



The Revitalization of Rimbo Larangan for the Minangkabau Tribe: An Innovation to Enhance Environmental Awareness among High School Students

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Abstract: Minangkabau community of West Sumatra is familiar for its local wisdom called *rimbo larangan*, particularly on a concept dealing with environmental conservation. Excessive forest exploitation made the local wisdom of *rimbo larangan* needs to be revitalized by the community. The research aimed to determine 1) the local wisdom of the Minangkabau community in managing *rimbo larangan* and 2) the implementation of local wisdom *rimbo larangan* in geography learning. The research was conducted in the *rimbo larangan* in Nagari Alam Pauh Duo, South Solok Regency, and Koto Malintang Nagari, Agam Regency, West Sumatra Province. The research design was a qualitative descriptive, and data was collected through interview, observation, documentation dan literature review. Interview were conducted with several informants such as village officials, traditional leaders, and village community. The research results illustrated that *rimbo larangan* is in good condition though some differences in the management. The revitalization of *rimbo larangan* can be done by supplementing local wisdom topics to the geography syllabus in high school to develop students' environmental awareness. This study confirm that local wisdom plays a crucial role in environmental conservation and character formation within society. Furthermore, it serves as a valuable learning resource for students to understand the importance of maintaining a balance between humans and nature.

Keywords: environmental awareness; geography learning; minangkabau tribe; rimbo larangan; senior high school

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INTRODUCTION

Various environmental disasters have caused material and moral damage to humans. Environmental disasters are caused by poor management and utilization of natural resources (Pribadi & Kurata, 2017; Purnomo et al., 2017; Syaufina, 2018). Environmental management in Indonesia was included in the government law No. 32 of 2009. In article 63 point W, it is stated that in environmental protection and management, the government has the duty and authority to provide education, training, guidance, and appreciation to individuals or groups of people that have services to the environment (Ministry of Environment and Forestry, 2018). The law involved the community in maintaining the environment sustainably by utilizing the local community's values (local wisdom) (Mutia et al., 2023; Sumarmi et al., 2019). Awards like the Adipura award, Kalpataru award, and Adiwiyata school award are meant to protect the environment.

School is the place to do the learning process (Ark et al., 2020; Sumarmi, 2015b). Students could gain knowledge through learning (Rahmiwati et al., 2018), and form attitudes and behaviors (Hardi et al., 2018; Mutia et al., 2023; Sumarmi et al., 2019) to realize awareness as a whole concept. A system is needed to establish students' awareness in maintaining the environment, namely the green school program. Besides, learning in the classroom requires strategies and learning models to increase students' awareness of the environment (Risnani et al., 2017; Sumarmi, Bachri, et al., 2020). Integrating local wisdom into environmental education can enhance students understanding of sustainability and strengthen their connection to nature (Asmin et al., 2016; Mutia et al., 2023). Additionally, incorporating community-based learning experiences allows students to observe and engage with traditional ecological practices, foresting a deeper appreciation for environmental conservation (Asmin et al., 2017; Aswani et al., 2018).

Forests have various benefits, including affecting the quality of life in health and physical activity (Vujcic & Tomicevic-Dubljevic, 2018), the sustainability of flora and fauna life, and soil conservation (Damayanti et al., 2018). The benefits will be reduced if the forest condition is degraded in quantity and quality. In the last 15 years, forests in Indonesia have decreased in size (Tarigan, 2016). It is dominated by changes in forest land to plantations (Tarigan, 2018). Although plantations replace forest land but the benefits provided are not the same as the benefits provided by natural forests. The reduced number of forests through over-exploitation results in

forest quality degradation and land quality damage (Agus, 2018). This degradation not only threatens biodiversity and disrupts ecosystems but also increase the risk of natural disasters such as landslide and floods, which have severe environmental and socio-economic impacts (Hardi et al., 2018; Syaufina, 2018). Up to this point, numerous geography textbooks have yet to incorporate local wisdom into their content. However, local wisdom is highly contextual for students, making it easier for them to comprehend and fostering greater environmental awareness in the protection of sacred forests.

At present, the amount of forest in Indonesia has been declined. In general, from 2000 up to 2009, deforestation has amounted to 15.15 million ha in Indonesia (Nahib et al., 2018). In 2009-2013, there has been deforestation of 4.58 million ha or equivalent to 31% of Indonesia's total forest area (Forest Watch Indonesia, 2014). Decreased forest area is caused by human activities such as clearing mines and housing (Hermon, 2016), changing forests into rubber and oil palm plantations (Hamdan et al., 2016). Forests are very close to residential areas, making the community involved in forest management and utilization by supporting ideas, values, and local views caused by human interaction with the environment, known as local wisdom (Sumarmi, 2015a). Local wisdom has many benefits in increasing public awareness to protect the environment, such as forests, water sources, and rivers (Mutia et al., 2023; Sumarmi et al., 2019).

Local wisdom in protecting forests is also carried out by the Minangkabau people of West Sumatra Province, known for its proverb of *rimbo larangan* (forbidden forest). Some previous research has investigated the community's local wisdom in managing forests and the environment. They are the local wisdom of the Tengger community (Wiswayana et al., 2024), Osing community (Sumarmi, 2015a), Balinese Aga and Samin indigenous peoples (Sumarmi et al., 2019), the Dayak Tunjung indigenous people, East Kalimantan (Siahaya et al., 2016). Outside Indonesia, local community-based forest management was also studied in various countries, including 24 studies in Asia, 7 studies in South America, 7 studies in North America, 7 studies in Africa, 3 studies in Europe, 2 studies in Australia, and 1 study on Intercontinental (Joa et al., 2018). From various previous studies, many studies have focused on examining local wisdom-based forest management. However, there have not been any studies on forest management based on local wisdom that has integrated into geography learning to develop environmental awareness of high school students.

This study provides a new perspective the role of local wisdom in environmental conservation and character development by highlighting how cultural values can serve as a more contextual and effective environmental education strategy. Additionally, it integrates the green school concept as a systematic approach to enhancing students' environmental awareness, an area that has been rarely explored in conjunction with local wisdom as a primary learning resource. The contributions of this study to scientific knowledge include: 1) Environmental education, this research enriches the literature on culturally based learning strategies by demonstrating that local wisdom can serve as an innovative approach to environmental education, particularly in fostering students' awareness of the balance between humans and nature, 2) Socio-Cultural-based conservation, it emphasizes that community based and local wisdom approaches can enhance the effectiveness of environmental conservation programs, providing valuable references for sustainable development policies, 3) By exploring the relationship between the green school concept and local wisdom, this study contributes to the development of a more holistic, value based environmental education model applicable in various global educational contexts.

The study aimed to determine 1) the local wisdom of the Minangkabau community in managing *rimbo larangan* and 2) the implementation of local wisdom *rimbo larangan* in geography learning. The study compared two indigenous peoples in managing *rimbo larangan* (forbidden forest), namely the community in the village (*Nagari*) Koto Malintang, Agam Regency, and the community in the village (*Nagari*) Alam Pauh Duo, South Solok Regency. Both districts are located in West Sumatra Province. The different systems and values in forest management are then integrated into geography learning to revitalize it to develop students' environmental awareness. The forest management values in those two villages (*Nagari*) were then adjusted into geography learning material in high school. Geography topics that can be integrated with the local wisdom of the forbidden forest are those directly related to forest conservation, particularly geosphere phenomena.

METHODS

The study used a qualitative descriptive method. Data were collected from May 2022 to August 2022 through interviews, observation, documentation, and literature studies from various sources, such as the latest research results (Creswell, 2016). This study aims to explore the management of *Rimbo Larangan* (forbidden forest) and identify the values that can be derived from its conservation practices. Additionally, it seeks to integrate these values into geography education at the high school level as an effort to enhance students' environmental awareness.

Interviews were conducted with informants in the *rimbo larangan* management, including two village officials (*Nagari* officials), three adat leaders (*Panghulu*), one teacher, two students, and two community villagers. The selection of informants was based on their direct relevance to the research object, namely *rimbo*

Larangan and the implementation of geography education in schools. Additionally, informants were chosen for their comprehensive knowledge of *rimbo Larangan* management. In addition, researchers also conducted observations to see the activities of the community around the prohibited forest area. To gather accurate and relevant information aligned with the research theme, it is essential to use structured interview guidelines, as outlined in table 1.

Table 1. Interview Guidelines

Research Aspect	Question Indicators	Informants
The Role of Local Wisdom in Environmental Education	- Community understanding of local wisdom values in environmental conservation. - Implementation of local wisdom in environmental education at schools.	Traditional Leaders, Teachers, Students
Effectiveness of Socio-Cultural-Based Conservation	- The role of the community in environmental conservation based on local wisdom. - What challenges are faced in applying culture-based conservation?	Community Leaders, Environmental Activists, Village Officials
Integration of the Green School Concept with Local Wisdom	- The relationship between the Green School concept and local values. - Benefits of the Green School approach based on local wisdom.	Teachers, Students
Impact of Local Wisdom-Based Education on Students' Environmental Awareness	- Changes in students' attitudes and behaviours toward the environment after receiving local wisdom-based education. - Student participation in environmental conservation activities at school and in the community.	Students, Teachers, Parents

The research studied the management of *rimbo larangan* (forbidden forest) of village communities (*Nagari*) of Koto Malintang, Tanjung Raya District, Agam Regency, and village communities (*Nagari*) Alam Pauh Duo, Pauh Duo Sub-district, South Solok Regency. The two villages have different cultural backgrounds. Koto Malintang Nagari is included in the main region of Pagaruyuang kingdom, which has three cultural areas (Luhak), namely Luhak Tanah Datar, Luhak Agam, and Luhak Limo Puluah Koto. Koto Malintang Nagari is located in the Luhak Agam region, while Nagari Alam Pauh Duo is located in the migration area (*Rantau*) of Luhak Tanah Datar. The regional difference then defines the management of *rimbo larangan*. The findings were analyzed using the triangulation method to examine the *rimbo larangan* values and integrated it into geography learning. For more details, please see figure 1.

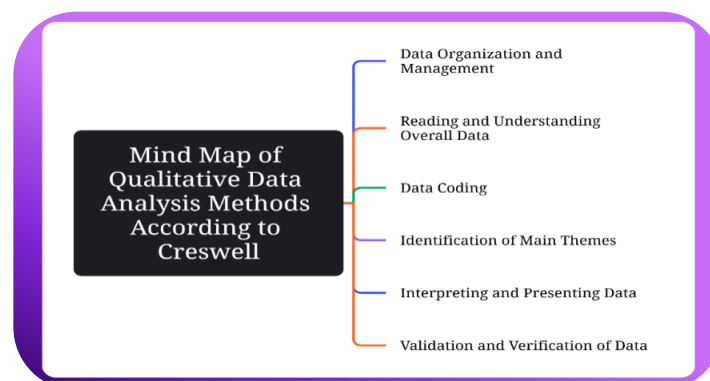


Figure 1. Research Analysis Methode (Creswell, 2016)

Based on the figure 1, it can be seen that this research was conducted by following the stages of qualitative data analysis to produce meaningful findings from the activities carried out by the community around the forbidden forest.

RESULT AND DISCUSSION

Following the *petatah petitih* (proverb), the people of Koto Malintang Nagari also obedient to traditional leaders (*Ninik Mamak*) and tribal leaders (*Panghulu*) to rules the *Malangge* tradition. The *Malangge* tradition is a community tradition during the durian harvest season by taking durian falling from the tree. *Malangge* can be attended for all young and old residents, even for villagers who do not have durian trees and people outside

the Nagari Koto Malintang. The Malangge tradition has rules included: 1) Activities was carried out before dawn until the sun rises, between 04.00-06.00 a.m, 2) No climbing (*Mamanjek*), taking (*Ma'ambiak*), or picking (observing) the durian fruit from the tree, the participant may only wait for the fruit to fall from their trees, 3) For the durian tree owners who want to sell durian outside the Nagari, they are also prohibited from picking fruit directly from the tree to maintain the quality of the well-known durian from Nagari Koto Malintang. The participant has to follow the rules and signed a collective agreement. The following is a table that summarizes the consequences of breaking the rules in the Malangge tradition:

Table 2. Rule of the Malangge Tradition

Consequence Type	Description
Warning	Given by Ninik Mamak or Panghulu as an initial reprimand.
<i>Galang Sabalik</i>	Individuals who pluck or climb trees must build a barrier fence around the tree to prevent further violations.
Indirect Penalties	The community believes that a durian tree that has been climbed or harvested before ripening will struggle to bear fruit (<i>Jarang Babuah</i>) and eventually die.

The table illustrates the consequences imposed within the Malangge tradition for violating environmental and cultural norms. These penalties serve as a social control mechanism to ensure compliance with traditional ecological wisdom. The consequences can be analysed through several theoretical frameworks: Durkheim argued that societies maintain order through a system of norms and sanctions (Mutia et al., 2023). In the Malangge tradition, the warning system by *Ninik Mamak* or *Panghulu* represents a form of informal social sanction aimed at guiding individuals back to acceptable behavior. The *Galang Sabalik* penalty aligns with restorative justice principles, where offenders take corrective action (building a barrier fence) rather than receiving purely punitive consequences. This approach fosters accountability and community-based resolution. The belief that premature harvesting weakens the tree's productivity (*Jarang Babuah*) reflects indigenous ecological knowledge. This aligns with Berkes' concept of Traditional Ecological Knowledge (TEK), where communities develop conservation strategies through generational wisdom (Aswani et al., 2018; Mutia et al., 2023). The Malangge tradition embodies a community-driven environmental governance system, balancing social norms, justice mechanisms, and ecological sustainability. These traditional practices reinforce the importance of cultural heritage in modern conservation efforts and environmental education (Aswani et al., 2018).

The *Malangge* tradition in Koto Malintang Nagari is well preserved because of the following benefits: 1) economy, the durian tree owners can sell the fruit to the market, 2) social, togetherness in following this tradition can encourage intimacy and friendship between the community around, 3) culture, the rules, and penalties given by *Ninik Mamak* and *Panghulu* made the participants obedient to the leader and helped this tradition continue because Koto Malintang was the only Nagari left that held the Malangge tradition of nine others Nagari in Tanjung Raya sub-district, 4) religion, participants believe that the fallen fruit is a present from God, 5) education, this activity teach good character values such as honesty, patience and being responsible as the punishment taken, 6) ecology, the community is prohibited from cutting down durian trees because this tree is capable to prevent landslides. The farming pattern in Koto Malintang Nagari has influenced by Dutch colonialism. The cropping pattern was proven to have many garden plants (*Parak*) that resemble forest vegetation, such as cinnamon, coffee, nutmeg, surian, cloves, cocoa, and durian. The vegetation area in the natural forest is called *Rimbo*. *Rimbo larangan* was formed by agreement between community leaders such as uncle (*Ninik Mamak*), tribal leader (*Panghulu*), academician (*Cadiak Pandai*), and religious leader (*Ulama*). The result of this agreement divided the Nagari into three regions, namely the upstream forest area becomes *rimbo larangan* and the area below is made up as a buffer forest (*rimbo penyangga*), the middle part is used for residents and gardens, while the lower part is used as rice fields, fish ponds and floating nets (*karamba apung*). Similar to the forest classification according to the "Arthashastra" law in Bengal Province, India classifies forests into protected forests, forests for Brahmins, and forests for community use (Ghosh & Ghosal, 2019).

Rimbo larangan is fully managed by the Koto Malintang Nagari officer assisted by *Ninik Mamak* and *Panghulu*, responsible for managing the forest and directing his sister (*Anak Kamanakan*) to take care of the forest. *Ninik Mamak* and *Panghulu* and the Nagari officer made customary law to monitor and protect the forest from being damaged or disturbed. An interview with one of the community members revealed that timber taken from *rimbo larangan* is usually used by the community to make small boats (*Sampan/Biduak*) and houses or huts. Social penalties are prioritized instead of physical penalties (Mutia et al., 2023; Sumarmi et al., 2019). The village (Nagari) of Alam Pauah Duo is located in the Kerinci Seblat National Park area and is upstream of the Batanghari River. Nagari Alam Pauh Duo consisted of several hamlets (Jorong), including Jorong Simancuang, Jorong Karang Hitam Simancuang, Jorong Durian Tigo Capang, Jorong Ampalu, Jorong Sapan,

Jorong Pekonina. The Nagari in the west is bordered by Nagari Pauah Duo Nan Batigo, north of Nagari Pulakek Koto Baru, east and south is bordered by Nagari Lubuak Gadang Selatan. Of the 1,450 ha of the Nagari area, 57% is included in protected forest areas, and the other 43% consists of 2% shrubs, 12% rice fields, 21% dry land, 20% mixed land, and 45% secondary forest (Asmin et al., 2016). The research location in nagari alam pauah duo is shown in the following figure 3.

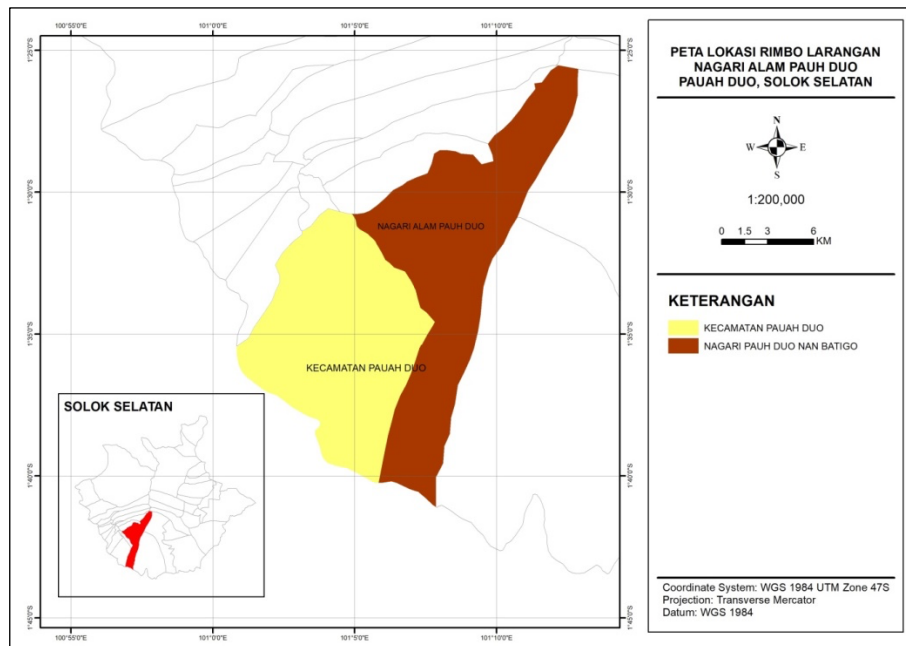


Figure 3. The research location of *rimbo larangan* in Nagari Alam Pauah Duo

Since 35 years ago, the *rimbo larangan* (forbidden forest) area of Simancuang was managed based on customary law around Jorong (*Salingka Jorong*) and was obedient to the Nagari Alam Pauah Duo public rights. However, the Minister of Forestry Regulation No. P.14 / Menhut-II / 2010 stated that since the Nagari government officer managed village forest management (Nagari), the management has to be chosen from village government elements even though the *rimbo larangan* area is in Jorong Simancuang and Jorong Karang Hitam Simancuang (Ministry of Environment and Forestry, 2018). It caused overlap over the management of *rimbo larangan*. Therefore, NFMI (Nagari Forest Management Institution) was established to solve this problem. NFMI is a community organization management consisted of Jorong Simancuang traditional community leaders that have an organizational system consisting of the chairman, secretary, finance, the officer for utilization of non-timber forest products (NTFPs), area supervisors, the officer for utilization of environmental services, and the officer for community relations with a total of 28 people.

The NFMI work system includes 1) mapping the natural non-timber potentials such as ornamental plants, endemic and wild animals, fruits, cave swifts, and others, 2) managing inventory and mapping of potential conditions for environmental services such as nature tourism, educational tourism, water resources, carbon trading, and others, 3) managing inventory of potential mining and non-mining natural resources such as plantations and agriculture. The jobs and responsibilities of NFMI covered the western area of 650 ha and the eastern region of the prohibited forest, which provided restrictions on the use of non-timber forest products to communities outside Jorong Simancuang. Before the existence of NFMI, the prohibited forest area included the indigenous area of Nagari Alam Pauah Duo, which meant that the people of Nagari Alam Pauah Duo had the right to use forest products from the *rimbo larangan* and *rimbo cadangan* (secondary forest). Changes in the management status of the Nagari Alam Pauah Duo custom to NFMI, based in Jorong Simancuang, led to differences of opinion among the people.

The central management by NFMI has caused changes in community perceptions. The community assumed that NFMI is fully responsible for forest management. NFMI rarely involves the community in forest management because it reduces emissions from deforestation and forest degradation (REDD +). Therefore, communities outside Jorong Simancuang are only able to use the forest reserved in the east. Even before the existence of NFMI, *rimbo larangan* (forbidden forest) was a joint right of the Nagari Alam Pauah Duo community. The different opinions caused overlapping in its use and could create conflict in the future. The same thing happened around Poland National Park that has reduced natural resources by local communities, especially in fisheries and agriculture (Zawilińska, 2020). Forest zoning has been done by the Nagari by Nagari Alam Pauah Duo community before the Nagari Forest Management Institution (NFMI) existed to prevent uncontrolled forest

exploitation. Forest zoning can be seen in the following table 3.

Table 3. Zoning Rimbo Larangan in Nagari Alam Pauah Duo

Zone	Location	Function and Utilization
<i>Rimbo Larangan</i>	Hills in the western part of the village	Primary conservation area, strictly protected from exploitation to preserve the forest ecosystem.
<i>Rimbo Cadangan</i>	Eastern part of the village	Managed by LPHK (Forest Conservation Management Institution) as a reserve forest for sustainable resource use.
<i>Parak</i>	Outside the <i>Rimbo Cadangan</i> zone	Agroforestry area utilized by villagers for cultivating productive crops such as rubber, durian, and coffee.

The zoning system of *Rimbo Larangan* in Nagari Alam Pauah Duo reflects a sustainable natural resource management approach deeply rooted in local wisdom. In the context of rural spatial planning theory, this zoning system aligns with several key concepts: This zoning system follows the Common-Pool Resources (CPR) concept, where communities collectively manage natural resources to ensure ecosystem sustainability and communal well-being. *Rimbo Larangan* serves as the primary conservation area, similar to the core zone in community-based resource management. Rural spatial planning often adopts a tiered zoning system, where areas are classified based on ecological and economic functions. The following is an illustration of the spatial layout of Nagari Alam Pauh Duo, see figure 4.

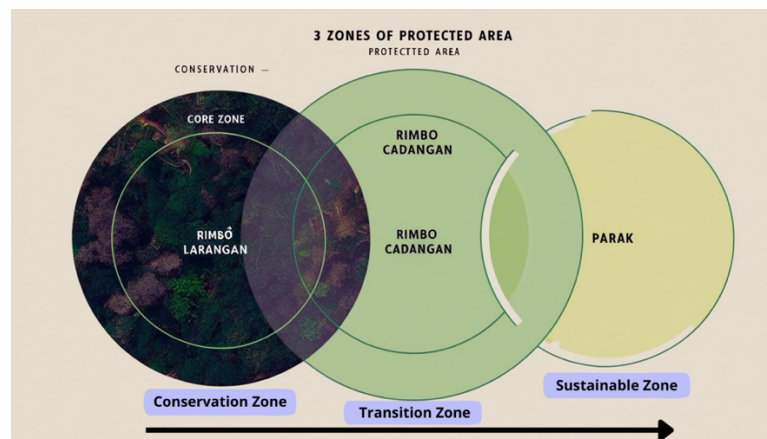


Figure 4. Zone of Protected Area

This classification aligns with the landscape-based management principle, ensuring that each zone has a specific role in maintaining ecological balance while supporting local livelihoods (Damayanti et al., 2018; Siahaya et al., 2016). *Parak* as an agroforestry area represents a model of sustainable land use, where communities can manage land for economic purposes without degrading the primary ecosystem. This approach is crucial in balancing conservation efforts with the sustainable use of natural resources (Mutia et al., 2023; Sumarmi et al., 2019). The zoning system of *Rimbo Larangan* in Nagari Alam Pauah Duo demonstrates how local wisdom-based rural spatial planning can serve as an effective community-driven conservation strategy. This model not only protects forest ecosystems but also allows communities to benefit economically in a sustainable manner (Zawilińska, 2020). The rule applied to *rimbo larangan* is that residents cannot take any natural resources, including timber. Meanwhile, the *rimbo cadangan* are not too strict compared to *rimbo larangan* in terms: 1) the residents are not permitted to open new land located in steep slopes, 2) retribution fee will be collected up to Rp. 50,000 for each timber cut, the money is given to the head of Jorong Simancuang to be used for the public interest, 3) the community other than Jorong Simancuang residents are prohibited from harvesting forest products, and 4) the community who opens new land is obliged to provide definite land boundaries. In addition to Nagari Forest Management Institution (NFMi), there are customary rules for managing *rimbo larangan* (forbidden forest), namely *rimbo cadangan* and *parak*. The Jorong Simancuang community also holds the *Mandarahi Kapalo Banda* tradition to clean up springs and the surrounding environment. Based on interviews with community members (Mr. HS) and a geography teacher at Public Senior High School 5 Solok Selatan stated that the tradition of cutting buffaloes around the spring then the meat is distributed to residents is also carried out the community in Koto Malintang Nagari called *Batamaik Kaji*. The *Mandarahi Kapalo Banda* tradition begins with praying together in the spring and then cutting the buffalo's head to ask God's blessing God blessing to stay away from misfortune (*tolak bala*). These are done to keep safe from all disasters and as a gratitude to God.

Meanwhile, *Batamaik Kaji* tradition in the Koto Malintang Nagari before the 2000s still used the ritual of

cutting buffalo in the upstream water source (*Kapalo Banda*), and it is no longer practiced as it is contrary to Islamic values of the community. Instead, it is substituted by religious lectures, prayers to reject disasters (*Tolak Bala*), and eating together as gratitude for God's blessing (based on interviews with community members (Ms. DR)). The *Batamaik Kaji* tradition in Koto Malintang Nagari is different from the *Mandarahi Kapalo Banda* tradition in Jorong Simancuang. The difference is in the ritual of cutting the buffalo head at the source of the spring. The *Mandarahi Kapalo Banda* tradition in Nagari Alam Pauah Duo and the *Batamaik Kaji* tradition in Nagari Koto Malintang are local wisdom realized because of efforts to protect the forest environment and stay away from the threat of natural disasters. People believe that humans are not alone on earth but are part of nature (Baisheva et al., 2017; Sumarmi et al., 2019). It is consistent with the statement that local communities can develop ecological knowledge and practices in managing their natural resources (Aswani et al., 2018; Sumarmi et al., 2019).

The following are the differences between the two *rimbo larangan*. *Rimbo larangan* (forbidden forest) in Nagari Alam Pauh Duo is a new forest formed based on community leaders' agreement since 1998. However, since 2010, the management of this forest has been managed by Nagari Forest Management Institution (NFMI), limiting the use of forest products by the community due to unilateral claims by some residents and can lead to conflict. The previous study results stated that there was overlapping environmental management between the government, non-government, and the community in Bahawalpur City, Pakistan, caused by differences in knowledge and attitudes towards environmental management (Asmin et al., 2016; Nahib et al., 2018). In contrast, the forest forbidden in Koto Malintang Nagari is a forest that has long been agreed upon with the existence of a non-formal legal environment. Since 2013 it has been proposed to become a formal law *Rimbo larangan* of Nagari Koto Malintang is managed by the Nagari officer collaborating with the adat (*Ninik Mamak* and *Panghulu*) as supervisors and policy directors in the field. A previous study indicated that overlapping environmental management responsibilities among government, NGOs, and communities often result from differences in knowledge and attitudes (Asmin et al., 2016; Nahib et al., 2018). This situation is similar to that in Nagari Alam Pauh Duo, where NFMI's management limits community access, potentially leading to social tensions. In contrast, the approach in Nagari Koto Malintang is more inclusive, integrating both formal institutions and customary authorities in resource governance, making it a potential model for community-based conservation policies.

Implications for Knowledge from this study include: 1) Community-Based Conservation Model, The Nagari Koto Malintang model demonstrates how integrating customary and formal legal systems enhances resource governance and can serve as a blueprint for sustainable conservation policies. 2) Natural Resource Governance Theory, The Nagari Alam Pauh Duo case highlights how exclusive formal management can trigger conflicts, reinforcing Ostrom's (1990) argument on the need for inclusive community participation in resource governance (Hamdan et al., 2016; Joa et al., 2018). 3) Sustainable Environmental Policies, Effective conservation policies should harmonize formal regulations with local wisdom, supporting co-management approaches that enhance ecosystem sustainability and reduce governance conflicts (Vujcic & Tomicevic-Dubljevic, 2018; Wiswayana et al., 2024; Zawilińska, 2020). This research strengthens community-based conservation theories and offers practical insights for sustainable environmental governance.

The value and meaning in the management of *Rimbo larangan*, *Batamaik Kaji* and the tradition, *Mandarahi Kapalo Banda* and *Malangge*, can be integrated into high school geography learning to develop self-character and improve 21st-century skills. One of the rules reflected on *rimbo larangan* (forbidden forest) is the prohibition against opening new land on steep slopes. It was showed that environmental care characteristics as steep areas used as new land could cause landslides (Sumarmi, Bachri, et al., 2020). Next, waiting for the durian to fall during the *Malangge* tradition represents religious character believing that the durian obtained is a gift given by God. Meanwhile, the *Batamaik Kaji* tradition contains caring social characters as it invites all community members to hold a *Makan Basamo* (hold meal together), strengthening the sense of togetherness regardless of social status in society. The following followings are other characters found in local wisdom.

Table 1. National Character Value Reflected on *Rimbo Larangan* (forbidden forest) Local Wisdom

Rimbo Larangan	Malangge tradition	Batamaik Kaji tradition and Mandarahi Kapalo Banda
Responsibility	Religiosity	Environment care
Democracy	Environment care	Friendly
Honesty	Social care	Social care
Environment care	Friendliness	Religiosity
Tolerance	Honesty	

Source: Researcher's analysis, 2022

Character values found in local wisdom are integrated into geography learning in high school reflected from the design of lesson plan enabling the teacher to give material supplements regarding local wisdom of *rimbo larangan* (forbidden forest), *Malangge* tradition, *Batamaik Kaji* tradition, and *Mandarahi Kapalo Banda* tradition was adjusted to the basic competencies in the syllabus. Learning that involves the environment as a learning resource can shape the character and increase student environmental awareness (Fua et al., 2018; Sumarmi et al., 2019).

Integrating values and meanings in geography learning is expected to improve 21st-century skills, including cooperation, communication, solving problems, and critical thinking, including geography and geography literacy (Marni et al., 2019; Suhendro et al., 2020; Utami et al., 2018). Integration of the values and meanings on *rimbo larangan* management and the traditions is grouped according to basic competencies as follows:

Table 2. Integration of Value and Meanings of Local Wisdom in Geography Learning

Tradition/ Local wisdom	Value and meaning	Class	Basic competence	Material
<i>Rimbo Larangan</i> at Nagari Alam Pauah Duo and Nagari Koto Malintang, and <i>Malangge</i> tradition	Knowledge of local communities in managing and maintaining forest ecosystems. Agreement with the community with the rules. There is awareness in maintaining the environment, which is represented in people's attitudes and behavior.	XI	3. Analysing the distribution of flora and fauna in Indonesia and the world based on the ecosystem's characteristics. 4.2 Making a map of the distribution of flora and fauna in Indonesia and the world that is equipped with images of endemic animals and plants.	Flora and Fauna in Indonesia and the World: Identifying the Characteristics of biomes in the world. Investigating factors that influence the distribution of flora and fauna. Conserving flora and fauna in Indonesia and the world. Using Indonesian flora and fauna as natural resources.
		XI	3.3 Analysing the distribution and management of forestry, mining, marine, and tourism resources according to sustainable development principles. 4.3 Making a map of the distribution of forestry, mining, marine and tourism resources in Indonesia.	Indonesian Natural Resource Management: Classifying the resources. Identifying the potential and distribution of forestry natural resources, and tourism in Indonesia. Using of natural resources by applying the principles of sustainable development.
<i>Mandarahi Kapalo Banda</i> and <i>Batamaik Kaji</i>	Gratitude for the sustenance given by God. The existence of knowledge, attitude and behaviour of people in maintaining water resources.	X	3.7. Analysing the dynamics of the hydrosphere and its impact on life 4.7. Presenting hydrosphere dynamics processes using maps, charts, images, tables, graphics, videos, and / or animations	Hydrosphere Dynamics and Their Impacts on Life: Implementing Hydrological cycle. Identifying potential, distribution and utilization of inland waters. Groundwater and Watershed Conservation (DAS).

Source: The Law issued by Indonesian Republic Ministry of Education and Culture Year 2016 No 24, appendix 50

Table 2 explained the values and meanings in the community's local wisdom that can be integrated into geography learning. Following the demands of the Indonesian national curriculum, on the basic competencies of 3.2 and 3.3 of the eleventh graders in high graders high school, students were able to analyze the distribution of flora and forestry resources management. Likewise, with the basic competency 3.7, tenth graders of high school students can analyze the hydrosphere dynamics around it. In this competency, the teacher gives examples and conducts discussions with students about the traditions of *Mandarahi Kapalo Banda* and *Batamaik Kaji* because of the tradition the community has awareness in maintaining water resources. The integration of indigenous knowledge systems, such as *Mandarahi Kapalo Banda* and *Batamaik Kaji* traditions, into geography education aligns with established theoretical frameworks including Contextual Teaching and Learning, ethnopedagogy, and Place-Based Education. This pedagogical approach creates meaningful connections between academic geographical concepts and students' local environmental contexts, particularly in understanding flora distribution, forestry resource management, and hydrosphere dynamics as required by Indonesia's national curriculum. Such integration not only enhances ecological literacy but also promotes sustainable development principles by acknowledging the scientific validity of Traditional Ecological Knowledge while fostering students' environmental responsibility through culturally relevant learning experiences.

Applying the right geography learning model can help achieve learning goal (Aliman, Budijanto, et al., 2019; Sumarmi, 2015b). The application of appropriate geographic learning models to increase student awareness of the environment has been carried out by other researchers, such as the Project-Based Learning Model (Risnani et al., 2017), Problem Based Learning Model (Sumarmi, 2015b), Earth Science in the Community (Earthcomm) Model (Aliman, Budijanto, et al., 2019), Service Learning Model (Sumarmi, 2015b; Sumarmi, Bachri, et al., 2020), Place-Based Education (Ark et al., 2020), and Strategy of Islamic Education (Fua et al., 2018). The learning model and method involved students directly and indirectly towards the surrounding environment's conditions to quickly understand the purpose of learning and develop knowledge, attitudes, and behaviors that care for their environment (Sumarmi et al., 2019). Overall, the implications of this research for science are that geography education that integrates local wisdom not only improves students' scientific understanding but also enriches their social and cultural values, while promoting responsible environmental management.

CONCLUSION

The local wisdom in Nagari Alam Pauah Duo and Nagari Koto Malintang, West Sumatra, has been grown and developed for a long time. The local wisdom of *rimbo larangan* is needed to maintain the forest ecosystem. The local wisdom differed in both Nagari. The local wisdom in Nagari Alam Pauah Duo focused on forest management, while in Nagari Koto Malintang was focused on maintaining water source. Also, the forest in both Nagari was managed by a different system. The forest in Nagari Alam Pauah Duo was managed by Nagari Forest Management Institution (NFMI), but in Nagari Koto Malintang, it was managed by the tribe leader and the community. The values in the local wisdom of *rimbo larangan* are needed to be implemented in geography learning to develop the environmental care character of high school students. As a impact of the research, the local wisdom of *rimbo larangan* can be implemented in the teaching materials, such as textbooks, learning complements, learning media, and booklet so that the information is well documented and can be used as knowledge for students. Local wisdom of *rimbo larangan* and other traditions can maintain public awareness to protect the environment and preserve the local culture. This study can be further explored to evaluate the effectiveness of integrating local knowledge values with geography education to enhance environmental awareness among high school students by utilizing scientific and contextual learning approaches.

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