Adat tapsila representation of the transformation of communication, information, and education of local wisdom *wetu telu* in efforts for environmental conservation in North Lombok, Indonesia.

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Abstract. Climate change and environmental degradation pose global threats, requiring indigenous knowledge and practices like the Tapsila tradition in North Lombok, Indonesia. This research examines the Tapsila customs as a representation of transformation in information communication and education, using Donal Carbaugh's naturalizing culture theory. The ethnographic approach is used, with in-depth interviews and participatory observation of rituals and environmental management practices. The study aims to capture the complexity of meaning in the *Tapsila* customs and their role in conserving the environment. The Tapsila tradition, a traditional wisdom of the Wetu Telu community, offers a comprehensive approach to sustainable environmental management. It encompasses customs governing the relationship between humans, deity, and nature. The method of land clearing involves four ngelokaq, including the *pemangku, jintaka, penghulu*, and *mekel*. The leader conducts a site inspection termed "*menjango*" to ascertain suitable areas for establishing rice fields. The caretaker and village chief determine rituals and allocate water supply. Customary law is enforced, and infractions result in sanctions. This tradition integrates spiritual, socio-cultural, and ecological dimensions, aiming to establish a comprehensive approach to climate change while respecting indigenous knowledge. Communication functions as a conduit between local knowledge and modernization, promoting direct engagement of the younger generation in traditional practices.

1 Introduction

Climate change and environmental degradation constitute significant global challenges, posing threats to human security, resources, and survival. Anthropogenic activities, such as the combustion of fossil fuels and deforestation, contribute to increased greenhouse gas emissions, resulting in global warming and rising sea levels [1], [2]. The exploitation of

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natural resources without consideration for ecological balance engenders substantial environmental damage, including deforestation, deterioration of water quality, and loss of biodiversity [3]. These phenomena precipitate food shortages, water scarcity, and an increased frequency of natural disasters, thereby jeopardizing global security and stability. Furthermore, environmental degradation engenders conflicts over resource claims, displacement, and migration, which are exacerbated by the effects of climate change and environmental degradation.

Developing countries exhibit heightened vulnerability to these impacts, necessitating international cooperation and funding to implement environmentally sustainable practices and respond to climate-related risks [2]. Since the 1980s, the global environmental crisis has precipitated increased scholarly interest in the knowledge, values, and practices of indigenous peoples and local communities to better address regional and global issues. Indigenous and local knowledge is deemed essential for comprehending the drivers and impacts of this crisis and identifying more equitable development pathways. Indigenous peoples and local communities have organized social movements to engage with environmental and development issues, advocating for a more reciprocal conceptualization of the human-nature relationship and asserting their rights. Academic literature on indigenous and local communities' knowledge, values, and practices has progressively incorporated attention to the interdependence between humans and nature within integrated socio-ecological systems, recognition of complementarity and synergy among knowledge systems, and greater visibility of research by and collaboration with indigenous scholars [4].

International alliances and regional cooperation are essential for ensuring peace and stability in affected areas [1]. A multi-disciplinary approach that considers environmental, social, and economic dimensions is imperative for a sustainable future. Indigenous knowledge, rooted in a community's cultural heritage, offers a holistic approach to environmental preservation based on comprehensive understanding of local ecosystems and interactions between humans and nature over centuries [5], [6].. Integrating indigenous knowledge into environmental conservation strategies is crucial as it incorporates the fundamental values of the community's way of life, ensuring the protection and sustainable management of the environment [7], [8].. This approach is often marginalized by contemporary methodologies but offers sustainable solutions rooted in the long-term experience of communities in interacting with nature.

Recognition of the existence of the rights and knowledge of indigenous communities has been acknowledged since the 1950s. The Convention on Indigenous and Tribal Peoples in 1957; the establishment of the Working Group on Indigenous Populations by the United Nations Economic and Social Council in 1982; the Convention on Indigenous and Tribal Peoples, also known as the International Labour Organization (ILO) Convention No. 169, in 1989; the establishment of the UN Permanent Forum on Indigenous Issues in 2000; and the adoption of the UN Declaration on the Rights of Indigenous Peoples in 2007. The process of recognition and inclusion extends to various sociocultural groups under the classification of local communication. BB has recognized and utilized various criteria to define indigenous peoples, including lineage and distinctive cultural characteristics such as language, religion, membership in tribal systems, material culture, cosmology, livelihoods, origins, and residence, among others, although a universally agreed-upon definition for indigenous peoples has yet to be established [9].

Indonesia's rich cultural heritage and diverse indigenous communities possess traditional knowledge in the form of local wisdom that has demonstrated efficacy in maintaining ecosystem equilibrium for centuries. The 1945 Constitution emphasizes the existence of customary law communities, which are recognized and respected insofar as they remain extant and align with societal development and the principles of the unitary state of the Republic of Indonesia. One manifestation of local wisdom that exhibits high relevance in

the context of environmental conservation is the Tapsila tradition, which constitutes a component of the Wetu Telu local wisdom in Lombok. This belief system and associated customs, a syncretic fusion of elements from Islam, Hindu-Buddhism, and animistic and dynamistic beliefs, reflect a worldview that emphasizes balance and harmony between humans and the environment [10], [11]. Through this tradition, the Wetu Telu community implements sustainable natural resource management practices, which have demonstrated efficacy in maintaining the ecological equilibrium in their region [9].

Previous research has demonstrated that local wisdom functions as a guiding principle in social and spiritual life and as an efficacious mechanism for ecological regulation [12]. For instance, through land rotation practices and water resource management, the Wetu Telu community maintains soil fertility and the sustainability of water resources, which are essential for their agriculture and livelihood [13]. This investigation aims to contribute to the understanding of how the Tapsila customs operate as a mechanism for environmental preservation in the Wetu Telu community, identify sustainable natural resource management patterns, support advocacy for more inclusive policies, and provide practical insights for policymakers and environmental conservation practitioners in Indonesia and globally.

2 Research method

This research aims to understand the role of Tapsila customs in environmental preservation within the Wetu Telu community using a qualitative approach, employing ethnographic methods and data collection techniques such as in-depth interviews, participatory observation, and document analysis. The ethnographic method is chosen for its flexibility and ability to capture the complexity and depth of meaning contained within the Tapsila customs. The research will be conducted in the Wetu Telu community in North Lombok, West Nusa Tenggara, Indonesia, which is the center of Tapsila customary practices and the Wetu Telu community [14]. Data collection techniques include in-depth interviews with key informants, such as traditional leaders, religious figures, and community members involved in the implementation of Tapsila customs. Participatory observation involves directly observing the implementation of traditional rituals and practices in natural resource management. Document analysis examines historical records, customary texts, and local literature to understand the historical and contextual background of the Tapsila tradition. To enhance validity and reliability, data triangulation techniques are employed by cross-checking data obtained from various sources (interviews, observations, documents) to ensure the consistency of findings and strengthen the conclusions drawn [15]. Narrative analysis will be used to understand how the Tapsila customs are narrated [16] and understood by community members, capturing the nuances and complexities that may not be visible through conventional thematic analysis [17]. This comprehensive research approach allows researchers to gain a deep understanding of the Tapsila customs and their role in environmental preservation within the Wetu Telu community.

3 Results and discussion

The indigenous peoples and local communities of Wetu Telu have cultivated a wealth of knowledge, values, and practices over generations, offering profound insights into socio-environmental challenges. Their approaches encompass various domains, including territorial stewardship, traditional governance systems, ecosystem preservation and rehabilitation, collaborative knowledge creation for evaluation and surveillance, addressing unsustainable resource exploitation, and active participation in multi-level environmental governance. Carbaugh in [18] emphasizes that communication is a process that occurs within

the physical and social contexts where nature and culture are interconnected as an integral part of life and the identity of wetu telu.

These strategies enable indigenous and local populations to significantly contribute to the maintenance of ecosystem health at local and regional scales, produce knowledge grounded in diverse natural principles, confront societal and environmental pressures, and assume leadership roles in environmental stewardship [19]. The body of traditional and local knowledge, comprising practices, values, and worldviews, is intricately woven into the fabric of community-nature relationships and transmitted across generations. The Tapsila custom is a traditional practice that governs the relationships among humans, between humans and their deity, and between humans and the environment. It encompasses village regulations and agricultural patterns comprising several stages. The jintaka conducts an inspection of suitable areas, known as "menjango," which constitutes a feasibility survey. Subsequently, boundaries are demarcated, and the process of clearing agricultural land commences. Individuals who violate the established rules are designated as pamaliq, and sanctions are imposed commensurate with the severity of the transgression.

The Tapsila tradition reflects the traditional worldview of the Wetu Telu community, emphasizing the significance of equilibrium among humans, nature, and spirituality. This perspective is implemented through various customary practices related to environmental management, such as land rotation systems, water conservation, and forest utilization regulations. The Tapsila tradition exemplifies how the cultural meaning system in Wetu Telu organizes direct interactions with nature, as elucidated by Carbaugh regarding the manner in which cultural communication constructs and interprets the meaning of nature within social spaces. The Tapsila customs upheld by the Wetu Telu community in North Lombok exemplify the complexity and depth of local wisdom that functions not only as a spiritual guide but also as an efficacious and sustainable environmental management strategy. The Wetu Telu community employs a rotational system for agricultural land use, which maintains soil fertility without depleting natural resources. This practice ensures the sustainability of agriculture and safeguards the local ecosystem from degradation caused by environmentally detrimental intensive farming practices. The Tapsila tradition also encompasses various ceremonies and rituals that reinforce the community's relationship with nature. Ceremonies such as Tapsila and Ngayu-ayuin involve invocations and offerings to the guardian spirits of nature, which the Wetu Telu community believes can contribute to environmental sustainability. This ritual serves as a form of symbolic communication that strengthens the relationship between society and nature, aligning with Carbaugh's concept of how cultural and social discourse can engender specific ways of life in certain locales and influence human interactions with the environment [20].

3.1 Land rotation system and natural resource management

The land rotation system known as ngaraman in Tapsila customs is a tangible example of traditional agroecological practices based on the principle of sustainability. In this system, the land used for agriculture is left to rest or not planted for a certain period of time. The goal is to allow the soil to naturally restore its fertility without excessive chemical intervention [21], [22]. This system also reduces pressure on the land, prevents erosion, and supports the sustainability of local agricultural ecosystems. The practice of Ngaraman shows that the Wetu Telu community understands ecological cycles and has mechanisms to maintain a balance between the exploitation and conservation of natural resources. Research [5] shows that traditional ecological knowledge like this is often more effective in the long term compared to intensive modern agricultural practices, which tend to overlook the overall health of ecosystems. By managing the planting and resting cycles of the land, the Tapsila tradition helps maintain soil productivity and prevent environmental degradation that can

occur due to excessive land use. The practice of sustainable agriculture not only contributes to the health of local agricultural ecosystems but also reflects the importance of sustainable environmental communication, as outlined by Carbaugh, where cultural practices play a crucial role in maintaining ecosystem balance and environmental sustainability.

3.2 Water management and collective awareness

The Wetu Telu community implements water resource management through a holistic approach, integrating social, spiritual, and ecological dimensions. Water is regarded as a vital resource that necessitates balance in both quantity and quality, aligning with the principle of palemahan in Hindu Tri Hita Karana. Water management is not solely predicated on practical requirements but also incorporates spiritual values and collective ethics. The Ngayu-ayuin ceremony, which encompasses prayers and offerings to water guardian spirits, exemplifies the belief that maintaining water resources is crucial for preserving the ecosystem's equilibrium [23]. Water management based on mutual agreements reinforces social cohesion among community members, as the distribution and utilization of water are regulated through collective agreements founded on shared responsibility. Communities that maintain a spiritual connection to nature tend to demonstrate greater efficacy in managing resources sustainably.

In addition to the spiritual aspect, water management in Tapsila customs encompasses technical aspects pertaining to the distribution and maintenance of irrigation systems [24]. The traditional irrigation system is predicated on principles of sustainability and efficiency, ensuring equitable water distribution among agriculturalists, mitigating conflicts, and optimizing water utilization without compromising the sustainability of water resources. The determination regarding water distribution is based on both technical considerations and ethical principles governed by customs [25]. In drought conditions, water is allocated primarily for essential needs such as domestic requirements and staple food crop irrigation, while water utilization for less critical purposes may be restricted. This water management system is not only pragmatic but also grounded in principles of justice and social responsibility [26], [27].

3.3 Customary rituals and ecological preservation

The Wetu Telu community's customary rituals, such as tapsila, serve as spiritual manifestations and reinforce the interconnection between humans and nature. These rituals encompass profound symbolism associated with natural cycles and ecosystem equilibrium, instilling values of environmental conservation into daily existence. During each Tapsila ritual, the community assembles to present offerings to ancestors and nature spirits, which are believed to bestow blessings and maintain harmony between humans and the environment. These rituals not only strengthen social [5] cohesion but also transmit traditional ecological knowledge from generation to generation, ensuring the values and practices of environmental preservation remain relevant even amidst rapid social changes. One significant ritual in water management is performed as a form of respect and supplication to water guardian spirits for the abundance and quality of water resources.

This ritual functions as a collective reminder of the importance of conserving and preserving water resources, reinforcing social norms that promote water conservation [28], such as prohibitions against polluting rivers and the obligation to maintain the cleanliness of water sources [29]. The Tapsila tradition is characterized by its intrinsic connection between spiritual and ecological dimensions. Within the Wetu Telu community, nature is perceived as a manifestation of spiritual power that necessitates respect and maintenance of equilibrium. Rituals such as Tapsila exemplify the belief that all elements of nature possess

a spirit or power that must be sustained through appropriate and ethical conduct. From a spiritual ecology perspective, the Tapsila tradition posits that environmental conservation constitutes not only an ecological imperative but also a moral and spiritual obligation.

3.4 Challenges and dynamics of modernization

Although the Tapsila tradition has proven effective in maintaining ecological balance, the challenges posed by modernization and globalization cannot be overlooked. The rapid process of modernization, often accompanied by pressure to adopt modern technologies and production methods, has the potential to erode the traditional values that underpin these customary practices. The process of modernization often brings changes in the way society views nature, shifting from a relationship based on harmony and respect to a more exploitative relationship focused on short-term economic gains [30], [31]. For example, the introduction of modern agricultural technology and the pressure to increase production often lead to the neglect of traditional practices such as ngaraman, which are considered economically inefficient. In addition, development policies that do not take local wisdom into account can also threaten the sustainability of Tapsila traditions. Massive infrastructure projects, such as the construction of highways and tourist areas, are often carried out without consulting local communities, resulting in the destruction of agricultural land [32], environmental degradation, and the loss of important traditional practices [33], [34]. This situation reflects the urgent need to integrate local wisdom into public policy so that values and practices that have proven effective in preserving the environment do not get lost amid rapid changes. The entry of monoculture farming practices driven by global market demands can disrupt traditional land rotation systems [35], [36], [37] and disturb the ecosystem balance that has been maintained by the Wetu Telu indigenous community. Thus, it is important to document, understand, and integrate local wisdom such as the Tapsila customs into broader environmental conservation policies.

3.5 Challenges and opportunities in integrating local wisdom and modern policies

The Tapsila tradition, a traditional wisdom system in Lombok, is encountering significant challenges in the era of modernization and globalization. External pressures, such as development policies that lack sensitivity to local culture and rapid social changes, threaten the sustainability of these practices [8]. These policies often prioritize short-term economic growth without considering long-term environmental impacts and the preservation of local cultures. The integration of local wisdom into climate change policies is crucial; however, challenges persist. The primary challenge lies in ensuring that this local wisdom is acknowledged and respected in the decision-making process, which is frequently dominated by technocratic and economic perspectives. Policies that are not attuned to the local context may overlook or eliminate traditional practices [38] that are essential for ecosystem sustainability [39]. An additional challenge is the alteration in land and water use patterns driven by population growth and economic pressures. The conversion of agricultural land into residential or commercial areas frequently disrupts traditional irrigation systems and results in a decline in water quality. Developing a more comprehensive environmental conservation model through active engagement of local communities in the planning and implementation of policies can effectively integrate indigenous knowledge into climate change mitigation and adaptation strategies [40]. This approach will contribute to environmental preservation and enhance the resilience of local communities against the impacts of climate change.

Despite the profound significance and relevance of the Tapsila tradition in environmental conservation, maintaining and integrating it into contemporary society presents considerable challenges. The processes of modernization and globalization have precipitated substantial shifts in societal perceptions of nature and the environment, resulting in conflicts between sustainable traditional principles [41] and modern practices. Societal transformations, including urbanization and alterations in cultural values, can potentially erode the reverence for indigenous knowledge and traditional practices. Consequently, it is imperative to develop strategies that preserve the Tapsila customs as a cultural heritage while adapting them to maintain relevance in the context of evolving environmental and social challenges.

3.6 Implications and opportunities of integrating local wisdom and modern approaches in addressing climate change

The Tapsila tradition serves as a significant resource for future environmental conservation initiatives, exemplifying indigenous knowledge that has effectively preserved ecosystem equilibrium within the Wetu Telu community across generations. Integrating this traditional wisdom with contemporary scientific methodologies in environmental management frameworks can yield sustainable and adaptable solutions to intricate ecological challenges. A more comprehensive environmental governance model that engages local populations in policymaking and implementation processes will not only safeguard indigenous customs and cultural practices but also enhance the efficacy of conservation efforts. Addressing climate change, a global predicament, necessitates the convergence of diverse approaches, including the synthesis of local expertise, the Tri Hita Karana concept, modern scientific research, and public policy. Indigenous knowledge offers time-tested, sustainable strategies that have maintained ecological balance for centuries. By incorporating the tenets of tapsila customs and wetu telu values into environmental management policies and climate change mitigation strategies, we can formulate approaches that prioritize the enduring harmony between human activities and natural ecosystems.

The Tapsila tradition offers a paradigm for formulating more comprehensive and sustainable policies that acknowledge the pivotal role of spiritual and cultural aspects in environmental stewardship. Within the EARTH framework, the Environment concept emphasizes adherence to linguistic and physical realities, while the Active principle stresses dynamic interaction with the terrestrial sphere and its inhabitants. The obligation to pursue beneficial actions, using nature as the benchmark for virtue, manifests in the enforcement of customary regulations and the imposition of traditional penalties for infractions of land-use protocols. The Time element underscores the necessity of dedicating sufficient periods to comprehend natural processes and act judiciously, reflecting an intricate understanding of ecological cycles and the importance of intermittent resource exploitation. Finally, the Heuristic Exploration principle advocates for the acquisition of knowledge and innovative methodologies to elucidate the human-environment nexus, which can be employed to incorporate indigenous wisdom into broader governmental policies.

4 Conclusion

The Tapsila custom, a traditional wisdom of the Wetu Telu community, offers a holistic approach to sustainable environmental management. Customs govern the relationship between humans and God, as well as the relationship between humans and nature. The land clearing process involves four roles with different responsibilities: the *pemangku, jintaka, penghulu, and mekel*. When starting to clear the rice fields, the jintaka leads the inspection of suitable locations known as "*menjango*," a type of feasibility survey. Once the *ajir-ajir* are

established to determine which areas can and cannot be opened, they are marked (*membangar*). After the boundaries are set, the activity of clearing agricultural land begins. The caretaker and the village chief are responsible for determining the time for the *selamet jlinjing* and *slamet kokoq* rituals, while the mekel is tasked with distributing the water supply fairly and evenly. In its implementation, the customary law that regulates the behavior and conduct of the community is enforced, and if there are violations, customary sanctions are applied. This tradition encompasses spiritual, socio-cultural, and ecological dimensions. Through the integration of local wisdom into modern policies, it is hoped that a comprehensive approach to climate change can be created while also respecting local knowledge. In this regard, communication serves as a bridge between local knowledge and modernization, through symbolic and cultural communication in maintaining relationships with nature. This education can be carried out by promoting the direct involvement of the younger generation in traditional practices that engage with the environment. The process of information and education communication involves a deep understanding of local values, promoting dialogue between traditional and modern knowledge, and developing approaches that respect and utilize local wisdom in public policy and environmental conservation practices. In this way, we can ensure that effective practices in maintaining ecosystem balance and environmental sustainability can be sustained and enhanced amid the ever-evolving global challenges.

5 References

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