



Local wisdom as a part of disaster communication: a study on the local storytelling in disaster mitigation

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ARTICLE INFO

Keywords:

Local Wisdom; Local Storytelling; Disaster Communication; Disaster Mitigation.

How to cite:

Fakhruddin, I., Elmada, M.A.G. (2022). Local wisdom as a part of disaster communication: a study on the local storytelling in disaster mitigation. ETNOSIA: Jurnal Etnografi Indonesia. 7(2): 154 - 166.

DOI:

10.31947/etnosia.v7i2.22145

ABSTRACT

Located between the tectonic plates of Asia and Australia, a zone of high tectonic activity on the Pacific Ring of Fire with a row of mountains and active volcanoes makes Indonesia one of the countries with the highest natural disaster risk in the world. One of the potential disasters that attract attention is the potential for megathrust in southern Java, which has the potential to cause a tsunami of up to 20 meters. Various disaster mitigation efforts were carried out, one of which was to explore disaster mitigation messages in local wisdom and rely on community leaders as bearers of mitigation messages. Using an exploratory case study method, this research seeks to see mitigation messages in local wisdom in Bayah, South Lebak. The role of community leaders is also observed in community-based disaster communication. As a result, it was found that many messages based on local wisdom had content on disaster mitigation and nature conservation. Community leaders have a strategic role as Key Opinion Leader in conveying disaster mitigation messages, both messages based on local wisdom and modern science, to the community.

1. Introduction

Indonesia is one of the countries with the highest natural disaster risk in the world. The occurrence of natural disasters in Indonesia has also intensified, with an increasing trend from year to year (Maulana, 2021). The territory of Indonesia is located between the tectonic plates of Asia and Australia, a zone of high tectonic activity located on the Pacific Ring of Fire with a row of mountains and active volcanoes. Volcanic eruptions, tsunamis, and earthquakes are the deadliest hazards in Indonesia (Djalante, Garschagen, Thomalla, & Shaw, 2017). The National Disaster Management Agency (BNPB) recorded 3,092 natural disaster events throughout 2021, dominated by wet hydrometeorological events (Muhari, 2021). Meanwhile, this year, until May 18, 2022, BNPB recorded 1,552

natural disasters, which were also still dominated by wet hydrometeorological events (Choirul, 2022).

One area in Indonesia that has recently been discussed because of its potential for disaster is Lebak, Banten. Regarding disaster data, Banten ranks first in the 2019 Provincial Disaster Risk Index Table, making it the most disaster-prone province of all 34 provinces in Indonesia. Pandeglang and Lebak are at the top of the Regency/City Disaster Risk Index Table for 2019 (National Agency for Disaster Management, 2020). Potential disasters such as floods, landslides, extreme weather, tsunamis, forest and land fires, and earthquakes threaten 28 sub-districts in Lebak Regency (Rizkoh, 2022).

Lebak has also recently been busy being discussed because of the results of the research of the ITB team, which conveyed the potential for an enormous tsunami that was predicted to occur in Southern Java, with a height that could reach 20m (Center for Earthquake Science and Technology, 2020). Various reactions arise regarding this prediction. Even so, the public is asked not to panic and increase preparedness in dealing with natural disasters, especially earthquakes and tsunamis (Firdaus, 2020).

The magnitude of the social and economic impacts caused by the threat of natural disasters needs to be addressed better (Hansun, 2020). Communication becomes a critical function in the planning and preparation to produce an effective response and recovery effort during and after a disaster (Rotanz, 2007). Strategic communication planning and preparation for prevention against uncertainty will help to deal with disasters. Disaster risk can be avoided or reduced by providing awareness to the public about the threat of the disaster (Susilo & Putranto, 2021).

To prevent and manage disasters, it is also essential to increase the understanding of local wisdom related to the environment to increase public trust (Hasmira, 2021). Disaster communication embedded in culture also plays a vital role in increasing the effectiveness of disaster information and encouraging public trust regarding the authenticity of disaster information based on local wisdom at the individual level (Gultom, 2016).

Regarding the potential for an earthquake and tsunami in Southern Java, particularly in the Lebak area, several initiatives have been initiated to strengthen community preparedness, one of which is forming a volunteer community for the South Lebak Mitigation Group (GMLS) consisting of residents of South Lebak. This community seeks to encourage the community to know natural disaster mitigation with a humanist approach within the local community (Suryana, 2020). This community approach is interesting, considering that trust is easier to obtain when disaster-related information comes from fellow communities who are also affected than if information comes from outside the community (Gultom, 2016).

Two things become the focus of this paper. First, this paper will try to look further into the role of local wisdom and environmental messages in discussions related to disasters, especially in the Bayah area, South Lebak. In addition, the role of community leaders in community-based disaster communication will also be observed. This paper as a whole is expected to provide an overview of how local wisdom and community leaders can play a role in disaster communication.

2. Literature Review

- Disaster Communication

One of the keys to responding to disasters is communication. Not only during and after a disaster occurs, but communication is also an essential part of both response and recovery initiatives. Communication allows disaster victims to connect with first responders, support systems, and family members (Moorthy, Benny, & Gill, 2018).

In disaster management, the communication model of one-way transmission is the most commonly used, where emergency agencies disseminate information to provide warnings. Even so, a sharing communication model is carried out primarily through social media as an emergency communication tool, which involves a two-way exchange of information (Dufty, 2020).

Communication is also crucial in preventing disaster situations. Lindell and Perry say that one of the critical functions of risk communication is to promote appropriate protective behavior for those who are the target of the communication (Santos & Aguirre, 2007). Before a disaster strikes, it is necessary to communicate disaster risks so that the general public can be protected from future dangers, with the primary objective of reducing the number of victims.

Disaster communication is in dire need of trust as the basis for rapid decision-making during critical times. Trust improves the overall quality of the communication process and the efficiency of information seeking in the context of a disaster (Gultom, 2016).

In disaster communication, communicators who convey messages to communities in disaster-prone areas must find things that can connect and interest community members. One of them is by understanding the environment from the community's perspective, known as local environmental wisdom (Hasmira, 2021).

- Local Wisdom in Disaster Communication

Local wisdom plays an essential role in disaster risk reduction (Anwar, et al., 2017). For thousands of years, disasters have been a part of people's lives in the Indonesian archipelago. Various studies have shown that changes in civilization occurred due to disasters in Indonesia, specifically related to the tsunami and earthquake disasters (Rafliana, 2017). The disaster event was then recorded locally through various oral traditions, usually found in the form of folk stories, myths, or legends. However, Rafliana said she did not always suggest what to do in the future if the same event were to happen again.

Even so, it should be understood that recording these events can be a starting point for disaster risk reduction efforts. Anwar et. al describes local wisdom as the knowledge that appears and develops in the community in the local system. Local wisdom applies not only as a reference for behavior but also the ability to make people's lives more civilized and dynamic (Anwar, et al., 2017).

The habits of the people who were transformed into local wisdom certainly have their peculiarities, considering that they were formed in different locations, situations, and contexts, as well as experiencing different natural problems (Suryandari & Wijayani,

2021). In Suryandari & Wijayani's research on local wisdom in Sampang Flood, Madura, they even found that local wisdom used for disaster management made the community more independent when the disaster happened.

According to Hasmira, local wisdom is always connected with human life living in a wise environment. The environment is considered a unitary space with everything in it. People, who live in disaster-prone areas, often have a way that is believed to be able to tell when a disaster will occur, with symbols that are understood as a way of interpreting nature (Hasmira, 2021).

- Disaster Risk in the South of Java Island

The southern area of Java is feared to have the potential for a large earthquake that could trigger a tsunami. Several earthquakes that occurred in the south area of Java need attention to increase awareness. Some segments of the earthquake in southern Java are known as seismic gap areas or large earthquake quiet zones, which can be interpreted as storing earthquakes (Arif, 2019).

From 2010-to 2018, 9 earthquakes were accompanied by a tsunami. Specifically, the southern area of Java is also mentioned as a potential source of megathrust earthquakes in the future (Latifah & Masykuri, 2021).

A paleotsunami study conducted by the Head of Geotechnology at the Indonesian Institute of Sciences (LIPI), Eko Yulianto, found traces of an old tsunami along the southern coast of Java. He found paleotsunami deposits in Lebak, Pangandaran, Cilacap, Pacitan, and in Kulon Progo. Some are known to have a similar age, which occurred about 300 years ago. Older layers also show the recurrence of tsunami events in the past (BNPB Editorial, 2017).

When it was first released, Heri Andreas, Head of Geodesy at the Institut Teknologi Bandung (ITB), said that there was an accumulation of energy in the megathrust section of the Sunda Strait to the south of Java Island. From the modeling carried out, if there is an earthquake with a magnitude of 8.7 to 9.0, then there is a possibility that a giant tsunami as high as 20 meters will follow (Tim detikcom, 2021).

Responding to citizens' concerns that occurred because of the modeling results, the BMKG issued a release stating that what the ITB team mentioned was potential, not predictions. The BMKG also reminds the public to remain calm and take mitigation efforts, both structural and non-structural (DLH Kulon Progo, 2019).

3. Method

This paper is part of research related to disaster mitigation in Bayah, South Lebak, Lebak, Banten and is an exploratory case study with a grounded theory approach. This paper aims to see how local wisdom is part of disaster mitigation in the region and the role of community leaders in disaster mitigation efforts with a community approach.

The data was collected through in-depth interviews with selected key informants who have knowledge related to local wisdom of disaster mitigation in the Bayah area, South Lebak, Lebak, Banten. In addition, to complete the data, a study of documents containing information related to the environment and disasters in the area was also conducted.

The data is then processed using thematic analysis to find themes and categories related to disaster mitigation and the role of community leaders based on local wisdom with a community approach.

4. Result and discussion

- The Description of Bayah's Local Wisdom

Bayah is a sub-district in the southern part of Lebak Regency, Banten Province. As is the case in several other areas of Banten, Bayah is a Kasepuhan area with a kind of government organizational structure. Kasepuhan Bayah has several Sub-Kasepuhan, including Kasepuhan Cicarucub, Kasepuhan Ciharang, and Kasepuhan Citorek.

Kasepuhan Bayah comes from descendants around Jasinga-Gajrug and enters the area around the Cimadur river with the task of being "Mandiri Mangku Makuta", also known as Pancer Mandiri. Based on the narrative of the character of one of the old-fashioned Bayah, the task of Pancer Mandiri is to carry out the role of information about the historical origins of the Jasinga descendants who have spread to the south (Kokoncong Madur) and include other Kasepuhan histories.

This task is based on the philosophy of "*manggul piutus ratu ngemban piwarangan sultan, aya paribasa dawuh ratu sabda raja*" (which was mandated by the ancestors to be carried out), which is to fill and manage the southern region around the flow and estuary area of the Cimadur River which empties into the Indonesian ocean (Bayah beach).

However, the Kasepuhan Bayah area is unlike other kasepuhans introduced to the public. According to several community leaders of Kasepuhan Bayah, it turned out that it was deliberately not exposed on the grounds of the trust of their elders, which was indeed the case. The Kasepuhan Bayah area is very valuable and will not be commercialized like other Kasepuhan Kasepuhan in Banten (Ki Agus Permana, Personal communication, 2022).

Fig. 1 Map of Sub-districts in Lebak Regency



The current Kasepuhan Bayah area includes Bayah Sub-District, Cibeber Sub-District, Ciligrang Sub-District, Panggarangan Sub-District, Cihara Sub-District, and Cigemblong Sub-District, with a total area covering 15,304.93 km² with a north-south east topography in the form of mountains with a peak of Mount Halimun at the southeast end, namely on the border with Bogor Regency and Sukabumi Regency, while in the south it is a coast with low and high contours on the east side (Anis Faisal Reza, Personal communication, 2022).

Fig.2 South Lebak Topographic Map



As a traditional territory, Kasepuhan Bayah still strongly adheres to its customs and social institutions. This can be seen by the existence of cultural rituals still being carried out today, such as the *Seren Taun*, which is a way to thank God Almighty for all agricultural products carried out this year while hoping that their agricultural output will increase in the coming year. This ceremony begins with the glorification of *Nyi Pohaci Sanghyang Asri*, the Goddess of Rice in ancient Sundanese beliefs. The belief system of the ancient Sundanese people was influenced by the cultural heritage of the indigenous people of the archipelago, namely the animism-dynamism of worshipping the spirits of *Karuhun* (ancestors) and natural forces and influenced by Hindu teachings. The ancient Sundanese agrarian society glorified the forces of nature that gave fertility to crops and livestock. These natural forces manifested as *Nyi Pohaci Sanghyang Asri*, the Goddess of Rice and Fertility (Intani & Andayani, 2006).

On the other hand, in the local agricultural tradition, apart from *Seren Taun*, the *Balik Taun ritual* is also held. It is a traditional ritual at the beginning of the rice planting period as a manifestation of prayer so that the rice to be planted will give abundant blessings to the community (Emak Sinagar, Personal communication, 2022).

In addition to being grateful, *Seren Taun* also describes their cultural identity as cultivators and environmental conservationists by basing their lives on local wisdom, which can be understood as a local cultural wealth that contains life policies, a way of life that accommodates wisdom and life wisdom. In the concept of anthropology, local wisdom is known as local knowledge (indigenous or local knowledge) or local intelligence (local genius), which is the basis of cultural identity (Kartawinata, 2011).

As an indigenous community in a country with great disaster potential, many aspects of local wisdom contribute to mitigation efforts, early warning systems, regional planning, and shelter that have been practiced for hundreds of years. In several cases, knowledge of disaster resilience related to local wisdom has been a saving factor. The practice of local wisdom is increasingly gaining international attention regarding its mitigation role; for example, when the 2024 tsunami hit Simeulue Island in the west of Aceh-North Sumatra, only seven people died out of 78,000 inhabitants of the island. Meanwhile, in Aceh alone, the victims reached more than 200,000 people (Kurnio, Fekete, Naz, Norf, & Jüpner, 2021).

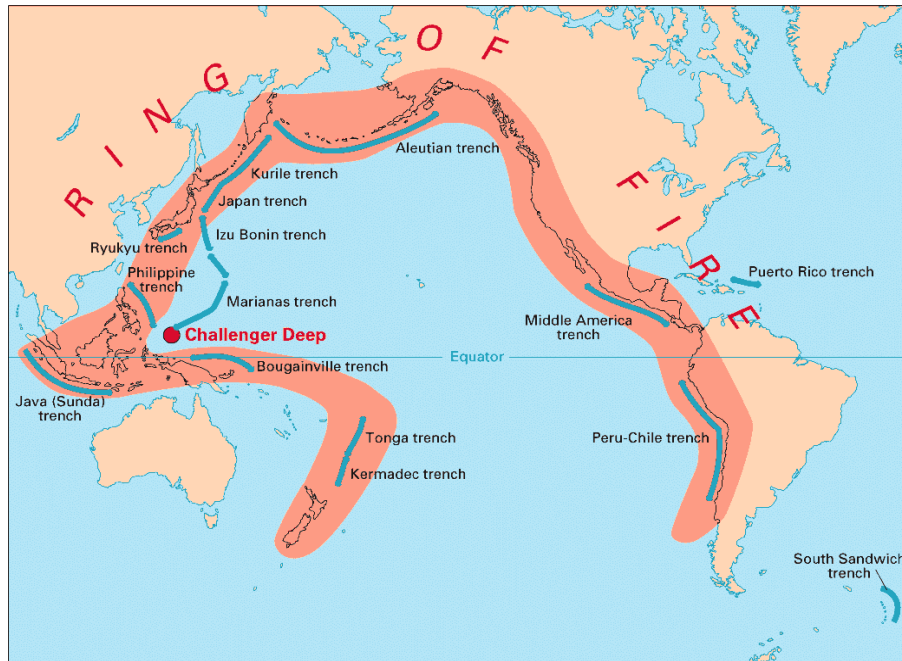
One of the critical aspects of local wisdom is how this knowledge becomes a guide on how to live side by side with nature, both from the perspective of disaster mitigation and nature conservation as a basis for sustainable living. As a way of life, this local wisdom is strictly implemented and applies to the people who inhabit the Kasepuhan traditional area. According to Jaro Rudiya, Head of Cihambali Village, Cibeber District, local wisdom in the Kasepuhan Bayah area is maintained through the collective memory of the community and the role of community leaders in carrying out the rules in their area. The forms of local wisdom in the Kasepuhan Bayah area are generally in the form of oral texts in the form of speech, advice, or *pamali* (Rudiya, Personal communication, 2022).

In addition, there are forms of communication resulting from rituals such as what Jaro or Emak do with certain processions that produce 'whispers' from *Karuhun* or ancestors that can be used as knowledge, reminders, and instructions regarding mitigation and response to disasters. (Anis Faisal Reza, Personal communication, 2022).

- **The Message of Disaster Mitigation and Conservation in Bayah's Local Wisdom**

Indonesia is located at the confluence of three earth plates, the Pacific, Eurasian, and Indo-Australian plates, making this country has an enormous potential and impact from the natural disasters it causes, especially earthquakes, volcanic eruptions, and tsunamis, as shown in Figure 3 below.

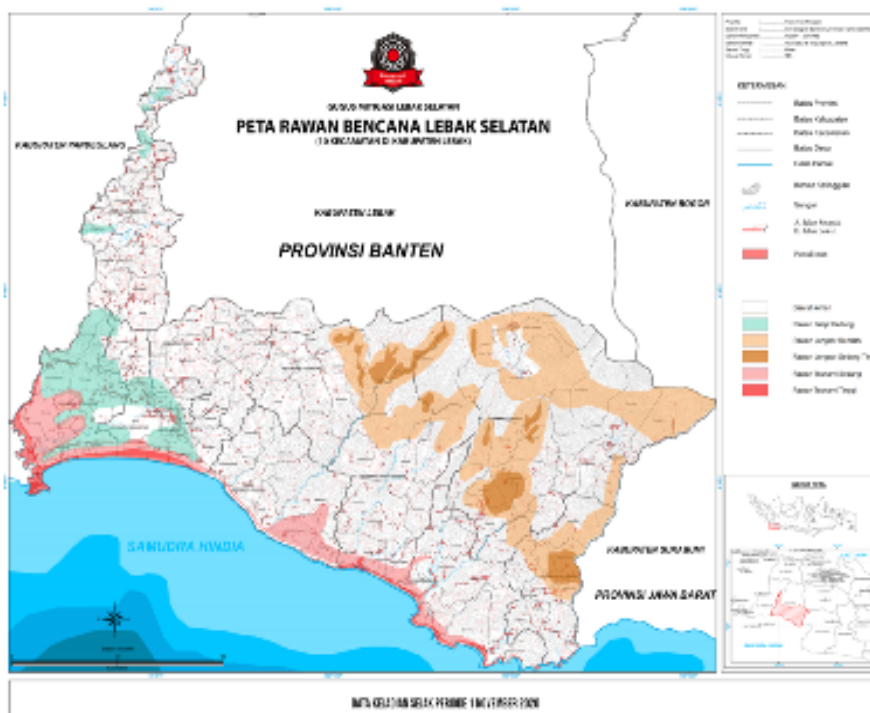
Fig 3. Map of the Ring of Fire and the Meeting of the Earth's Plates



In 2019, the Agency for Meteorology, Climatology, and Geophysics (BMKG) recorded 11,573 earthquakes (Kurnio, Fekete, Naz, Norf, & Jüpner, 2021). The extreme environment forced the community to prepare for disasters using local wisdom, which is still believed, adhered to, and practiced today in several areas, including Kasepuhan Bayah. In general, in Indonesia, there are 1128 ethnic groups spread across 37 provinces throughout Indonesia, 50-70 million people of whom are indigenous communities, including Kasepuhan Bayah. Each indigenous community has its own culture, including local wisdom. The local wisdom is conveyed through poetry in folklore, lullabies, and traditional songs.

According to Ki Agus Permana, a traditional elder in Panggarangan, local wisdom in Bayah is closely related to messages that lead to disaster mitigation, literacy efforts, and nature and environmental conservation. The South Lebak region itself, based on research on the potential for tsunamis on the South Coast of Java, where tsunami tidal waves can reach a height of 20 meters as a result of the megathrust earthquake that has been carried out for several years by several researchers, including Widjo Kongko (2018), Ron Harris (2017–2019), the latter by a cross-institutional team led by the Bandung Institute of Technology (ITB) supported by the Meteorology, Climatology and Geophysics Agency (BMKG). Each study examined the potential for a tsunami on the South Coast of Java with different methods, approaches, and assumptions. However, they produced the same research conclusions, while the distribution of the potential for a large earthquake was in the south of West Java, south of Yogyakarta, south of Central Java, and East Java.

Fig 4. South Lebak Disaster Prone Map (Source: GMLS, 2021)



Local wisdom in the form of oral speech and *karuhun* messages through traditional elders in the Kasepuhan Bayah area is generally in the form of local storrtelling. The message content of the local storrtelling involves several aspects, especially how indigenous peoples view the interrelationships between mountain and marine ecosystems, and all of them are interrelated. (Emak Sinagar, Personal communication, 2022).

As an example, during the flash flood and landslide in Lebak in December 2019 (Ramadhan, 2020), which was the impact of land conversion in the mountains of Mount Halimun in the Mount Halimun Salak National Park area into community mining and illegal logging, Jaro Rudiya from Cihambali Village, Cibeber District said that there is an 'order' to plant the mountain ridge with thousands of Rindu trees as an effort to prevent landslides and flash floods, and to conserve springs.

According to Jaro Rudiya and Emak Sinagar, special rituals are held related to disaster mitigation, both initiatives from traditional leaders and 'orders' through whispers and dreams they receive. Indigenous leaders such as Jaro and Emak are community leaders and patrons who will provide instructions regarding disaster response that the community will obey.

Regarding the potential for megathrust earthquakes and tsunamis that threaten the South Lebak region, there is already knowledge and stories based on local wisdom that have been passed down from generation to generation in Bayah, as stated by Ki Agus Permana (2022), that one day when '*Bayah rek dikumbah ku caah laut*' (Bayah wants to be washed or submerged in a giant flood/tsunami) will be preceded by several natural signs before the earthquake and tsunami as follows:

1. The descent/exit of mammals and birds from the mountains and forests to the place below.
2. Crocodiles will appear on the water's surface at river mouths and on the southern coast.
3. A red light will appear like a vast curtain from the sea horizon to the southwest Bayah beach.

Regarding disaster response, according to Ki Agus Permana (2022), there are orders to avoid coastal areas for people in 3 major coastal areas, namely Cihara, Panggarangan, and Bayah. The order was an evacuation to 3 gathering points, namely Pasir Tangkil (for the Cihara area and its surroundings), Kiarapayung (for the Panggarangan area and its surroundings), and Bungkeureuk (for the Bayah area and its surroundings). Based on the narrative of Anis Faisal Reza (2022) as a traditional leader in Panggarangan, there are local wisdom and Karuhun stories that for the residents of Bayah and its surroundings to go to Pasir Jawa (the valley area behind the hill around Cidikit towards Cikotok) and the residents of Panggarangan to Pasir Janji, 8 km to the north towards Kampung Sinagar under Mount Halimun.

At the end of November 2021, several unusual phenomena occurred along the coast of South Lebak, from Muara Binuangen to Sawarna, where crocodiles on the coast and river mouths that were previously rarely seen quite often appeared on the surface of the water. Another phenomenon is the appearance of flashes of red light on the sea horizon of an extensive area in several areas, Panggarangan, Bayah, and Ujung Genteng (Anis Faisal Reza, Personal communication, 2022).

Based on the narrative of Urip Setiyono, S.Si., M.DM., Coordinator of Data and Information for Class I Geophysics Station Tangerang (2021), said that three evacuation points in the event of a tsunami were determined based on the height above sea level as a rescue effort. The 3 points are Pasir Tangkil, Kiarapayung, and Bungkeuruk. This point has been measured empirically to be used as a Temporary Evacuation Place (TES) and a Final Evacuation Place (TEA). This shows that speech based on local wisdom can be juxtaposed with modern scientific calculations.

- The Role of Opinion Leader in Disseminating the Message of Disaster Mitigation

In the local culture of Kasepuhan Bayah, the community is very attached to social institutions and is dependent on traditional leaders. In carrying out their lives, they are guided by the traditions handed down by their ancestors. They hold to the values, norms, knowledge, and rules lived as a belief. The role of traditional leaders is critical in controlling and managing the community in Kasepuhan Bayah.

Traditional leaders play a dominant role in carrying out public communication activities. They are also tasked with maintaining the customs and traditions that have been going on from their ancestors. The traditional leaders in Kasepuhan, with their leadership style, have been very close to the local traditions and culture in Bayah for hundreds of years ago (Anis Faisal Reza, Personal communication, 2022).

The South Lebak Mitigation Group (GMLS) is an initiative of the South Lebak community from various elements of community organizations that pay great attention

to the importance of being prepared to face natural disasters independently. This familiar spirit encouraged the formation of this group in the hope of learning together about disasters: their potential, mitigation, and preparedness. The South Lebak Mitigation Group (GMLS) is a hub for various elements to serve humanity and help the government and society build the preparedness of the South Lebak community to face potential disasters through continuous education and advocacy.

The South Lebak Mitigation Group (GMLS) plays a role as a mitigation volunteer in a pioneering community-based mitigation framework in South Lebak with various activities within the framework of identifying potential and disaster preparedness (piloting disaster-ready and applying recognition) with activities based on local wisdom. As the Head of the South Lebak Mitigation Group and a traditional leader, Anis Faisal Reza plays a strategic role as a Key Opinion Leader who can more easily reach all local stakeholders in South Lebak.

The role of the South Lebak Mitigation Group as a liaison to government institutions, community organizations, the private sector, NGOs, academia, media, and the community facilitates the delivery of official disaster messages through related institutions (e.g., BMKG, BNPB). Anis Faisal Reza is a Key Opinion Leader who makes disaster mitigation messages conveyed as hybrid information based on modern science and local wisdom more efficiently, flexibly, and believably. The network built by Anis Faisal Reza with several Kasepuhan in Bayah area also allows messages obtained by traditional leaders through their respective rituals to arrive more quickly as an early warning system based on local wisdom, which can then be processed and disseminated through funneling to better reach the broader community in South Lebak.

5. Conclusion

Based on the findings in the field and the results of the analysis, it shows that disaster mitigation already exists in local storytelling, which is presented as poetry in the format of folk tales, songs, lullabies, fairy tales, as well as advice spoken by ancestors in Kasepuhan Bayah for hundreds of years. This disaster mitigation message based on local wisdom has proven to be juxtaposed with the knowledge resulting from the development of modern science or, in other words, indirectly empressing the local wisdom. This local message is also an early warning system that is relatively inexpensive because it is stored in the community's collective memory, of course, if it is still practiced together.

Traditional leaders such as Anis Faisal Reza, who is also the Chair of the South Lebak Mitigation Group, have a strategic role as a Key Opinion Leader in conveying disaster mitigation messages, both messages based on local wisdom and modern science through the GMLS's activities towards a resilient community and tsunami ready whenever a megathrust earthquake that followed by a tsunami will occur.

This research is expected to be a reference regarding local wisdom in disaster mitigation in the South Lebak region in particular. Furthermore, in general, it is hoped that it can serve as a reminder for disaster mitigation efforts to explore local wisdom to find messages related to disaster mitigation that are close to the community.

Acknowledgement

This paper is part of a research that, of course, is supported by Universitas Multimedia Nusantara, where the two authors are joined. Support also came from the South Lebak Mitigation Group (GMLS), which helped provide access to information and connected crucial informants in this research.

Conflicts of Interest

We declare no conflict of interest. The funding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

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