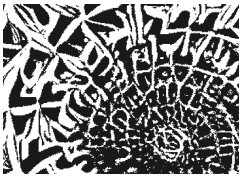

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INDIGENOUS PEOPLE AND THE MEANING OF THE CONSTRUCTION OF DISASTER INFORMATION LITERACY BASED ON LOCAL WISDOM

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Indonesia is one of the countries that faces numerous disasters, with the recent increase largely attributed to the worsening effects of climate change. This study aimed to map out the experiences and meanings of indigenous communities regarding disaster information literacy based on local wisdom in facing the threat of global climate change. It uses an interpretive paradigm with a phenomenological approach. Data collection techniques comprised in-depth interviews, focused group discussions, and participatory observations. The results showed that the indigenous peoples have the capacity to maximise their cultural assets to reduce disaster risks. In disaster crisis situations, these indigenous communities use their local wisdom to strengthen their capacity to deal with various threats such as droughts and floods. Second, cultural aspects determine the preparedness of indigenous peoples to face various risks of climate change. Therefore, they build an understanding that one of the effective ways to mitigate disasters is to use culture-based local wisdom. They also perform traditional rituals as a form of prayer when the crisis intensifies.

Keywords: indigenous people, disaster information literacy, traditional knowledge, local wisdom, climate change adaptation

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INTRODUCTION

Earthquakes, tsunamis, floods, forest fires, hurricanes, droughts, and heat waves are natural events that occur with alarming frequency. The recent rise in the impact of these disasters is largely attributed to the worsening effects of climate change and the increasing complexity of the socio-ecological systems in the interconnected and globalised world (Global Risk Report, 2023; Rosselló et al., 2020).

Indonesia is highly susceptible to natural disaster (Beck et al., 2022) due to its tectonic location, and position at the convergence of three major tectonic plates, including Eurasia, Indo--Australia, and the Pacific. Geologically, this country is located along the Pacific Ring of Fire, known for its active volcanoes (Martire et al., 2023). The geological context gives rise to disaster consisting of earthquakes, tsunamis, and volcanic eruptions. Additionally, hydroclimatic dynamics are affected by various phenomena, particularly El-Nino Southern Oscillation (ENSO) and La Nina (Jayanti et al., 2020), which trigger natural events such as floods, landslides, droughts, and tornadoes (Messakh et al., 2018).

Natural disasters frequently occur in Indonesia, as evidenced by data from the National Disaster Management Agency (BNPB), which records an annual occurrence of up to 3,058 calamities (Adi et al., 2022). The East Nusa Tenggara province, specifically the Timor Tengah Selatan Regency, falls within disaster-prone zones. Statistical records substantiate that this regency experiences recurrent disasters, including floods, earthquakes, and landslides (Statistics of Timor Tengah Selatan Regency, 2023). Furthermore, drought is one of the high vulnerability risks in the Timor Tengah Selatan Regency (Messakh & Punuf, 2020). One of the indigenous communities most threatened and vulnerable to drought disasters is the Oebelo and Noemuke villages in South Central Timor Regency, Indonesia. Based on preliminary research, communities in this region were found to be the most vulnerable to the impacts of climate change. One of these is drought, which leads to crop failure. According to Cajete (2020), indigenous peoples are one of the groups most vulnerable to the negative impacts of global climate change. In terms of disaster mitigation, one of the interesting things about indigenous communities in South Central Timor Regency, East Nusa Tenggara Province, Indonesia, in addition to government interventions, is that they use the potential of local wisdom to become an interesting instrument for disaster mitigation.

Numerous reviews have emphasised the substantial impact of local wisdom on climate change adaptation. However, there remains a gap in practical comprehension concerning

the integration and application of local wisdom in the context of climate change adaptation (Scally & Doberstein, 2022).

A study conducted in Kenya aimed to identify the factors influencing pastoralists' selection of adaptation strategies in response to climate change (Ndiritu, 2021). The results indicate that pastoralists' perceptions of climate change and associated risks play a crucial role in shaping their adaptation decision-making processes. Therefore, there is a need to enhance the understanding of the existing climatic conditions experienced by pastoralists (Ndiritu, 2021).

A subsequent investigation conducted in Bangladesh aimed to assess community participation and identify priority programmes capable of enhancing adaptive capacity in addressing climate change. Therefore, this study focuses on exemplifying beneficial adaptation initiatives designed to improve community capacity to respond to the adverse impacts of climatic conditions. It also shows the intervention potential and the need to prioritise adaptation options and strategies that corroborate with local context (Sultana & Luetz, 2022). Other reviews examined local wisdom with the primary goal of reducing vulnerability to disaster impacts.

Previous investigations showed that indigenous and local community knowledge could play a crucial role in detecting the impacts of climate change on biological and socio-economic systems. However, the collection of information concerning these impacts remains rare (García-del-Amo et al., 2020). The investigation shows the profound influence of disaster information literacy on community preparedness (Marlyono et al., 2016).

DISASTER INFORMATION LITERACY

Disaster literacy includes the ability of individuals, communities, and institutions to understand disaster risks and acquire the skills and knowledge necessary to address these impending threats. Disasters arise from natural events or sequences of these events, and their occurrence can be attributed to three factors, comprising natural, non-natural, and social/human factors (Adi et al., 2022). Previous explanations showed that Indonesia has a high level of disaster vulnerability (Beck et al., 2022). In 2021, Indonesia's World Risk Index (WRI) registered at 41.46 points, evidenced by the frequent encounters of the country with natural events. WRI consists of five facets, *firstly*, disaster exposure, scoring 39.89 points, is categorised as very high. *Secondly*, vulnerability, with a score of 43.10 points, is classified as high. This category considers the number of refugees, asylum seekers, and communities affected by natural disaster in the past five years. *Thirdly*, susceptibility, scoring

33.48 points, falls within the high category. *Fourthly*, the deficiency in coping capacities, scoring 50.67 points, is classified as very high. *Lastly*, the lack of adaptive capacities related to disaster, recording 47.19 points, is categorised as moderate (Beck et al., 2022).

A study conducted in West Java, Indonesia, shows that community disaster preparedness was strongly influenced by the level of disaster information literacy. Disaster information literacy consists of 4 indicators, namely the ability to identify and locate disaster information, the ability to evaluate disaster information, the ability to organise and integrate disaster information, and the ability to effectively use and communicate disaster information according to applicable ethics (Marlyono et al., 2016).

THEORETICAL FRAMEWORK

A wide range of literature suggests that the resilience of indigenous peoples in the face of threats and disasters is closely linked to their local wisdom and culture. Bayrak et al said that cultural practices and cultural perceptions are critical in shaping indigenous households' responses to climate-related disasters (Bayrak et al., 2020). Other studies have concluded that one of the solutions used by indigenous peoples to mitigate disasters is cultural practices based on local wisdom (Eridiana et al., 2018) (Hos et al., 2021). Further research into disaster risk management that integrates cultural heritage or local wisdom is also confirmed to help reduce the vulnerability of indigenous peoples (Rosa et al., 2021) (Wardekker et al., 2023).

The role of cultural factors is not limited to the disaster mitigation phase. Research conducted in Zimbabwe found that one of the factors that can influence the success of post-disaster recovery is community culture (Ngulube et al., 2024). This is corroborated by research by Bayrak et al. that post-disaster recovery in indigenous communities can be more successful if their cultural aspects are taken into account (Bayrak et al., 2021).

The focus of this research is on the efforts of indigenous peoples in disaster mitigation. It is known that communities, including indigenous peoples, are one of the main pillars in all disaster management cycles (Mosurska et al., 2023). Various disaster mitigation efforts in areas inhabited by indigenous peoples often fail because they do not take into account the potential and capacity of indigenous peoples (Ali et al., 2021).

Based on these previous studies, it can be concluded that local wisdom as an integral part of indigenous culture plays an essential role in reducing vulnerability to disaster threats. Therefore, this research focuses on the experiences of indigenous peoples in using their local wisdom to mitigate climate

change-related disasters. The aim of the research is to map indigenous peoples' experiences and meanings of disaster information literacy based on local wisdom in the face of the threat of global climate change.

Indigenous people are generally defined as an ethnic group that inhabits a particular area, has been connected and settled for generations, and uses traditional knowledge as the basis of their daily life (Athayde et al., 2021). One of the salient features of indigenous life is local wisdom. Every indigenous community in the world, including Indonesia, has unique characteristics, which are derived from the customs, traditions, and local wisdom that exist in each region (Putri et al., 2022). However, with time, local wisdom in various indigenous communities faces increasing erosion due to the tide of modernisation.

Several experts stated that local wisdom summarised the worldview of communities in a particular region, showcasing the understanding of the natural environment where they reside. This worldview is deeply rooted and has persisted among communities for decades or even centuries. Considering its longstanding nature, local wisdom becomes deeply ingrained and inseparable from the communities inhabiting the region (Ndiritu, 2021).

The use of local wisdom for disaster mitigation aims to enhance comprehension of disaster by drawing upon the cultural heritage within communities, a legacy of ancestral thinking in dealing with natural calamities. Local wisdom is an invaluable component of disaster management system, including disaster preparedness. The presence of local wisdom enables communities to recognise and interpret natural signs signalling impending disasters such as floods, droughts, and earthquakes. Every region in Indonesia possesses its reservoir of local knowledge for disaster mitigation, and when integrated with a modern mitigation system, holds the potential to significantly diminish the impact of disaster across the country.

This research uses the Communication Crisis Theory developed by Timothy and Seeger, which emphasises that in a crisis or disaster situation, an ongoing process is needed to create shared meaning among and between groups, communities, individuals and institutions in order to prepare for, mitigate, contain and respond to threats and hazards (Sellnow & Seeger, 2013). The mentioned theory is relevant to this research, in which the use of diverse local wisdom by indigenous peoples to reduce threats and vulnerabilities due to global climate change is one form of shared meaning.

This research aims to map out the experiences and meanings of indigenous communities regarding disaster information literacy based on local wisdom as an effort to adapt to climate change. The research questions to be addressed are:

RQ1. What are the natural disaster mitigation efforts?

RQ2. What are the best practices in natural disaster mitigation based on local wisdom?

RQ3. What is the meaning of the construction of disaster information literacy?

RQ4. How important is disaster information literacy based on local wisdom?

METHODOLOGY

Methods

This study was situated within the interpretive paradigm, using a qualitative method. The chosen approach is phenomenology. The main focus of phenomenological research is to examine the meaning of a person's experience of the phenomena they live through (Burns et al., 2022). Phenomenology is defined as a scientific approach that highlights people's subjective experiences of the reality of their lives in the world (Lundh, 2020).

Data collection techniques

The research was conducted in Oebelo and Noemuke villages, where indigenous communities live with the highest risk and vulnerability to drought disasters in South Central Timor Regency, East Nusa Tenggara Province, Indonesia. Data collection was carried out for 4 months from 1 July to 1 November 2023. Data collection methods included semi-structured interviews, focus group discussions and observation. Semi-structured interviews were conducted using a prepared questionnaire. The interview process was conducted by first explaining the purpose of the research and why the person had been selected as an informant. After obtaining consent, the interview was conducted for an average of 50-60 minutes. Participants were also informed that their names would not be included in the research report and manuscript to be published. Focus group discussions were conducted separately with women's groups and youth groups. The purpose of these discussions was to obtain the perspectives of their respective groups on the importance of disaster information literacy based on local wisdom. Meanwhile, daily observations throughout two weeks were also made at disaster-prone sites to see the mitigation efforts undertaken by the community, especially those based on local wisdom.

Participants

The sampling technique, which uses maximum variation sampling as one of the sampling methods, aims to identify the participants. To ensure maximum variation, the participants in this study were selected taking into account gender, occupation,

age, position in the community and level of education. There were 12 informants consisting of residents, community leaders, village disaster response teams, women's groups and youth groups. Participants were selected using purposive sampling techniques with the following criteria: resident since birth, 18 years of age or older, and involved in natural disaster mitigation. The names of the informants were determined in consultation with the respective village leaders.

Demographic characteristics of the participants are presented in Table 1.

TABLE 1
The demographic characteristics of the participants

Code	Gender	Age (years)	Occupation	Position in the community	School level
P 1	Male	57	Farmer	Community leader	Junior High School
P 2	Male	57	Farmer	Community leader	Junior High School
P 3	Female	34	Farmer	Village apparatus	Senior High School
P 4	Male	63	Farmer	Head of village	Senior High School
P 5	Female	37	Farmer	Community member	Senior High School
P 6	Female	25	Farmer	Youth member	Senior High School
P 7	Male	58	Farmer	Community member	Primary School
P 8	Female	37	Farmer	Village Disaster Preparedness Team Member	Senior High School
P 9	Female	44	Farmer	Community member	Primary School
P 10	Male	60	Farmer	Community leader	Junior High School
P 11	Male	62	Employee	Community leader	Bachelor's degree
P 12	Female	41	Employee	Community member	Bachelor's degree

Data analysis

The collected data were subjected to analysis using a thematic analysis method, comprising six stages. The first stage consisted of data familiarisation, accomplished by listening to interview recordings and subsequently transcribing them in a non-verbatim manner. The second stage centred on coding, manifesting as specific abbreviations that served as summaries of the transcript content, elucidating the responses of the respondents. The theoretical coding was done by labelling words or phrases that represented important (and recurring) themes in each participant's responses in order to identify the different themes and the relationships between them. The third stage comprised the identification of themes related to the study topic. The fourth stage centred on reviewing the established themes to focus on the study objectives. In the fifth stage, themes were categorised and a visual mind map was constructed to show the interconnections between various themes. Finally, the sixth stage presented the results in the form of a qualitative narrative report (Xu & Zammit, 2020).

Validity

To ensure the validity of this qualitative study, the researchers applied several strategies suggested by Creswell such as triangulation, member checking, the use of rich and thick descriptions, revealing the biases that the researcher brings to the study, presenting negative or contradictory information that goes against the themes of the qualitative research, spending extended time in the field, and using peer debriefing (Creswell, 2009). To avoid data collection biases, information triangulation was carried out in terms of data sources and method triangulation. The collected data was reviewed with informants, allowing for a reassessment of the accuracy of the gathered information. Additionally, the data was cross-checked with other sources knowledgeable about the analysed issues. Method triangulation was conducted to match information obtained from in-depth interviews with information gathered during observations.

Ethics approval

This study was conducted in accordance with the Declaration of Helsinki. All guidelines and regulations stipulated by the Declaration of Helsinki were complied with. Before each interview, written and verbal informed consent was obtained from all participants after verbally explaining the purpose of the study.

RESULTS AND DISCUSSION

The indigenous community's experience in implementing disaster mitigation based on local wisdom

Indigenous communities in Oebelo and Noemuke, situated in the South Amanuban Sub-district of the Timor Tengah Selatan Regency, were 2 villages annually plagued by drought disasters. The recurring water scarcity adversely affected a multitude of crops, both in gardens and fields, as expressed by P1 in Oebelo Village:

> "Drought occurred nearly every year. Our garden crops consistently withered and perished" (Interview with P1).

P2 in Noemuke Village echoed a similar sentiment:

> "…last year, the rains arrived late, leading to extensive crop failures. Therefore, the Social Services of the Timor Tengah Selatan Regency extended food assistance to 396 households. ...the crop failure resulted from the delayed rainfall, which also caused farmers to sow their seeds late" (interview with P2).

Acknowledging the vulnerability of both villages in the South Amanuban Sub-district to drought threats, the Timor Tengah Selatan Regency government, through the Regional Disaster Management Agency, confirmed these recurring challenges. According to the Head of the Regional Disaster Management Agency, the primary cause were insufficient efforts in moderating the intensity of rainfall.

The most frequently encountered repercussions faced by the residents in Oebelo and Noemuke villages included decreased crop yields and limited water supply. However, these communities initiated commendable practices in responding to climate change.

In response to climatic irregularities that contributed to drought disaster, the indigenous communities of Oebelo and Noemuke took measures to adapt to climate change. The following is the community's experience in implementing disaster mitigation based on local wisdom for adapting to climate change to prevent the threat of drought disasters.

TABLE 2
The experience of disaster mitigation based on local wisdom according to informants

Category	Interview statements of participants
Protecting water sources	P 2 "To prevent drought, we usually cultivated trees capable of retaining water, such as banana, coconut, tamarind, and areca palm trees. Besides being beneficial for drought prevention, these plants were selected because their fruits were marketable."
	P 3 "As the village government, we continually counseled and prompted the communities to plant protective trees including coconut, kapok, banana, or tamarind trees."
Not selling food products	P 4 "We, as representatives of the village government, directly provided guidance, ensuring that the communities were well-prepared for the dry season. We advised them not to sell food products such as corn or rice. This was to secure an adequate food supply during the dry season. Additionally, we sent letters to the church to relay the message through the pulpit. We also disseminated this message during community festivals or celebrations."
	P 5 "The village government counseled us not to sell our harvests to prevent hunger. We only sold products from raising cattle for the school expenses of our children and other financial needs."
Increasing the cultivation of leguminous plants	P 6 "We prepared the land well in advance of the rainy season to mitigate crop failures during the dry season. Additionally, we cultivated an increased quantity of green beans, ensuring that we were not solely reliant on maize. We also engaged in crop rotation with green beans, which resulted in substantial harvests."
	P 7 "We received green bean seedlings from the agriculture department and the village government."

(Continues)

(Continued)

Category	Interview statements of participants
Establish customary rules that prohibit careless felling	P 8 "In our village, traditional elders had enacted a strict prohibition against indiscriminate tree felling. Violators faced fines as penalties of trees for transgressions. These customary laws had proven highly effective, with no instances of indiscriminate tree felling to date. Furthermore, these customary sanctions played a crucial role in safeguarding our water sources from drying up. Even during the dry season, water flow remained undiminished."
	P 9 "the prohibition instated by traditional elders through customary law commanded unwavering obedience from all our community members. The residents also highly respected and obeyed customary laws because of their severe sanctions and consequences."
Performing the *Uis Pah Tuaf* customary ritual	P 10 "...there was a ritual to implore for rain. It was performed near a water source. When it failed to rain, traditional leaders ventureda water source to the spring to pray for rain. Typically, these leaders brought chickens, and sometimes even pigs, offering them as part of the ritual. This ceremony was called *Uis Pah Tuaf*, signifying a prayer ritual for rain from the landowner."
	P 11 "...community leaders, traditional elders, and most residents in Oebelo Village engaged in traditional rituals called *Uis Pah Tuaf* to prevent drought disaster. Typically organized by landowners with support from community leaders and select farmers, the ritual was conducted near a river. Offerings usually consisted of chickens or pigs. The core request transferred through this ritual was for rain, beseeching the ancestors for their intervention."
Creating infiltration holes	P 9 "...We instituted a rainwater harvesting system as a measure to mitigate the impacts of the drought. Therefore, we dug holes in every yard and garden to collect rainwater, which could be used during the dry season. When drought struck, this infiltration water served as an important resource for minimizing its impact."
	P 10 "The government, with a specific emphasis from the Agriculture Office, urged every community member to establish infiltration holes within their premises. These cavities accumulated water during the rainy season, which could be used when needed. During the dry season, these infiltration holes served as reservoirs of important groundwater."

Table 2 is explained in more detail as follows:

Protecting water sources. Water sources such as springs and wells were crucial for the communities of Oebelo and Noemuke. Therefore, the two villages adopted a commendable practice of encircling these water sources with protective trees. During each rainy season, they proactively planted trees selected for water-retention qualities, including banana, coconut, kapok, tamarind, and areca palm trees.

This practice was consistent with the statement made by P2, who explained that safeguarding water sources incorporated planting protective trees.

> "To prevent drought, we usually cultivated trees capable of retaining water, such as banana, coconut, tamarind, and areca palm trees. Besides being beneficial for drought prevention, these plants were selected because their fruits were marketable".

Information provided by P2 found further validation from the Noemuke Village authority (P3), indicating that the village government consistently urged and reminded the communities to plant trees around water sources such as springs and wells. This proactive measure aimed to prevent the drying up of water sources during the dry season.

> "As the village government, we continually counselled and prompted the communities to plant protective trees including coconut, kapok, banana, or tamarind trees" (interview with Noemuke Village Authority, P3).

Not selling food products. Communities were subjected to another crucial measure to adapt to climate change by refraining from selling their harvests. As it was well-known, drought threats often led to limited food supplies, stemming from suboptimal harvests due to prolonged dry periods.

An interview with the Head of Oebelo Village (P4) showed that the government consistently engaged in persuading the communities to exercise prudence in managing their harvests. House visits and formal village meetings served as platforms for the village government to consistently deliver the message to communities about not selling their harvests. Additionally, the government collaborated with the church to disseminate this message to the congregation.

> "We, as representatives of the village government, directly provided guidance, ensuring that the communities were well-prepared for the dry season. We advised them not to sell food products such as corn or rice. This was to secure an adequate food supply during the dry season. Additionally, we sent letters to the church to relay the message through the pulpit. We also disseminated this message during community festivals or celebrations" (interview with the Village Head, P4).

The residents of Oebelo Village attested to adhering to the advice from the village government. "The village government counselled us not to sell our harvests to prevent hunger. We only sold products from raising cattle for the school expenses of our children and other financial needs" (interview with P5).

Increasing the cultivation of leguminous plants. The residents of Oebelo and Noemuke villages embraced the cultivation of leguminous plants as an additional measure to adapt to climate change and confront drought threats. These communities predominantly cultivated maize and rice. However, owing to the annual variability in rainfall, both the government and communities recognised the necessity of expanding the cultivation of leguminous plants. P6, a respected member from Oebelo Village, commented on this method:

> "We prepared the land well in advance of the rainy season to mitigate crop failures during the dry season. Additionally, we cultivated an increased quantity of green beans, ensuring that we were not solely reliant on maize. We also engaged in crop rotation with green beans, which resulted in substantial harvests" (interview with P6).

This sentiment was expressed by P7, a community member from Noemuke, who indicated their strategy for mitigating crop failures through an intensified cultivation of leguminous plants, particularly green beans. "We received green bean seedlings from the agriculture department and the village government" (interview with P7).

Establishing customary rules that prohibit careless felling of trees. In both Oebelo and Noemuke villages, the residents recognised the presence of traditional elders who had established customary and unwritten laws, regarding the prohibition of tree felling. These restrictions were specifically effective in areas along riverbanks, in proximity to water sources, and within forests. These rules were not merely in place, but they were diligently enforced and adhered to by the communities. Violations of these customary laws carried customary fines as sanctions.

Customary laws traced their origins through generations, passing from ancestors to the present day. These revered customs were considered highly beneficial by the communities, acting as a safeguard against prolonged drought and the anticipation of drought threats. P8 from Noemuke Village elaborated on this aspect:

> "In our village, traditional elders had enacted a strict prohibition against indiscriminate tree felling. Violators faced fines as penalties for transgressions. These customary laws had proven highly effective, with no instances of indiscriminate tree felling to date. Furthermore, these customary sanctions played a crucial role in safeguarding our water sources from drying up.

> Even during the dry season, water flow remained undiminished" (interview with P8).

This sentiment was shared by other community members. The results of focused group discussions with women in Noemuke Village indicated the binding nature of these customary sanctions. In fact, the communities expressed a greater inclination to adhere to customary laws than formal laws enforced by local government authorities. "...the prohibition instituted by traditional elders through customary law commanded unwavering obedience from all our community members. The residents also highly respected and obeyed customary laws because of their severe sanctions and consequences" (FGD, statement from P9).

The emergence of customary rules, firmly upheld within these rural communities, served as an effective mechanism to prevent environmentally destructive behaviours. With customary sanctions firmly in place, they became a potent deterrent against wrongdoing. Moreover, customary laws wielded a stronger binding force and invoked greater fear among indigenous community members.

Performing the *Uis Pah Tuaf* customary ritual. In both Oebelo and Noemuke villages, an essential facet of local wisdom was the performance of customary ceremonies aimed at requesting rain and seeking protection from drought threats. P7 expressed a unique tradition in Noemuke Village incorporating a rain-requesting ritual conducted during prolonged dry seasons. This became an excerpt from the interview:

> "...there was a ritual to implore for rain. It was performed near a water source. When it failed to rain, traditional leaders ventured to the spring to pray for rain. Typically, these leaders brought chickens, and sometimes even pigs, offering them as part of the ritual. This ceremony was called *Uis Pah Tuaf*, signifying a prayer ritual for rain from the landowner" (interview, P10).

A parallel ritual was observed in Oebelo Village. The *Uis Pah Tuaf* ceremony served as a form of transcendent communication, uniting community members with their ancestral belief that they held the solutions to ongoing problems. The quote from the interview was shown below:

> "...community leaders, traditional elders, and most residents in Oebelo Village engaged in traditional rituals called *Uis Pah Tuaf* to prevent drought disaster. Typically organised by landowners with support from

> community leaders and select farmers, the ritual was conducted near a river. Offerings usually consisted of chickens or pigs. The core request transferred through this ritual was for rain, beseeching the ancestors for their intervention" (interview, P11).

Although this traditional ritual was rooted in ancestral beliefs, it served to show the communicative customs deeply ingrained within these communities. Through traditional practice of *Uis Pah Tuaf*, the communities established a channel to express the significance of environmental preservation as a means to avoid natural disaster.

Creating infiltration holes. Another commendable practice carried out by the communities to adapt to climate change was the creation of infiltration holes. This comprised the digging of holes in every household yard and garden, to capture and collect rainwater. The intention behind this practice was to preserve groundwater supplies, preventing them from flowing into rivers or the sea.

> "...We instituted a rainwater harvesting system as a measure to mitigate the impacts of the drought. Therefore, we dug holes in every yard and garden to collect rainwater, which could be used during the dry season. When drought struck, this infiltration water served as an important resource for minimising its impact" (interview with P9).

The act of creating these infiltration holes garnered recognition from local government, particularly through the Timor Tengah Selatan Regency Agriculture Office. Field agricultural extension officers consistently engaged in educating and supporting communities in this endeavour.

> "The government, with a specific emphasis from the Agriculture Office, urged every community member to establish infiltration holes within their premises. These cavities accumulated water during the rainy season, which could be used when needed. During the dry season, these infiltration holes served as reservoirs of important groundwater" (interview with P10).

The statements made by these two informants found resonance among other community members who attested to the positive impact of creating infiltration holes in every household. These infiltration holes were considered traditional technology, effectively aiding them in addressing the challenges and water crises that manifested during prolonged dry seasons.

The experience of indigenous peoples in disaster mitigation, when summarised and linked to crisis communication theory, is shown in Figure 1.

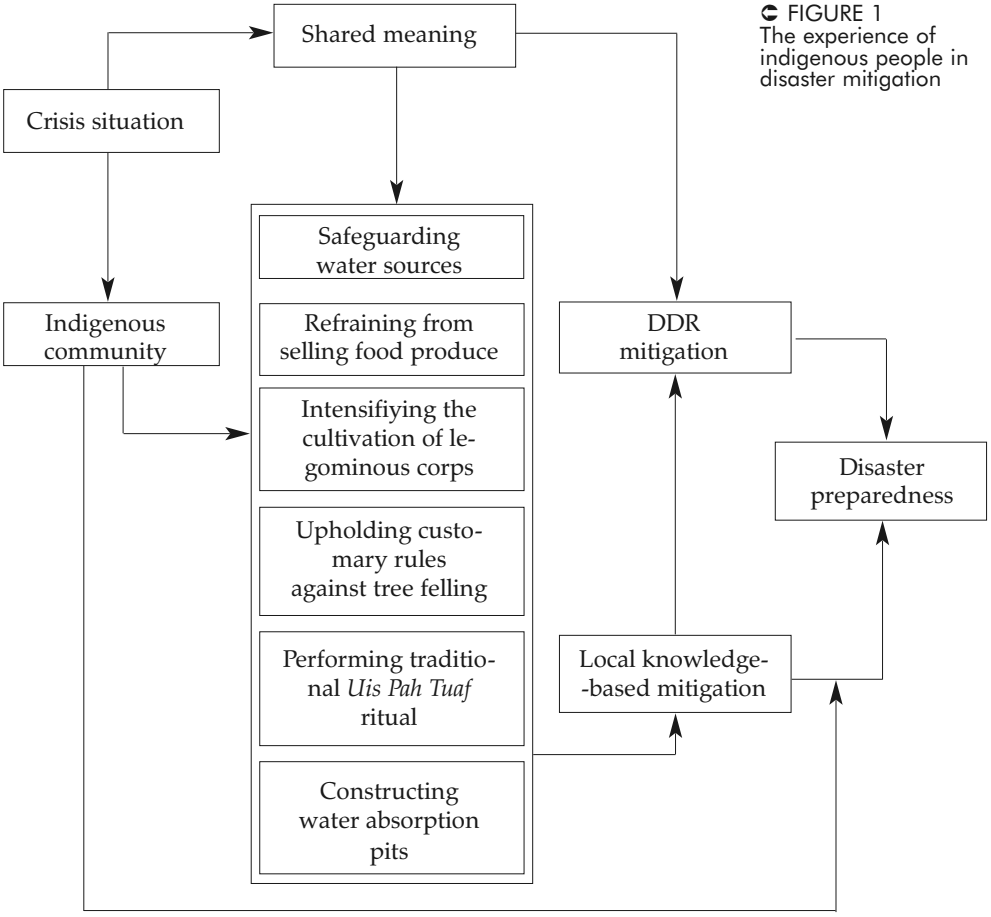

FIGURE 1
The experience of indigenous people in disaster mitigation

The meaning of local wisdom for the indigenous peoples. Similarly, the previous section explained that indigenous peoples rely heavily on their traditional knowledge in everyday life. In terms of efforts to adapt to global climate change, indigenous communities in Oebelo and Noemuke villages rely on their local wisdom to mitigate drought disasters. This traditional knowledge or local wisdom, passed down from generation to generation by their ancestors, is used as a mitigation strategy to reduce the risk of disasters in their area. Below are some of their perspectives or meanings of local wisdom:

1) *Local wisdom related to environmental maintenance is considered useful in reducing the impact of drought*. The indigenous peoples consider that the customs that have been accepted from

generation to generation are related to the preservation of the environment, which is considered as local wisdom and traditional knowledge that is useful in suppressing various threats and potential disasters. Their habits of protecting springs, making absorption holes, and not selling their harvests are considered very useful in reducing the effects of drought (P2, P3, P4, and P7). Traditional knowledge is therefore interpreted as an effort to reduce the threat of drought disasters. According to the recognition of this indigenous community, by instilling these local wisdom values, the community can survive better when a drought occurs.

> "Our ancestors taught us to plant many protective trees around springs. We have been practicing this for generations and it is very helpful for us when the dry season continues" (P4).

2) *The cultural ritual of asking for rain is interpreted as a form of prayer to avert disaster*. Indigenous communities in drought-prone areas also believe that, in addition to mitigating disasters by planting trees, it is necessary to perform special rituals to ask for rain. A prolonged dry season can bring the threat of famine. For this reason, indigenous peoples preserve the customs of their ancestors in the form of ceremonies to ask for prayers and blessings from the owner and ruler of the sky (the god they call *Uis Neno*). This cultural ritual is perceived as a form of ancestral tradition to preserve and protect against the threat of drought (P10 and P11).

3) *Local wisdom is one way to adapt to climate change.* Global climate changes such as rising geothermal temperatures, prolonged droughts, erratic rainy seasons, and the emergence of the threat of tropical cyclone Seroja, as experienced on the island of Timor, pose challenges and threats to indigenous communities. In addition, with limited economic capacity and power support, they are making greater use of the potential of local resources to adapt to climate change. Therefore, the traditional knowledge they possess is considered to be very effective capital in averting the negative impacts of the global climate change that is occurring. P11 shared the following:

> "At present, the natural conditions are not friendly to us. The rainy season is shorter than usual. If we are not good at adapting to the climate that has started to change recently, we will not be able to survive. We start with what we can do. Don't wait for the government to tell you to do something" (P11).

Based on indigenous communities' experiences and meanings of local wisdom as an effort to mitigate drought disasters, Figure 2 presents a model of indigenous community disaster information literacy linked to crisis communication theory.

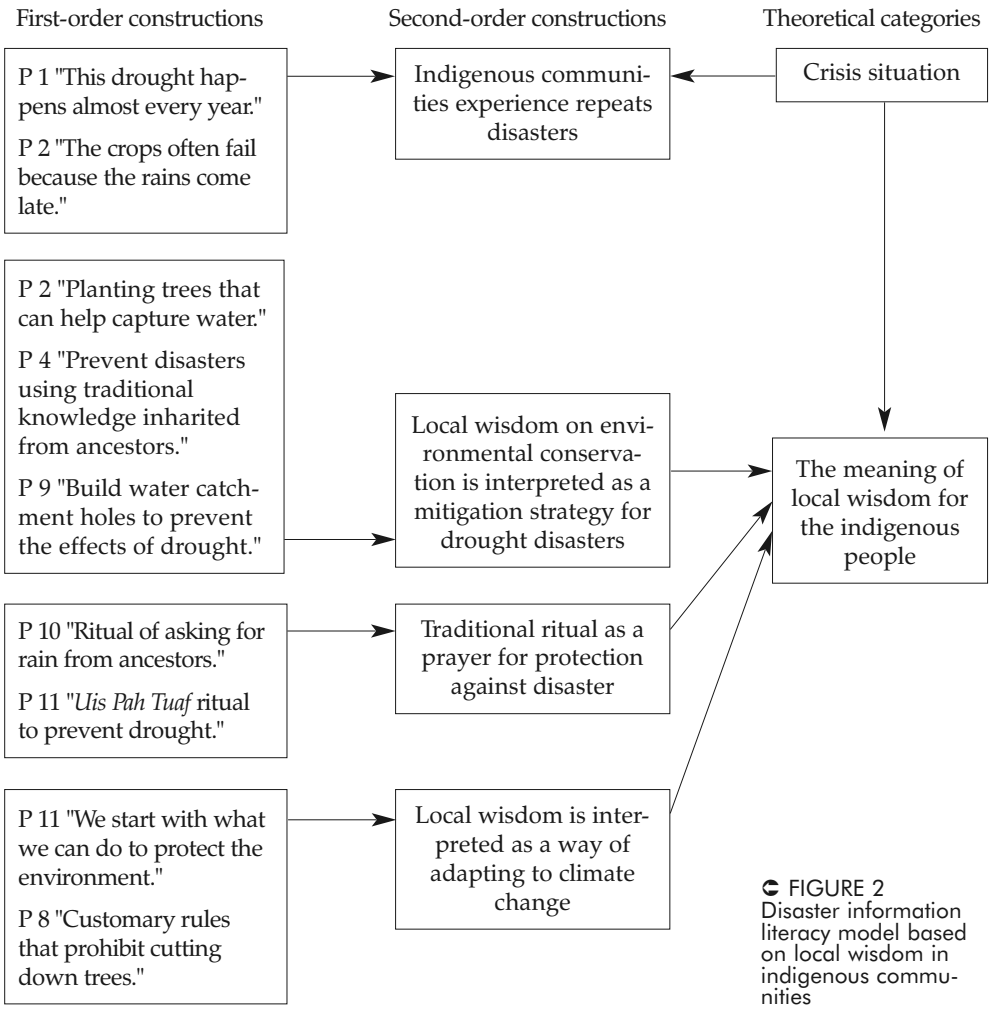

FIGURE 2
Disaster information literacy model based on local wisdom in indigenous communities

DISCUSSION

The results of this study prove that indigenous peoples have the ability to mitigate disasters in order to reduce their vulnerability to the effects of global climate change. By using local wisdom passed down from their ancestors, they have been able to increase their capacity to deal with various impacts of climate change, such as prolonged droughts, floods and landslides. Culturally appropriate best practices are essential to maintaining a sustainable environment. This is in line with the findings of Quinn et al, who argue that culturally responsive practices are essential in disaster-affected indigenous communities (Quinn et al., 2022).

From the perspective of crisis communication theory, it can be argued that indigenous peoples in crisis situations seek

to create shared meaning (Sellnow & Seeger, 2013). Various mitigation efforts, based on local cultural wisdom, are a form of shared meaning constructed by these indigenous peoples. This shared meaning is the basis for their actions to build resilience and preparedness for crisis situations.

Actions based on shared meaning have been passed down through generations. It thus becomes a local wisdom that is guarded and maintained as a common mitigation effort in the community. As the research by Santoso et al. shows, natural disaster preparedness based on local wisdom is very helpful for traditional communities in recognising the signs of natural disasters and then taking action to reduce the risk (Santoso et al., 2019). The use of local wisdom is very appropriate in the Indonesian context, where various indigenous communities live in remote areas and are vulnerable to various disasters.

Based on the previous explanation, Indonesia was susceptible to various disaster potentials in terms of intensities, quantities, types, impacts, and complex challenges. Effective disaster risk reduction necessitated the active participation of all stakeholders, including local communities residing in disaster-prone regions (Supartono et al., 2022). Global climate change had profound implications for communities, particularly farmers and their livelihoods (Singh et al., 2022). The resilience of these farmers in the face of climate change was based on three main dimensions, including their coping capacity (human, physical, financial, natural, and social resources), their ability to self-organise in response to climate change, as well as their knowledge and skills to construct a robust structure (Tohidimoghadam et al., 2023).

Disparities existed in the characteristics of community resilience between urban and rural areas when responding to the threats posed by climate change impacts. Urban community resilience leaned heavily on the strength of infrastructure and the resilience provided by their surroundings. Meanwhile, the resilience of rural communities in addressing climate change threats often relied on their economic capabilities and the degree to which local wisdom was implemented (Su et al., 2022).

In the context of Indonesia, the residents situated in Oebelo and Noemuke villages, the Timor Tengah Selatan Regency, had embraced disaster mitigation literacy to confront threats, particularly the recurrent droughts. These communities leveraged their traditional knowledge as a form of local wisdom in executing climate change adaptation measures.

In these two villages, the efforts made represented proactive measures aimed at avoiding broader impacts on their neighbouring communities and the environment (Zulkafli et al., 2023). Traditional knowledge and local wisdom played a crucial role in detecting and reducing disaster risks resulting

from climate change (García-del-Amo et al., 2020; Scally & Doberstein, 2022; Putri et al., 2022). The best climate change adaptation strategies were those that corroborated with the unique characteristics and local context of the communities, including their local wisdom (Sultana & Luetz, 2022). Moreover, the choices and methods adopted by these two villages to adapt to climate change were heavily influenced by their understanding of the climatic conditions in their region (Ndiritu, 2021).

Efforts centred around leveraging traditional knowledge held by indigenous communities played a crucial role in reducing vulnerability and enhancing preparedness for climate change-related disaster (Sechi et al., 2022). The promotion of adequate environmental literacy elevated environmental awareness, further enhancing these efforts (Yusuf et al., 2022).

The community-based disaster mitigation efforts driven by local wisdom were intricately linked to the proactive engagement of local governments in disaster education. Furthermore, the active and participatory role of communities in development, particularly in preserving the environmental equilibrium, served as a hallmark of effective local governance (Sjuchro & Andung, 2020). The engagement of indigenous communities in disaster mitigation based on their local wisdom not only fostered a sense of ownership but also encouraged active contributions to community-based disaster risk reduction endeavours (Leal Filho et al., 2022).

To achieve a more comprehensive method to disaster mitigation, local government had to integrate traditional knowledge held by these communities with scientifically-based knowledge to formulate the most effective climate change adaptation strategies (Gbedemah, 2023). This was consistent with the idea presented by Zvobgo et al. (2022), emphasising that disaster risk reduction efforts within indigenous communities gained greater effectiveness when they incorporated local wisdom in responding to climatic conditions. A democratic and participatory environmental governance system influenced the active participation of communities in climate change adaptation (Albagli & Iwama, 2022). Moreover, efforts to maintain environmental sustainability cannot only be guaranteed by the enforcement of normative rules. New invasion strategies are needed, such as the involvement of local communities (Kacperczyk & Żulicki, 2022). One of the strategies is to create space for the active participation of young people in local community groups as pioneers in efforts to mitigate and adapt to climate change (Wielk & Standlee, 2021; Cowan et al., 2023). Another strategy for ensuring environmental sustainability is to increase pro-environmental behaviour (Avci, 2023).

The limitations of the research are, firstly, that the research was conducted in only two sample villages with the same types of disaster threats, drought and flooding. The lo-

cation of these two villages is not too remote. If the research were extended to sample villages with different disaster threats, it would be possible to obtain more diverse and unique data. Further research should take into account the diversity of disaster threat types. Secondly, the indigenous people who are the subject of this research are the indigenous people of the periphery. Culturally based local wisdom in peripheral communities tends to be looser and changes considerably with time and technology. Further research should extend this study to traditional indigenous communities with intact cultural wealth.

CONCLUSION

In conclusion, this study yielded the following results: firstly, indigenous peoples have the capacity to maximise their cultural assets, such as traditional knowledge, in order to reduce disaster risks due to the effects of global climate change. In disaster crisis situations, these indigenous communities use their local wisdom to strengthen their capacity to deal with various threats such as droughts and floods. Secondly, cultural aspects determine the preparedness of indigenous peoples to face various risks of climate change. Therefore, they build an understanding that one of the effective ways to mitigate disasters is to use culture-based local wisdom. They also perform traditional rituals as a form of prayer when the crisis intensifies.

This research has academic implications in helping to expand the scientific repertoire in the field of disaster communication, particularly in the use of local wisdom based on the cultural assets of indigenous peoples as a disaster communication tool. Disaster communication studies need to broaden their scope in the area of traditional communication, which has been proven to be an effective tool in building community capacity to be better prepared for disasters.

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Autohtono stanovništvo i značenje stvaranja informacijske pismenosti o katastrofama na temelju lokalne mudrosti

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Indonezija je jedna od zemalja koja se suočava s mnogim katastrofama, a njihov nedavni porast uglavnom se pripisuje pogoršanju učinaka klimatskih promjena. Ova je studija imala za cilj mapirati iskustva i značenja autohtonih zajednica u informacijskoj pismenosti o katastrofama na temelju lokalne mudrosti prilikom suočavanja s prijetnjom globalnih klimatskih promjena. Ovo istraživanje koristi se interpretativnom paradigmom s fenomenološkim pristupom.

Tehnike prikupljanja podataka uključivale su dubinske intervjue, rasprave u fokus-grupama i participativna promatranja. Rezultati su pokazali da autohtoni narodi imaju kapacitet maksimalno iskoristiti svoja kulturna dobra, poput tradicionalnoga znanja, kako bi smanjili rizike od katastrofa zbog učinaka globalnih klimatskih promjena. U kriznim situacijama katastrofa ove se autohtone zajednice koriste svojom lokalnom mudrošću kako bi ojačale svoje kapacitete za suočavanje s raznim prijetnjama, kakve su npr. suše i poplave. Drugo, kulturni aspekti određuju spremnost autohtonih naroda da se suoče s raznim rizicima klimatskih promjena. Stoga razvijaju shvaćanje da je jedan od učinkovitih načina ublažavanja katastrofa upotreba lokalne mudrosti utemeljene u kulturi, a zatim i izvođenje tradicionalnih rituala kao oblika molitve u trenucima pojačavanja krize.

Ključne riječi: autohtoni narodi, informacijska pismenost o katastrofama, tradicionalno znanje, lokalna mudrost, prilagodba klimatskim promjenama