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Article

Local cultural coping strategies to mitigate the impact of Baribis Fault disasters

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Abstract: Baribis Fault disasters caused the loss of human lives. This study investigates the strategies local communities employ in Indonesia to cope with disasters. A qualitative study was conducted on various cultural strategies used to mitigate disasters in relevant areas. These strategies were selected based on the criteria of locally based traditional oral and written knowledge obtained through intensive interviews. The study reveals that technological and earth science solutions are insufficient to resolve disasters resulting from Baribis Fault activity. Still, local culture and knowledge also play a crucial role in disaster mitigation. The study contributes to a deeper understanding of how cultural strategies avoid disasters and highlights the need to transform local knowledge regarding effective cultural strategies for mitigating such disasters. This transformation can have positive psychological implications and enhance community harmony.

Keywords: cultural coping strategies; local communities; disaster mitigation; the Baribis fault; local knowledge

1. Introduction

The management of concerns raised by local communities residing in regions surrounding the Baribis Fault necessitates the application of cultural-based approaches. This fault traverses from the westernmost part of Java Island in Banten Province to Probolinggo Regency of East Java Province in the east, where the affected local communities possess crucial cultural expertise to respond to reoccurring disasters. Notably, Batavia (now Jakarta) experienced a devastating megathrust in 1699 that caused extensive destruction and numerous fatalities (Yulianto et al., 2017). Similarly, the Cianjur area has been affected by multiple earthquakes originating from the same fault, causing harm to both infrastructure and human life. The Baribis Fault poses a continuous threat to the regions it traverses, as confirmed by the monitoring of its activities by Tim Pusat Studi Gempa Nasional (the National Earthquake Studies Center) in 2017. As detected by the seismograph sensors of the BMKG (Badan Meteorologi, Klimatologi, dan Geofisika, or the Meteorology, Climatology, and Geophysical Agency) in 2022, earthquake activity persists along the fault line, although at minor magnitudes of 2.3 to 3.1 Richter Scale. Therefore, local communities have equipped themselves with cultural-based knowledge to respond to the fault's movements, prompted by the BMKG's cautionary message conveyed during its press conference on 26 June 2022.

To date, three predominant themes exist in the literature on the Baribis Fault. The first theme pertains to the seismotectonic order, where Java Island, situated in both active and highly active seismotectonic arcs, is at risk of frequent and disastrous occurrences (Febyani et al., 2020; Haryanto et al., 2017; Kusmita et al., 2020; Widiyantoro et al., 2022). The second theme explores the historical aspect of the fault, with strong and devastating earthquakes recorded in the area known today as Jakarta and (Daryono et al., 2021; Sari and Subakti, 2015). However, local knowledge and culture have yet to be incorporated into disaster managem its surrounding areas—including the southern part of Sumatra Island—since the eighteenth and nineteenth centuries, indicating the Baribis Fault as the epicentre of these seismic events. According to existing records, the seismic event that transpired on 22 January 1780 stands as the most significant earthquake in Java's history, measuring an 8.5 magnitude on the Richter scale (Damanik et al., 2020; Harjono, 2017; Nugraha et al., 2014; Ridwan et al., 2021; Wichmann, 1918). Finally, studies focused on earthquake geology suggest that the northern part of West Java experiences movement caused by the active Baribis Fault, which is expected to continue towards Jakarta, with varying strike lineaments ranging from 107°–127° ent strategies relating to the Baribis Fault. This constitutes a significant knowledge gap, given that Indonesia has cultural practices and traditions passed down from their ancestors.

This study aims to complement previous research efforts by shedding light on disaster risk reduction strategies rooted in local culture. Specifically, this paper aims to uncover communities' well-maintained coping mechanisms and problem-solving techniques in response to disasters related to the Baribis Fault. To achieve this aim, the study not only examines the rituals of tolak bala (warding off misfortune), a cultural early warning system, but also analyses the local knowledge possessed by the communities comprising natural signs and cultural narrative guidelines that inform practical teachings and practices. Through mapping and analysing these local cultural strategies, the study aims to provide insights into the formulation of steps that must be taken to deal with future disasters.

The central argument of this paper is that local communities possess culturally-based solutions that can aid in addressing disasters and mitigating disaster risks associated with the Baribis Fault. These communities engage in continuous local cultural practices, which involve adhering to rules passed down by their ancestors and utilising knowledge from natural signs. While these ancestral rules often take the form of myths and legends, they serve as guiding principles for community members. Additionally, the community utilises their understanding of natural signs to detect early warning signals before natural disasters occur. Consequently, disaster risk reduction strategies have become an integral part of their daily lives, ingrained in their subconscious to safeguard themselves and their families from the persistent threat of disasters.

2. Literature review

2.1. Coping strategy

In accordance with Budimir et al. (2021), a coping strategy represents a cognitive effort and individual behaviour that aims to address problems that may affect the

community's rights and limits in their environment. Coping behaviour is characterised by dynamic patterns, encompassing both conscious thoughts and behavioural patterns, that are utilised to overcome stressful and challenging situations (Amat et al., 2016). Consequently, a coping strategy encompasses specific patterns of behaviour and thought that individuals employ to manage demands and pressures that may stem from individual and group relationships within the environment (Galiana et al., 2020), aiming to avoid the onset of stress and adverse effects on individuals and society at large. Individuals are motivated to prevent negative impacts on themselves and their environment, taking up coping strategies to tackle such challenges (Freire et al., 2016; Wahyuningtyas et al., 2019).

The utilisation of coping strategies is influenced by various factors, such as cultural background, experience in problem-solving, environmental factors, and self-concept, which significantly affect an individual's approach in handling their problems (Freire et al., 2020; Ogueji et al., 2022). In problem-solving, coping strategies can be categorised based on the type, namely problem-focused coping by changing the situation and emotion-focused coping as a step to recover feelings and emotions (Babore et al., 2020). Concerning natural disasters, local communities can employ coping strategies to assess their capacity. These communities possess knowledge acquired from their ancestors, which is then realised and passed down to future generations to anticipate disasters and minimise casualties, both structurally and non-structurally (Demenois et al., 2020; Moris, 2021). Local community coping strategies are also categorised based on the implementation time, including before, during, and after the disaster (Ikeda and Nagasaka, 2011). In other words, the concept of coping strategies is closely related to the efforts of the community as a form of emergency management to survive and face the pressures and threats.

2.2. Local community

In academic discourse, the term "local community" or "indigenous society" refers to a distinct group of people who share a common cultural identity and are direct descendants of the earliest inhabitants of a particular geographic region, defined by specific boundaries, language, and cultural traditions. These communities are not composed of immigrants from other areas but rather represent the original inhabitants of the region (Dewi et al., 2020). The term "indigenous society" is often used to describe a group of people who maintain their traditional culture or other aspects of the original culture of the earliest inhabitants of their homeland (Carr, 2020; Ford et al., 2020). These communities are typically characterised by a territorial or geological unit with its own unique resources, and their members are able to act with autonomous legal authority (Crivelli et al., 2016). The indigenous society is typically comprised of native descendants who share familial ties with one another (Danu et al., 2021). These communities adhere to principles and values passed down from their ancestors to preserve the authenticity of their cultural traditions and customs for future generations (Dressler, 2016).

Indigenous society is recognised as a community that easily integrates with nature and is crucial in protecting and preserving biodiversity and ecosystem health (Kesler and Walker, 2015; Ruiz-Mallén et al., 2013). They also seek recognition for their identity, way of life, and rights to their ancestral lands, territories, and natural

resources passed down for generations (Achmad et al., 2019). Therefore, the lives of indigenous societies revolve around various natural resources or customary lands (Zubaidah et al., 2017). Nature significantly contributes to physical, economic, social, cultural, spiritual, psychological, and emotional well-being (Carothers et al., 2021; González et al., 2022; Wylie and McConkey, 2019). Moreover, indigenous society is equipped with local wisdom passed down from generation to generation, such as dealing with disasters. For instance, the local knowledge of the Simeulu community in Aceh, known as smong, is inherited through songs that parents sing to their children. Smong contains information about natural phenomena that can cause tsunamis and mitigation efforts such as running to high places when a strong earthquake occurs, in addition to containing counsel to heed and follow the advice provided (Gadeng et al., 2018; Suciani et al., 2018).

2.3. Disaster mitigation

In the field of disaster management, disasters are defined as a sequence of events that jeopardise and disrupt the lives of communities, instigated by either natural or anthropogenic factors, resulting in fatalities, damage to infrastructure, environmental decay, financial loss, and psychological trauma (Kitagawa, 2021). Conversely, mitigation involves a chain of measures intended to minimise the hazards associated with an incident, including physical development, raising awareness, and developing the capacity to cope with the disaster (Fawzy et al., 2020). Mitigation must be implemented for all types of disasters, whether they are natural or man-made (Bruinen de Bruin et al., 2020). To plan and strategise mitigation effectively, a comprehensive understanding of risk assessment is imperative (Haemmerli and Stauffacher, 2020; Mwesiumo et al., 2021). Risk assessment is performed to determine the extent of danger, vulnerability, and capacity of a particular region to deal with a disaster and is influenced by physical and contextual factors (Ivanova et al., 2020; Rojas-Downing et al., 2017). Hence, the disaster mitigation concept acts as a pattern to reduce the colossal losses caused by disasters, which often transpire undetected (Wahyuningtyas et al., 2019).

Disaster mitigation aims to achieve many goals, including but not limited to reducing the occurrence of fatalities and injuries that result in death, providing a basis for development planning, and improving community awareness of how to manage and mitigate the impact of disaster risks (Juhadi et al., 2021; Suharini et al., 2020). To accomplish this, disaster mitigation strategies involve the creation of environmental and social policies and regulations that educate the public about the harmful effects that may result from disasters (Ichsan et al., 2021; Suharini and Baharsyah, 2020). Appropriate measures should be taken in accordance with a phased process based on time cycles and with professional guidance to identify necessary steps to be taken before, during, and after the occurrence of natural disasters (Suarmika et al., 2022). The initial step in disaster mitigation is conducting a risk assessment to determine a given area's potential hazards, vulnerabilities, and capacities to withstand disasters, taking into account physical and contextual factors (Ali and George, 2022; Rozaki et al., 2021). Consequently, mitigating the risk of disasters requires comprehensive, coordinated, and integrated planning to develop effective systems.

2.4. Baribis fault

Active faults, which number up to 295 on Earth, are those that have moved within the past 10,000 years. These faults are responsible for almost all damaging earthquakes (Keller and Pinter, 1996). Among these active faults is the Baribis Fault, a land fault running east to west across Java. The fault line, which spans over 100 km, traverses through the regions of Tangerang in Banten Province, southern Jakarta, as well as Bekasi, Karawang, and Purwakarta in West Java Province, among others, as indicated by the recent research by Widiyantoro et al. (2022). The Indonesian Meteorology, Climatology, and Geophysical Agency (BMKG) confirm that the Baribis Fault moves up to 5 mm annually. Due to the shallow hypocenter and proximity to the surface, even a small magnitude of 4.5 earthquakes caused by activity along the fault can result in damage (Koulali et al., 2016; Widyantoro et al., 2022).

The Baribis Fault, which adheres to the pattern of the island, represents a significant fault zone in western Java. It is characterised by various segmented paths, including the Cipanas River, Ciremai, and Jakarta on its southern part and Bekasi-Purwakarta on the eastern side. This active fault zone spans approximately 25 km south of Jakarta. It is an extension of the Baribis Fault, traversing Purwakarta and Cibatu (Bekasi) in West Java Province as well as Tangerang and Rangkasbitung in Banten Province. Notably, by drawing a straight line from Cibatu to Tangerang, the fault cuts across several Jakarta subdistricts, including Cipayung, Ciracas, Pasar Rebo, and Jagakarsa (Adhitama, 2020; Koulali, 2016). The activity of the Baribis Fault has had catastrophic consequences, causing destructive earthquakes that have resulted in widespread disruptions of life. The Baribis Fault System in Majalengka, one of the suspected active faults, caused earthquakes in West Java, as evidenced by the 1990 and 2001 earthquakes in the Talaga area. The fault is also present in Cimandiri and Lembang in West Java, as well as in the Citanduy River that flows from West Java to Central Java. Furthermore, Central Java hosts seven faults, namely Baribis, Kendheng, Ajibarang, Merapi Merbabu, Muria, Pati/Lasem, Ungaran 1, and Ungaran 2. The active geological structure of Java is primarily dominated by strike-slip and thrust faults, with minor normal faults. The thrust fault structure (the Kendeng and Semarang fault zones) is prevalent in the central and eastern parts of Java, while the normal fault system (the Pasuruan, Probolinggo, and Baluran faults) represents the dominant structure in eastern Java (Ilahi et al., 2020; Febyani et al., 2020).

3. Methodology

The utilisation of local culture to mitigate natural disasters is a crucial topic that warrants thorough examination and analysis as a valuable lesson learned. This approach encompasses a diverse range of local knowledge that is put into practice by the Indonesian local community, specifically the Sundanese ethnic group residing in the western region of Java Island, which the Baribis Fault traverses. The selection of the Sundanese ethnic group for this study is based on two key factors. Firstly, the Sundanese population predominantly resides in the western part of Java Island, near the Baribis Fault. Secondly, the Sundanese community has a wealth of local knowledge that is employed to rescue themselves, their families, and the environment during disasters, particularly those that are linked to the Baribis Fault. The Baribis

Fault is an unpredictable threat to human life and the environment, underscoring the importance of individual preparedness and awareness (Daryono, 2017).

This study utilised a qualitative methodology to examine the cultural coping strategies employed by local communities residing in areas traversed by the Baribis Fault to mitigate disasters associated with its activity. To achieve this, the study adopted philological and anthropological techniques to scrutinise manuscripts and oral traditions in the targeted research area. The manuscripts uncovered are kept by both the communities and formal institutions within the country, such as the National Library, which maintains a significant collection of manuscripts from the relevant areas. The analysis of oral tradition adopted an anthropological approach, which carefully considered the tradition within the appropriate text and context. Additionally, the research drew on historical records of natural disasters and their mitigation measures in regions intersected by the Baribis Fault.

The current study utilised a qualitative method, consisting of a literature review and fieldwork, to collect data. The literature review centred on analysing manuscripts and historical documents to identify relevant, locally based knowledge, while the fieldwork focused on collecting knowledge through oral traditions from informants. The oral traditions included rituals, myths and legends, and folk stories that continue to persist within the community. Additionally, the fieldwork included using observational tools to gather authentic knowledge of the area, natural conditions, and physical evidence of past relics related to disasters. Furthermore, the fieldwork aimed to locate and identify manuscripts that local community members individually stored. Information gathering also included collecting the experiences of manuscript owners in coping with and mitigating disasters.

The data collection process for this study targeted primary sources, including manuscripts, oral traditions, and field documentation. The manuscript data was traced through institutional and individual manuscript owners, while the oral traditions were traced through cultural masters, customary elders, and other community members who witnessed the historical occurrence of disasters. The oral tradition data was obtained through in-depth interviews with informants recruited through the gatekeeper and snowball methods. Field documentation was obtained through direct observation during data collection. **Table 1** explains the themes and substances obtained during the fieldwork.

Table 1. Research themes and substances.

Method	Themes	Substances	Sources
Observation	Natural events and community responses	Documentation of Baribis Fault-related natural events; manuscripts; ritual practices	Banten Province: Rangkasbitung (Lebak Regency) and Serang (Serang Reg.) West Java Prov.: Purwakarta (Purwakarta Reg.), Subang (Subang Reg.), Sumedang (Sumedang Reg.), Majalengka (Majalengka Reg.), and Indramayu (Indramayu Reg.)
Interview	Community memory and pratices	Information on oral traditions: rituals, legends, myths and folklore	Community figures, cultural masters, religious figures
Text	Ancestral teachings	Historical stories of disasters, their predictions, and solutions in dealing with disasters	Disaster-related manuscripts

In this study, the data was analysed using the three-stage approach introduced by Huberman and Miles (2010), including data reduction, display, and verification. The process of systematic data reduction involved organising the data based on themes, actors' involvement, and actors' motivation. Two methods were employed for data display, which included displaying interview quotes and presenting tables relevant to the research themes. The content analysis technique was utilised to interpret the textual data gathered from the manuscripts.

4. Results

The Baribis Fault, traversing vulnerable areas, has prompted communities to devise local solutions for disaster-related challenges. The indigenous culture has a range of well-maintained techniques for disaster mitigation that train individuals to endure and recover during and after a calamity. Such cultural insights have generated three solution models. Firstly, a cultural early warning system stemming from pre-disaster cultural solutions. Secondly, the locals' ability to interpret and comprehend natural indications of impending disasters. Thirdly, the capacity to comprehend the cultural narrative framework inculcated by ancestors and elders, coupled with the ability to adapt to the environment. These three components are crucial in preserving the mental and physical well-being of the community in the face of adversity.

4.1. Tolak bala rituals as a cultural early warning system

The tolak bala (warding off misfortune) rituals are employed by local communities to prevent disasters. These rituals function as cultural-based early warning systems that are believed to be capable of preventing disasters. Such rituals exhibit at least three distinct dimensions that reflect the uniqueness and diversity of particular ethnic groups, depending on the local environment and culture. First, the use of indigenous language in the terminology of the tolak bala ritual. Second, there is a variation in the timing of the ritual from one place to another. Third, the diverse procedures for the ritual are adapted to local conditions. Despite these variations, the ultimate goal of the ritual is generally the same—to secure safety and avoid disasters. Among the ethnic groups that perform tolak bala rituals to prevent disasters are the Sundanese people who reside along the Baribis Fault. As indicated in **Table 2**, the traditions of the tolak bala ritual that have evolved among the Sundanese population inhabiting the Baribis Fault zone differ significantly depending on the location and local culture.

Table 2 provides an overview of the three tendencies exhibited in the tolak bala rituals of the Sundanese ethnic group. Firstly, the Sundanese emphasise the significance of environmental conservation as a preventive measure against disasters, reflected in their practice of "meruwat bumi," meaning to preserve the earth. This tradition aims to ensure a stable environment and promote safety for all living beings and their surroundings. Secondly, the Sundanese maintain a collective memory of past disasters to facilitate prompt action and prevent future calamities. For instance, the Sundanese in Banten Province conducts a commemorative ritual to remind their people of the Krakatoa disaster. This enables them to prepare for future disasters and respond promptly when they occur. Thirdly, the Sundanese prepare themselves by

ensuring adequate food supplies and mental resilience to cope with disasters. They conduct regular rituals aimed at securing food and scheduled preparation for potential disasters. These three ritual tendencies underscore the importance of vigilance and preparedness, given the region's vulnerability to disasters.

Table 2. Tolak bala rituals performed by Sundanese ethnic groups in different locations.

Area	Name of ritual	Practice	Objective	Informant
Subang (West Java Prov.)	Ngaruwat Bumi (cleansing/caring for the earth)	Praying to be kept away from calamities and disasters	To ward off misfortune as well as an expression of respect for the ancestors	SS (40 years old)
	Mapag Sri	Praying for tranquility and safety	To avoid famine	RO (50 y.o.)
	Hajat Wawar	The ritual of rejecting bad luck for all types of disasters that occur in the village	To guard the area from disasters with prayers and sounds	RO (50 y.o.)
Sumedang (West Java Prov.)	Tutunggulan	Producing noise by striking the mortar and pestle continuously in the event of an earthquake	To mitigate the impact of earthquakes, informing individuals inside buildings to evacuate and assemble in an open area	CS (51 y.o.)
	Kohkol/Kentungan	Striking the kohkol (wooden slit drum) continuously in the event of an earthquake	To convey information that an earthquake has occurred	CS (51 y.o.)
Majalengka (West Java Prov.)	Aur Bumi	A form of prayer ritual performed after harvest in the hope of maintaining safety	To ward off future misfortunes and disasters	AW (79 y.o.) NN (40 y.o.)
Indramayu (West Java Prov.)	Lindu/Palilindon	Reciting salawat (praises to the Prophet) and dhikr (chants of remembrance) to attain tawassul or mediation to be closer to God	The people of Indramayu hold the belief that the earth rests atop the apex of a bovine horn; any displacement of the cow results in a corresponding shift of the earth and consequent seismic activity. Consequently, it is imperative to maintain a reverential relationship with God and practice virtuous deeds as a preventative measure against calamitous events and to ensure well-being.	N (37 y.o.) S (57 y.o.)
	Gerhana (eclipse)	• Ruwatan (cleansing) ritual with offerings, wayang performance • Making loud noises by striking the tutunggulan or other objects • Pregnant women are advised to hide under the bed.	• To avoid disaster or disturbance caused by Batara Kala (believed to be responsible for the occurrence of a solar or lunar eclipse) • To scare Batara Kala into releasing the sun or moon in his mouth • To protect pregnant women from the malevolence of Batara Kala	N (37 y.o) S (57 y.o.)
	Baritan	Praying together and reading the Yusup manuscript; making tumpeng (cone-shaped rice dish)	To anticipate or be able to cope with future disasters	S (57 y.o.) W (60 y.o.)
	Babad Dermayu	Reading Babad Dermayu (the Dermayu manuscript) on certain days	To pray for protection against disasters, such as flood	N (37 y.o.)

Table 2. (*Continued*).

Area	Name of ritual	Practice	Objective	Informant
Purwakarta (West Java Prov.)	Domyak	A ritual to ask for rain	To prevent draught	BR (55 y.o.)
	Leuit	Sharing food with all members of the community on Wednesday in the month of Maulid (the birth of the Prophet) in the Islamic calendar	To prevent famine	BR (55 y.o.)
Banten Province	Rabu Wakasan	Conducting tahlilan (praising the oneness of God) and dhikr on the last Wednesday of the month of Safar in the Islamic calendar	To prevent various disasters	AA (51 y.o.)
	Kalembak	A ceremony commemorating the victims of Mount Krakatoa's eruption	To send prayers for the victims of Mount Krakatoa's eruption and the resulting tsunami	AA (51 y.o.)
	Nukuh Lembur	Conducted once every three or seven years by the Badui people	To pray for the earth's sustainability	AA (51 y.o.)

4.2. Signs of nature as local knowledge

One form of local wisdom found among every ethnic group in Indonesia, including the Sundanese, is the ability to read sudden natural signs, which can save lives in a disaster. This knowledge is highly localised and dependent on unique environmental conditions. Therefore, it is crucial to act promptly upon receiving such signs to prevent harm, resulting in a communal spirit among the Sundanese people, characterised by mutual assistance, empathy, and concern, to mitigate the impact of natural disasters. **Table 3** explains the local communities' ability to understand and interpret natural signs, enabling them to adopt appropriate attitudes when faced with a disaster.

Table 3. Local communities' understanding of signs of nature.

Area	Sign of nature	Local meaning	Attitude/Action
Lebak and Pendeglang (Banten Prov.)	Red spots in the sky	A sign of an impending disaster	Referring to segments of an oral tradition related to signs of nature.
Serang (Banten Prov.)	The descent of animals from a mountain.	A sign of an impending mountain eruption.	Referring to segments of an oral tradition related to signs of nature.
	The occurrence of a lunar or solar eclipse in the month of Safar in the Islamic calendar.	A sign of impending big waves and tornadoes.	Referring to segments of the Gunungsari manuscript related to signs of nature.
Majalengka (West Java Prov.)	Kuyeup bedas (white crab)	A symbol of the Baribis Fault; their movements signal the shaking of the earth.	
Sumedang (West Java Prov.)	The occurrence of a lunar or solar eclipse in the month of Kapit (Dzulqa'dah) in the Islamic calendar.	A sign of impending trials from the nobles (great figures); a sign of an impending big earthquake.	Being alert and calm in the event of an earthquake (CS, 51 y.o., referring to the Patakonan manuscript).
Purwakarta (West Java Prov.)	The rumbling sound of water underground	A sign of impending large-scale ground movement(s).	People in the vicinity are advised to immediately move to other areas.
	Continuous rainfall	A sign of landslides and rocks falling from the mountains.	Individuals must remain watchful and are advised to relocate promptly from high-risk areas.

Table 3. (*Continued*).

Area	Sign of nature	Local meaning	Attitude/Action
Indramayu (West Java Prov.)	The appearance of a snake in the sea.	A sign of an impending great disaster.	Related to the belief or myth of Nyi Blorong, who is symbolized by a snake/dragon.
	The occurrence of an eclipse in the month of Kapit (Dzulqa'dah) in the Islamic calendar.	A sign of an impending earthquake (to the point that the earth splits) or impending strong winds, storms, a tsunami, or uprooted trees.	Referring to signs of nature related to eclipses (ngalamat gerhana).

Table 3 highlights that the Sundanese people's ability to interpret and respond to natural indicators swiftly leads to an immediate comprehension of the appropriate measures. The Sundanese's adherence to indigenous knowledge connected to natural signs has been dutifully observed by the local populace, resulting in successful mitigation initiatives. For example, upon hearing the sound of rumbling water from below the surface, they instinctively relocate to safer locations without any prompting, thereby avoiding disaster (as depicted in **Figures 1** and **2** below). At this level, individuals residing in high-risk disaster areas can be saved, and fatalities can be prevented. The losses incurred are limited to material assets such as homes (photos in **Figure 3**).

Figure 1. House damage due to ground movements caused by the Baribis Fault in Purwakarta, 2021.
Photo: research collection.

Figure 2. Road damage due to ground movements caused by the Baribis Fault in Purwakar ta.
Photo: research collection.

Figure 3. Destruction of residential buildings caused by the Baribis Fault activity in Banten, Friday, 14 January 2022.

Photo retrieved from https://www.newsmedia.co.id/news-room/pr-602365343/info-terkini-gempa-bumi-ujung-kulon-penampakan-rumah-warga-yang-rusak-akibat-gempa-di-sumur-pandeglang.

The Baribis Fault activity in Purwakarta, West Java Province, resulted in ground movements that caused no fatalities but damaged buildings, roads, and the environment, as shown in the figures above. The event was preceded by a natural sign, namely the sound of rumbling water underground at night, which the local community recognised, prompting them to prepare for evacuation and move to safer places (interview with Mimi, November 2022, in Pesanggarahan Village, Mount Parang, Purwakarta). It is known that the ground movements occurred due to the Baribis Fault that traverses Mount Parang (interview with National Disaster Management Agency Purwakarta or BNPB Purwakarta). The earthquakes are estimated to have occurred due to plate shifts. Therefore, fault movements in Indonesia can cause ground movements and trigger seismic activity in areas traversed by faults, including the Baribis Fault.

4.3. Cultural narratives as guidance

Local communities utilise cultural narratives as another mitigation strategy to enhance their readiness and resilience in disasters. This guidance—encompassing oral traditions such as myths, legends, folktales, and written traditions such as ancestral teachings and messages recorded in ancient writings—contains local knowledge and teachings for determining attitudes and actions regarding disasters. **Table 4** outlines the types of cultural narrative guidance developed within the Sundanese ethnic group to mitigate the impact of disasters that often arise in their daily lives.

Table 4 indicates a pattern in which local communities acquire knowledge about achieving safety through experiences connected to previous disasters, influencing their psychological outlook and fostering disaster mitigation measures. The oral and written accounts are extensive and cover a wide range of topics, encompassing historical and factual information about past disasters, presented in the form of legends and myths, as well as ancestral teachings communicated in the form of ancient manuscripts. This demonstrates the significance of safety for local communities and the role these cultural narratives play in shaping their disaster mitigation strategies.

At a different level, the Sundanese ethnic group also espouses a philosophy of life equilibrium known as tritangtu, which finds expression in their daily existence.

Tritangtu, comprising three elements—Rama, Resi, and Prabu—symbolises a balance among the environment, humans, and God. This equilibrium concept has been implemented in the management of natural resources in Nunuk Village and in maintaining social cohesion, which has been translated into measures to cope with earthquakes, such as the one that occurred in 1990. At that time, two nearby villages aided the victims in the most adversely affected village, and by promptly reinstating the situation and condition of the village, they maintained equilibrium. This illustrates the efficacy of disaster risk mitigation efforts through timely responses, as stated by 79-year-old informant AW in an interview in Majalengka (November 2022).

Table 4. Teachings in Sundanese cultural narrative guidelines.

Area	Type of cultural narrative guidance	Content of cultural narrative guidance	Teaching or warning	Source
Sumedang (West Java Prov.)	Myth	The Sundanese people derive local knowledge to prevent disasters from their ancestral figures, namely Prabu (King) Resi Aji Putih and Prabu Siliwangi. The teachings of the latter are documented in the Wangsit Siliwangi manuscript.	Providing knowledge to the people about what to do in the event of an earthquake	Interviews with AE (33 y.o.) and Suhadi (52 y.o.)
	Legend	According to a legend associated with Mount Gede/Tampomas, it is recounted that when the mountain exhibited signs of impending eruption, the king heard a supernatural whisper instructing him to cast the kingdom's golden kris (dagger) into the mountain's crater. In response, the king hurled the dagger into the crater, causing the mountain to settle and preventing an eruption.	The legend conveys a moral lesson on the importance of obeying authority and following rules.	Interview with AE (33 y.o.)
Purwakarta (West Java Prov.)	Ancient manuscript	The manuscript teaches that disasters can be prevented through hardwork	The manuscript instructs individuals to engage actively in agriculture and afforestation.	The Campakadilaga manuscript by Islamic scholar Mama Sempur
Banten Province	Myth	The myth of the sight of white crocodile or dragon	A warning of an impending tsunami	Interviews with RN (35 y.o.) and AY (52 y.o.)
	Myth	A body position of lying sideways facing the direction of East Java with the head, while the back is directed toward Mount Kendeng and the feet toward Ujung Kulon	According to local knowledge, this position imitates the path of the Baribis Fault.	Interview with AA (51 y.o.)
	Ancient manuscripts	Narratives containing memories of the eruption of Mount Krakatoa and the resulting tsunami	Reminding people of past disasters	Jangjawokan mantras and Lampung poetry manuscript (public collection)
	Parimbon, Gembong, and Banten manuscripts	Predictions with regard to eartquakes, lunar eclipses, rainfalls, and winds	Educating individuals about disasters and to promote a cautious approach in the future	Public collection

Table 4. (*Continued*).

Area	Type of cultural narrative guidance	Content of cultural narrative guidance	Teaching or warning	Source
Indramayu (West Java Prov.)	Myth related to lindu or palilindon (earthquakes)	The people of Indramayu hold the belief that the earth rests atop the apex of a bovine horn; any displacement of the cow results in a corresponding shift of the earth.	Providing knowledge about earthquakes and the importance of drawing nearer to God and engaging in virtuous actions as means of disaster prevention	Interviews with N (37 y.o.) and S (57 y.o.)
	Myths related to eclipses	The belief that eclipses occur due to the consumption of the sun or moon by Batara Kala, whose character involves devouring humans	Providing knowledge about eclipses and the importance of drawing nearer to God and engaging in virtuous actions as means of disaster prevention	Interviews with N (37 y.o.) and S (57 y.o.)
	Myth of Nyi Blorong	According to local beliefs, Nyi Blorong is regarded as the guardian of the Northern Sea in Java, symbolized by a serpent or dragon and often associated with impending calamities.	A counsel to draw nearer to God and to engage in benevolent deeds as a means of avoiding disasters, as well as to exercise caution wherever one may be	Interview with N (37 y.o.)
	Babad Dermayu (the Dermayu manuscript)	The manuscript tells of the origin story of Indramayu, alongside a narrative concerning the occurrence of a great flood in the region	Serving as reminder about past disasters, emphasizing the importance of environmental protection as a means of preventing future disasters	Interview with N (37 y.o.)
	The Yusup manuscript	The text provides a narrative of the story of the Prophet Joseph and includes an account of the sedekah bumi (alms for the earth) ritual, which serves as a method of seeking protection and is typically recited during the Baritan ceremony.	The importance of disaster preparedness and seeking divine protection	Interview with W (60 y.o.); the manuscript is kept as a legacy at the Surya Pringga Dermayu Foundation, Cikedung Subdistrict

5. Discussion

After analysing the relationship between the cultural strategies of local communities and disaster mitigation efforts, this research has yielded three crucial findings. Firstly, the tolak bala (warding off disaster) rituals significantly encourage local communities to abide by local rules to achieve safety and prevent disaster. The processions are conducted with great care to obtain optimal results. Secondly, the knowledge based on signs of nature educates local communities to be vigilant in the face of impending disasters. Thirdly, local communities possess a number of disaster mitigation teachings encapsulated in cultural narrative guidelines. The instructions and advice conveyed in these narratives are believed to help avert disasters. These instructions are then applied in everyday life as a means of disaster mitigation. These three strategies are employed to maintain equilibrium between the environment, humans, and God, which are then translated into social practices for responding to disasters.

The findings of this study depart from previous research that has solely highlighted how Baribis Fault-related disasters can be addressed by considering three aspects: 1) early warning systems from government entities such as BMKG and BNBP; 2) seismic and geological studies to determine the sources of disasters linked to the

Baribis Fault; and 3) examination of historical events that have inflicted damage on specific areas. In contrast, this study demonstrates the role of local knowledge as an alternative disaster mitigation strategy ingrained in daily life and readily applicable during disaster situations. The implementation of this cultural strategy yields two positive impacts. Firstly, it motivates local communities to be vigilant and well-prepared well ahead of time, serving as an early warning system (Thoha, 2018). Secondly, it enables local communities to mentally brace themselves for the strenuous conditions and circumstances triggered by disasters.

The presence of local knowledge that shapes a cultural strategy in responding to disasters, as expounded in this discourse, holds far-reaching implications for national safety in times of calamity. Those who survive disaster can swiftly resume their normal lives and acclimate to new circumstances in a relatively brief period. Mental health disorders such as stress and depression can be minimised, and in turn, a robust and positive outlook can thrive. As a result, regular activities can promptly recommence. At least three affirmative implications can arise in organising social life. Firstly, environmental equilibrium can be optimally sustained. Secondly, the ability to persevere can be extended. Thirdly, quality of life can be improved with all positive activities able to proceed without significant obstacles and hindrances arising from a disaster (Juhadi et al., 2021; Suharini and Baharsyah, 2020; Suharini et al., 2020).

Local knowledge, among the strategies employed in coping with difficulties before, during, and after disasters, can persist in the lives of local communities due to its foundation on at least three factors. First, the adaptability factor stems from the culture of local communities, which has the ability to adapt to successive disasters and generate effective mitigation strategies. Disasters are not considered detrimental, but rather, they contain positive values that foster a positive mindset. Second, togetherness and compassion transcend various differences and promote a culture of mutual assistance in dealing with life problems. This aligns with the philosophy that has developed in Sundanese society, which emphasises the importance of maintaining balance and fostering continual harmony. This philosophy is reflected in folklore and myths and, over time, becomes internalised in memory and applied in daily life. Third, the impact of religion constitutes a substantial component of local communities' lives, given that religion can adapt to the local culture and become a deeply ingrained aspect of their daily existence. During challenging times, the presence of religion can serve as a source of motivation and inspiration, reviving the zeal for life (Hasbullah, 2017; Hadi, 2019; Setiawati, 2019).

The results of this study call for anticipating at least three action plans. Firstly, it is essential to involve stakeholders to the fullest extent in preserving the local knowledge still upheld by the Sundanese community to prevent its deterioration due to various factors that could lead to its extinction. Secondly, local knowledge and cultural strategies should be transformed into educational materials and integrated into the curriculum at all levels of education. These teaching materials can be utilised by students for self-directed learning or under the guidance of teachers to raise awareness about the significance of local knowledge in disaster mitigation (Hendriana, 2020; Hatibe et al., 2021; Wasliyah, 2018). Simultaneously, students can practice the strategies provided by this local knowledge, enabling the continuous maintenance of these strategies in their daily lives. Thirdly, it is recommended that this strategic

knowledge be converted into digital formats and disseminated through various platforms, including social media. This approach would simplify access and facilitate future generations' wider adoption of this knowledge. Consequently, the knowledge will become alive within the digital community and will be accessible to anyone without temporal and spatial limitations.

6. Conclusion

This study has offered compelling evidence that the Sundanese ethnic group, among other local communities, holds culture-oriented mitigation strategies to handle calamities proficiently. These strategies are formulated based on narrative guidelines and natural indicators that give rise to native knowledge and wisdom that align with the patterns and regulations of their local environment. Three primary strategies are employed to deal with challenges before, during, and after disasters. Firstly, the local community regularly conducts a ritual to avert disaster, following a predetermined schedule in accordance with their traditions. They carry out all the ritual processes with reverence and complete concentration, enabling them to grasp the embedded significance. Subsequently, they have faith in the efficacy of their actions and the fulfilment of their prayers. Secondly, they possess an understanding of natural signs and remain vigilant in following directives that provide indications for their own protection, their families, and the environment. The occurrence of natural signals at particular times necessitates prompt action from each local community to relocate to secure areas. Thirdly, the local communities conform to the safety instructions in their cultural narrative guidelines to mitigate potential disaster risks. These narratives encapsulate essential knowledge passed down from their forebears, and these guidelines are habitually applied in their daily routines, forming a shared collective memory.

The present study expands our understanding of disaster mitigation strategies by highlighting the role of local culture in mitigating and reducing disaster risks. These culture-based strategies enable local communities to cope with disaster-related challenges and thrive in the face of future uncertainties. The study identifies two critical factors that can positively influence the behaviour and attitudes of local communities situated along the Baribis Fault in managing disasters. Firstly, the knowledge embedded in these strategies promotes a positive mindset that strengthens their resilience and mental well-being, thereby reducing the negative impact of environmental changes resulting from disasters. Secondly, it fosters a spirit of cooperation and mutual support among various stakeholders, such as the virtues of solidarity, empathy, and compassion, which can help alleviate disaster difficulties.

7. Limitations

The present study has limitations that future research should address. This study employed a limited number of informant samples in collecting field data due to the restricted research timeframe. However, a more comprehensive understanding of local knowledge requires a much larger and more comprehensive sample of informants in each visited region. Furthermore, a large area of western Java has not been fully explored, and not all villages have been visited. This study only focused on several

areas inhabited by the Sundanese ethnic group along the Baribis Fault. It is believed that there is still a wealth of local knowledge to be discovered in other areas crossed by different faults. Thus, it is recommended that further studies be conducted that accommodate larger sample sizes and incorporate a wider range of regions to obtain a more comprehensive understanding of the knowledge possessed by other ethnic groups in Java, specifically, and Indonesia, in general.

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