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An Analysis of Disaster Mitigation Activities Based on Madurese Local Wisdom

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Abstract

Mitigation is defined as any continuous action taken to reduce or eliminate long-term risks to human property and life. Mitigation is a mechanism so that the community can avoid the impact of potential disasters. The actions can focus on disaster avoidance, in particular avoiding the placement of people and property in dangerous areas. In carrying out disaster mitigation, the right strategy is needed in conveying valid messages to the community. The character of a fast, precise, valid and reliable message will be able to build the right disaster literacy community. This paper aims to examine disaster mitigation literacy activities carried out based on the local wisdom of the Madurese community. This study used a qualitative descriptive method to explain facts and phenomena in the field comprehensively. Data collection was carried out by observation, in-depth interviews and literature review. The analysis process is carried out through the stages of reduction, presentation and conclusion. The research informants are the community and traditional leaders in Madura. The results of the study show that the Madura people have local wisdom, traditional knowledge that has the value of moral, social kinship and spiritual messages about disaster mitigation. The results of the study concluded that local wisdom is a reliable communication strategy in building disaster mitigation literacy

***Keywords**: disaster mitigation, local wisdom, Madura, Madurese local wisdom*

1. Introduction

Natural disasters are events that can occur anytime and anywhere. These events are inevitable and can be predicted precisely (Carrera et al., 2015). Human interaction with natural disasters becomes inevitable. Humans tend to succumb to disasters and often associate them with human fate (Surminski et al., 2015). Recently, interaction with natural disasters has become inevitable. People tend to be resigned to disasters and often consider disasters to be part of human destiny(Surminski et al., 2015). Floods, droughts, tornadoes, and earthquakes are potential natural disasters in Madura. Based on data from BMKG (Tempo, 2018), Madura Island is included in the earthquake-prone area. BMKG

recorded three facts about earthquake vulnerability on Madura Island after the earthquake that occurred in Sumenep on Wednesday, June 13, 2018. This proves that Madura is not a safe area from earthquakes as many residents have believed so far.

Madura Island experiences several earthquakes triggered by fault activity which can also result in surface deformation.(Anjasmara & Muthmainnah, 2018).

In addition, on Madura Island there are several active faults in the form of ascending faults, sliding faults, and normal faults (Anjasmara & Muthmainnah, 2018; Supandjono et al., 1992). Pamekasan has eight potential disasters, including landslides, floods, tornadoes, fires, droughts, abrasions, earthquakes, and tsunamis(Supandjono et al., 1992) . The Sumenep region has the potential for disasters, including potential floods, landslides, tornadoes, and extreme weather (Basri, 2022). Sampang has the potential for flood disasters. According to data from the Regional Disaster Management Agency (BPBD) of Sampang Regency, there are four sub-districts affected by the floods, including Jrengik, Tambelangan, Torjun, and Sampang Kota Districts. The flood water level in Jrengik ranged from 50 centimeters to more than one meter, hitting Margantoko Village, Majengan Village, and Asem Nonggal Village, among others. Meanwhile, the average water level in Tambelangan District is 1.5 meters and in Torjun District the average water level reaches 60 centimeters (Azis, 2024). In addition to floods, Sampang also has the potential for drought disasters. Based on data from the Sampang BPBD recorded from 14 sub-districts, ten sub-districts that experienced drought were Sampang, Torjun, Pangerengan, Sreseh, Karang Penang, Sokobanah, Banyuates, Kedungdung, Robatal, and Tambelangan sub-districts. Meanwhile, 4 other sub-districts that were reported not to be affected by the drought were Camplong, Omben, Jrengik, and Ketapang Bangkalan District (Afifah, 2020). In the rainy season, the Bangkalan area has 2 potential flood disasters. Based on data from the Bangkalan Regency Government, Arosbaya District is indeed listed as one of the sub-districts in Bangkalan Regency that is prone to flooding. The other sub-districts are Geger and Blega (Afifah, 2020). Meanwhile, the potential disaster in the dry season is drought. In the Bangkalan area, as many as 50 villages in 7 sub-districts were affected by the drought. In addition, 72 villages in 12 sub-districts were identified as prone to drought in the critical dry category (Afifah, 2020). Based on data from the Bangkalan Regional Disaster Management Agency (BPBD), currently there are 61 villages in 9 sub-districts that have experienced drought, namely Tanah Merah, Kwanyar, Arosbaya, Blega, Klampis, Modung, Sepulu, and Kokop Districts (Azis, 2024). In general, the potential for drought disasters is also a threat to Madura. Indarto's study explains that drought is marked by a decrease in water in rivers, reservoirs, and lakes(Indarto et al., 2014). Meanwhile, Afifah's study (Afifah, 2020) shows that the Java-Madura region is experiencing carbon level disturbances, deforestation, and forest degradation. As a result, the condition of the watershed becomes critical. According to the research results of Andreas Kresnan Hadi et al. (Kresnan, 2016) show that the physical condition of Madura is less fertile, some of the soil in the form of

lime since the Pleitocene era and even around 99,650 hectares (18.20%) is deforested. Such a condition, technically and hydrologically, is classified as critical. The average rainfall in Madura is only about 1276 mm. The average annual wet month is 5.4 and the dry month is 4.8. The average air temperature in Madura is 26.61 degrees Celsius. In terms of climate, Madura is in the AW Type category, marked by the driest monthly rainfall of 13.95 mm (below 60 mm). This type of drought cannot be compensated by the amount of rainfall throughout the year. There are two seasons in Madura, namely the dry season (May-Mid-October), and the rainy season (Mid-October-April)(Basri, 2022). Based on the above data, Madura is a disaster-prone area.

On the other hand, the Madurese have a lot of local wisdom on how to handle disasters that have been passed down from generation to generation (Suryandari & Wijayani, 2021) Therefore, the Regional Disaster Management Agency in the Madura region is testing the government's readiness to provide assistance as soon as possible when a disaster occurs. In addition, to reduce disaster risk, the government and the people of Madura must build good and effective communication. The results of the study (Sjoraida & Anwar, 2018) showed that the increase in community independence and the continuous role of local institutions in assisting disaster mitigation determine the success of the establishment of community communication systems(Damayani et al., 2022)

This paper tries to explain the variety of local wisdom of the Madura people as a disaster mitigation activity.

2. Literature Review

2.1.Local Wisdom

Local wisdom with a cultural approach is used as one of the approaches in mitigation efforts. According to Triana, by using cultural benefits or cultural approaches, mitigation efforts can be carried out (Triana et al., 2017). The cultural approach has enough value and strategic function, especially to be applied in several areas that have special locality values. Madura Island is included in this category, an island at the northern tip of Java Island which is currently still synonymous with the value of locality, especially in culture and religion (Hannan & Triyaningsih, 2021). and religious culture that is still attached to the identity of the Madurese people affects patterns of action, including mitigation efforts. Local wisdom generally consists of 3 components, namely hereditary knowledge about nature and the environment, such as how to grow crops or mitigate natural disasters(Elok Indi Pradanasari, 2023). Second, local values and beliefs that are applied in daily life such as mutual cooperation and respect for nature(UNY, 2020). Third,Traditional Skills developed from generation to generation, such as tillage or earthquake-resistant building methods(Elok Indi Pradanasari, 2023).

2.2.Madurese Local Wisdom and Disaster Mitigation

The implementation of disaster management has been regulated in Regional Regulation Number 21 of 2016 concerning the Implementation of Disaster Management (2016),

especially in chapter 2 article 2, which states that the Regional Government is authorized and responsible for the implementation of disaster management, related to disaster risk reduction through development programs. One of the important steps to reduce disaster risk is through disaster mitigation. It is explained that disaster mitigation is a series of efforts to reduce disaster risk through physical development, awareness, and capacity building to deal with disaster threats (Putri & Hamzah, 2021). According to article 47 paragraph 2 (c), one form of disaster mitigation activities is through education, counseling, and training, both conventional and modern.

A series of actions aimed at reducing disaster risk, both through physical development and increasing awareness and ability to deal with disaster threats, is known as disaster mitigation (de Leon et al., 2021; Hikichi et al., 2020; Saito & Matsuyama, 2012). To raise awareness and deal with disasters, the right communication strategy is needed. This is not only necessary in a disaster emergency, but it is also important during and before a disaster because it is said that communication is the best way for disaster mitigation, preparedness, response, and recovery of the situation when a disaster occurs. According to Suherman (Suherman, 2018), conveying disaster messages to the public, the government, the media, and opinion leaders can reduce the risk and impact of disasters and save lives.

Regarding the context of disaster risk communication, the people of Madura already have local wisdom to guide them. Local wisdom is a traditional view and knowledge that is a reference in behaviour and has been practiced from generation to generation to meet the needs and challenges in people's lives. Local wisdom has a function and meaning in society, preserving natural and human resources, maintaining customs and culture, and benefiting life (Permana et al., 2011). This includes how to reduce risks (mitigation) in the event of a disaster. According to disaster expert Dr. Rahma from the Bandung Institute of Technology (ITB), it is better to collect information about disasters starting from downstream (disaster-prone areas), not from upstream (cities), which assumes that information is obtained based on local wisdom of the community. This statement illustrates that the extraction of disaster information must start from the conditions, situations, and cultures of disaster-prone communities. Through the acquisition of community-based information, disaster management can be more directed

. A study shows that local wisdom can serve as a system for predicting disasters. Research by Gadeng, Maryani, and Rohmat (Gadeng et al., 2018) shows that the Simeulue people use the local wisdom system of smong to inform people about tsunamis. Manafi-nafi, mananga-nanga (a swing song to put the baby to sleep), and nandong are means of conveying early warning. In small and medium business products that are widely consumed by the community, appeal information boards and songs are used to spread local Smong wisdom. This tradition increases public awareness on how to handle tsunami disasters (Gadeng et al., 2018)

As mentioned earlier, Madurese people have local wisdom in dealing with disasters. Local wisdom still exists in several indigenous groups. The people of Madura, who live in coastal and mountainous areas, have local wisdom in dealing with disasters. For example, people on the coast perform *"rokat tase"*, a Madurese tradition, to thank God Almighty and ask for protection from various marine disasters.

Based on the description above, the purpose of this study is to describe disaster mitigation literacy based on local wisdom. This research sees local wisdom as a new way to disseminate information about disaster mitigation. Local wisdom provides the community with a variety of information containing social, moral, and spiritual values on how to anticipate disasters

3. Method

This qualitative research aims to provide an in-depth explanation of the phenomenon after data collection (Creswell, 2007). Descriptive research examines community problems, societal procedures, and certain situations in phenomena. The approach of this research is qualitative descriptive, inductive thinking, which comes from facts and field data that are analysed and studied with approaches and theoretical thinking in an effort to build a new concept(Neuman, 2007). This means providing a complete overview of the subject and object of research (Neuman, 2007).

Qualitative methods are used to understand phenomena in depth, especially related to behavior, perception, and social interaction (Abdi, 2020). This method fits this theme because researchers want to explore subjective experiences or understand the complex context of a problem, not just measure variables. This method is used to explore the reasons behind an action or mindset in a certain community, in this case the Madura community related to local wisdom and disaster mitigation.

The focus of qualitative research is to interpret social phenomena. This study uses grounded research and action research approaches. The purpose of the research, which is to create a communication design (strategy), is the reason why the research strategy is chosen. Observation, structured interviews, and documentation are the methods used to obtain research data. Below are the processing procedures and techniques used to analyse the research data: (1) sorting and determining the classification of data; (2) data editing and coding, which means providing code to the data to shape the performance of the analysis; (3) confirmation and deepening of data that requires verification and deepening; and (4) data analysis based on the structure or construction of the discussion of research results.

The stages of data analysis can be explained more specifically as follows:

Sorting : This stage involved systematically organizing the data according to the relevant categories. Data taken from interviews, observations, or local documents are compiled based on the theme or phenomenon being studied, such as the form of local wisdom in flood mitigation or the way the Madurese people deal with natural disasters

. *Coding* : After the data was sorted, a coding process is carried out, namely labeling parts of the data that have a certain pattern or theme. In the context of disaster mitigation, codes can relate to traditional practices, public perceptions of disaster risk, and mitigation strategies carried out. This coding helps researchers to find trends and patterns that may be hidden in the data. *Categorization*: The results of the coding are then grouped into broader categories. For example, local wisdom about the use of the environment or traditional technology can be a large category in this research, to then be analyzed in depth. *Thematization*: The categories that have been identified are integrated into the main theme of the research, such as how local wisdom plays a role in shaping the culture of disaster mitigation in Madura. It provides deeper insights into the social and cultural implications of local wisdom on disaster mitigation.

4. Findings and discussion

Local Wisdom and Disaster Mitigation

According to anthropologists such as Robert Chamber (Blaikie, 1996; Chamber, 1987; Saleh M Ali, 2000) members of society or societies have the knowledge that is used to interpret the elements of the natural environment and manage them as their source of life. They use a variety of terms for this information. Local knowledge, customary knowledge (Sillitoe, 1998), local wisdom (Mattulada, 1991), traditional wisdom (Norman Edwin, 1991), and traditional knowledge (Sardjono & Samsoedin, 2010) are terms mentioned by some people. However, whatever the name, this knowledge is usually learned through experiments about reality. Its development is not as rapid as the development of contemporary knowledge because the process takes a long time for observation and experimentation.

Indigenous peoples' local wisdom includes not only indigenous peoples' knowledge and understanding of humans and their good relationship with each other, but also their customs and knowledge of people, nature, and the invisible. This local wisdom is practiced, taught, and spread from generation to generation (Keraf et al., 2002). Epistemological conceptual ideas known as local wisdom live and develop in people's consciousness. It serves to regulate people's lives, from the sacred to the profane.

Local knowledge usually contains environmental wisdom, or environmental wisdom, which allows the formation of an ecosystem balance (Vayda, 1981). According to Budi Santoso(Santoso, 1988), Indonesia's pluralistic society has a lot of environmental wisdom that can be used to build relationships with a sustainable environment. Sani and Hijjang also have similar opinions. They say that local people in an area usually have high local wisdom about their environment (Hijjang, 1988). However, "indigenous knowledge", also known as "indigenous knowledge", refers to a cross-disciplinary understanding that includes the thinking of local or indigenous communities as well as how they manage and regulate the environment as a whole as a system (Sillitoe, 1998). Local knowledge, also known as indigenous knowledge, is an important part of the culture of indigenous peoples

and is part of their cultural structure. The objectives of ceremonial rituals, artistic design, singing, dance, oral traditions, subsistence patterns, placement of sources of burial, and land in a particular location are part of their culture. To ensure that indigenous cultures remain stable, this knowledge is essential. It is also an important tool for people to adapt to the contemporary changes that enter their communities (Burton, 2003)

Variety of Madura Local Wisdom about Disasters

Traditional knowledge is an important asset in the management of community-based disaster management systems, especially in the disaster mitigation phase. Traditional knowledge and intelligence are formed from the results of people's interactions with their physical environment over a long period of time. The formation of this traditional intelligence makes a community able to know and read natural signals or signs about events before the flood disaster in Sampang Madura. Because the community's understanding of the environment is quite good, disaster management by referring to the characteristics of the community's interaction with the local environment can be more effective if implemented.

In relation to these goals, existing traditional knowledge and intelligence need to be explored and conveyed so that it can be understood by the next generation. In addition to being applicable in the disaster management system, in the socio-cultural context, traditional knowledge and intelligence are also assets that need to be maintained. Traditional knowledge and intelligence show the existence of a social and cultural system of society in Indonesia that is closely related to the environment so that it provides specific characteristics.

The expertise of the Madurese people in reading natural signs is shown in the annual flood phenomenon in this city. If there are clouds and clouds in the northern Sampang area, then it is certain that there will be rain in the area, and it will have a flood impact in their area

The kinship system of the Madurese people is very thick. The kinship of the Madura people is widely known and open. The terminology of relatives in the Madura context is known as *beleh (karabet), taretan dibi"*. The people of Madura strongly maintain this kinship relationship, so that the culture of visiting each other between relatives is still maintained to this day. In the context of disasters, Madura residents rely heavily on information from their relatives from the northern region of Madura to prepare for disasters.

Madurese local wisdom related to respect and obedience to teachers, parents and leaders is "*Buppa' bhebu' guru rato"*. This expression is often used by the people of Madura to emphasize a sense of respect for parents, teachers, and leaders. In the context of this flood disaster, the people of Sampang Madura strongly believe in the role of prayer and scholars in dealing with the flood disaster. At the beginning of the rainy season, in some areas of Sampang there are still rituals of joint prayer and "rosulan" as an expression of gratitude for the arrival of the rainy season. In the view of the people of Sampang Madura, rain is

a gift and blessing from God that must be thankful. This ritual is also an expression of prayer to be given safety during the rainy season

5. Conclusion

Disaster mitigation is carried out by the people of Madura using local wisdom. Wisdom comes from the environment in which they live. The best way to maintain local wisdom and adapt to the environment is always sought by the community, as it has been done for generations. Local wisdom comes from community habits. Different wisdom is formed for different natural problems in different places. The community became self-reliant after this disaster. In facing disasters, the local wisdom of the Madurese people is divided into two parts. The first is their ability to identify (predict) disasters, such as the people of Sampang seeing natural conditions when it is cloudy in the northern areas of Sampang such as Robatal, Omben Ketapang, and Karangpenang, so people in the Sampang area (city) are prepared to face flood disasters. Second, Madurese people depend on information provided by their relatives in the northern region of Sampang about the potential for flooding. The expression of mutual cooperation, solidarity, and traditional kinship of the Madurese people is also associated with local wisdom. All these elements bring people closer to each other and better understand the flood disasters they are facing. The findings about the variety of local wisdom in Madura as a disaster mitigation activity have broader implications, namely: Strengthening the capacity of local communities: like traditional ways to mitigate the impact of disasters, increasing community resilience in facing crises. This reduces people's dependence on external assistance and makes them more prepared for disasters. Education and Awareness: The application of local wisdom in disaster mitigation can also be used for disaster education in schools and in the community. It helps young people and the general public develop awareness of risks and how to prevent them, making disaster mitigation an integral part of the culture. Cultural and Environmental Preservation: In addition to serving as a mitigation, local wisdom practices also help preserve the environment and cultural heritage. Practices such as tree planting or bamboo utilization not only reduce disaster risk, but also maintain the balance of local ecosystems.

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