUPA) which is strengthened in Qanun Number 10 of

2008 concerning Traditional Institutions. This emergency task is not yet supported by Governor Regulation no. Regarding the position of Keujreun Blang in Irrigation Management, it has been 45 years (2015). The results of research (Umin, 2019) carried out by Keujruen Blang, specifically: First, coordinating rice cultivators to carry out irrigation cooperation from upstream to downstream, and for those who are not subject to sanctions; Second, appeal to the public not to dispose of waste in irrigation; Third, keep irrigation from being shallow and dirty; Fourth, arrange the distribution of water to each rice field based on a schedule; Fifth, prevent irrigation channels from being damaged or leaking. To get abundant rice yields, they work together to maintain and clean water channels, which is the local wisdom of the Acehnese people, according to Keujreun Blang. Keujruen Blang was founded to manage rice farming as a water source for Acehnese farmers to preserve their culture and maintain communal water sources.

Khanduri laot, Aceh Pesisir Timur and Pesisir barat

Tradition is culture that has been passed down from our distant ancestors until today. Khanduri laot is a tradition that has been carried out for a long time and continues to be a routine activity in the lives of the people of Southwest Aceh Regency, specifically in Susoh District, which is on the coast. Research results (Rahman et al., 2018) show that the practice of khanduri laot begins with tadarus at night and tahlilan so that people can pray and eat together during the day. After that, the practice of panglima laot was carried out, and some residents of Susoh District released the buffalo heads into the sea. In essence, the teachings of Islamic law remain the basis of the people's theological beliefs. Khanduri laot is held solely to gain the approval and pleasure of Allah SWT, because only Allah SWT can provide sustenance and safety. Khanduri laot is carried out by the people in Susoh District as a form of gratitude to Allah SWT who has given them sustenance, blessings and safety. Khanduri laot is an embodiment of the relationship between humans as His creatures and the surrounding environment.

Pula U tradition, in North Aceh and Pidie

The results of research (Nugroho et al., 2023) show that traditional ceremonies for birth, marriage, and death, as well as the apostle's circumcision, kenduri blang, kenduri padee bijeh, kenduri jeurat, pilgrimage peusijuk, new house, and new car, are all carried out by people Aceh. There are 28 types of plants used in Acehnese traditional ceremonies, including 11 types for welcoming ceremonies, 20 types for wedding ceremonies, and 11 types for death ceremonies. It is well known in society what the plants used in traditional ceremonies symbolically mean and how they are used.

Conclusion

This study found 7 local wisdoms of the Acehnese people that contribute to nature conservation and disaster mitigation, including; Smong, Keuneunong, Perueren, Dedesen, Kejruen Blang, Khanduri laot, Adat Pula U. The local wisdom of the Acehnese people has a vital role in nature conservation efforts and disaster mitigation. Involving local communities in the planning and implementation of conservation and mitigation initiatives will further increase the success and sustainability of these efforts. In facing global challenges and climate change, recognizing and preserving local wisdom is a strategic step to achieve sustainability of nature and human life in Aceh and the surrounding region.

Disclosure statement

This article has no conflict of interest on the part of the parties.

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