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Is the Tourism Business Ready to Face the Threat of Tsunami Disaster? (Case Study of Coastal Area of North Lombok Regency)

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Abstract: Due to its proximity to the Flores Back Arc Thrust, North Lombok Regency, a popular tourist location in Indonesia, is regarded as being particularly vulnerable to earthquakes with the potential to trigger tsunamis. Concrete steps must be taken to lower the risk of a tsunami's impact and safeguard the stability of the tourism sector. This study aimed to find out how the preparedness of the tourism business in the coastal area of North Lombok Regency in facing the threat of a tsunami disaster by looking at the aspects of preparedness are a) Vulnerability Assessment b) Planning; c) Institutional Framework; d) Information System; e) Resource Base; f) Warning System; g) Response Mechanisms; g) Education and Training; and h) Rehearsal. The type of case study research with a qualitative approach was chosen in this study. The respondents involved consisted of tourism business actors whose information was extracted using in-depth interview techniques, focus group discussions, and observation. The Miles and Huberman model was used to assess the data once it was obtained, and data triangulation was used to reduce bias. The study's findings indicated that raising awareness of the tourism industry is still necessary, and that the industry's post-tsunami preparedness is only limited to the creation of standard operating procedures and the installation of evacuation routes. The need for integrated cooperation between tourism businesses, the government and the community in maximizing effective and efficient preparedness.

Keywords: preparedness; tourism business; tsunami disaster

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Introduction

Technology has not yet been able to anticipate when each catastrophe would occur exactly. 'Unpredictability' is a catastrophe trait. Attempting to lessen the effects of the catastrophe is a sane and sensible decision (Liu et al., 2021). According to Law No. 24 of 2007, there are three stages of disaster management: pre-disaster, emergency response, and post-disaster. During each step, all parties must cooperate. Based on the 2010-2014 disaster map compiled by the National Disaster Management Agency (BNPB), West Nusa Tenggara is one of 16 provinces with a high level of disaster vulnerability. According to research done in August 2017 by Ron Harris, a geologist from Brigham Young University in the United States, a 9.1-magnitude earthquake would be followed by a tsunami in numerous southern regions of Java, Bali, and Nusa Tenggara. This is a threat considering that many of Indonesia's mainstay tourist destinations are located in the region such as Lombok Island, NTB with a high number of tourist visits, both domestic and foreign tourists.

Given the risk of a tsunami can come at any time, and until now there is no tsunami early warning tool in Lombok. So, to reduce the risk of a tsunami, preparedness is needed, especially for tourism community groups on the island of Lombok to deal with tsunamis. According to the Head of the BMKG Mataram Climatology Station, Agus Rianto, the area number on the island of Lombok, North Lombok Regency (KLU), which is categorized as prone to earthquakes, may cause a tsunami. In close proximity to the Flores Back Arc Thrust, which causes an earthquake in Lombok's northern area. North Lombok, the newest NTB regency, is ideally located close to the northern foot of Mount Rinjani and has an area of 809.53 Km2. The Lombok Strait is becoming increasingly clogged with marine traffic from the Middle East for the transfer of fuel oil and from Australia for the transport of natural resources to the Pacific area of Asia, and North Lombok Regency has a favorable location in the destination region. Several of the region's tourist destinations, such as Gili Terawangan, Sendang Gile Bayan Waterfall, and the breathtaking Segare Anak Lake close to Rinjani's peak, are well-known outside of Indonesia. Around a million individuals visited North Lombok in 2017. A total of 995,966 visitors, comprising both locals and tourists, arrived at the destination.

North Lombok Regency is a hilly or mountainous area, with this appearance beginning in the central part from north to south, and residential areas are relatively far from the coastline, while coastal areas along the coast are sparsely populated and mostly inhabited by traditional fishermen (Lugra & Arifin, 2008; PKLU, 2016). Tiga Gili, Sire Beach (Tanjung Regency), Kerakas Beach and Lempenge Beach (Gangga Regency), and Tanjung Menangis Beach (Bayan Regency) are among the tsunami-affected areas in North Lombok that have natural coastal tourism potential and have become popular destinations for local and national visitors. Tiga Gili is a natural tourism area located outside the main island, so tourism trips require sea accommodation, so that a lot of sea transportation anchors along the coast of Tiga Gili.

According to the KLU Disaster Management Plan document, there are 13 different types of disaster hazards that might affect the university, including earthquakes, flash floods, extreme weather, the Mount Rinjani explosion, quakes, wildfires, forests and land fires, flooding, storms, landslides, and tsunamis. On July 29, 2018, an earthquake with a magnitude of 6.4 on the Richter Scale (SR) and the potential for a tsunami rocked West Nusa Tenggara (NTB), causing significant loss and damage to the impacted areas, with KLU suffering the worst effects. The earthquake occurred in both small and stronger scales; as of 7:00 a.m. on August 5, 2019, BMKG has recorded 585 aftershocks, 6 of which had a magnitude greater than 5.5. An rising fault in the KLU region was responsible for this earthquake. Figure 2 shows the earthquake's geographic dispersion.

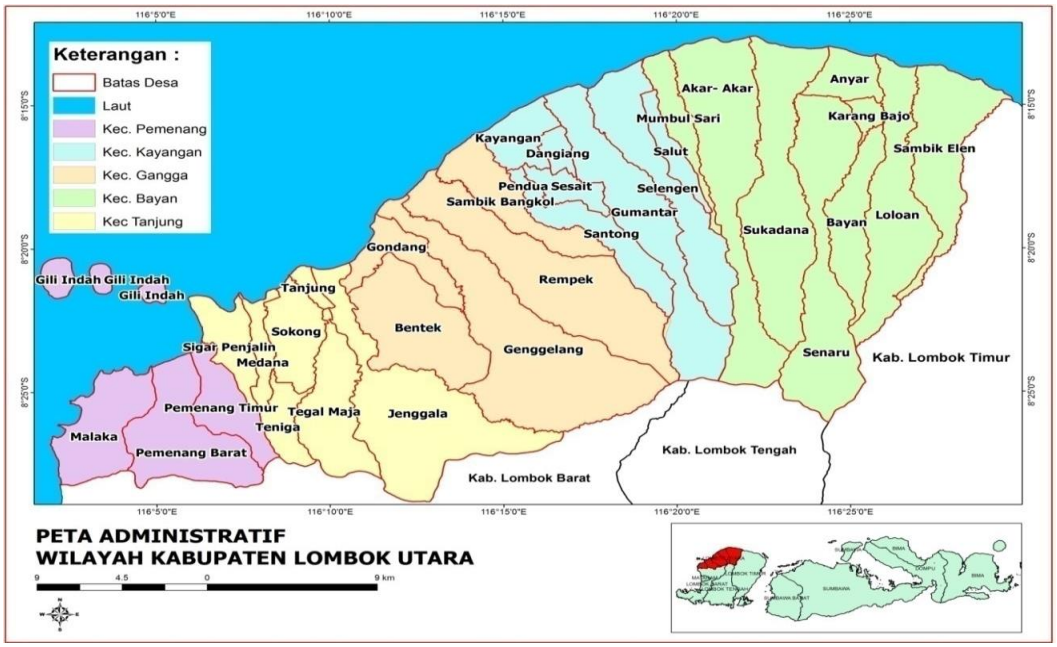

Figure 1. Administrative Map of North Lombok Regency, West Nusa Tenggara

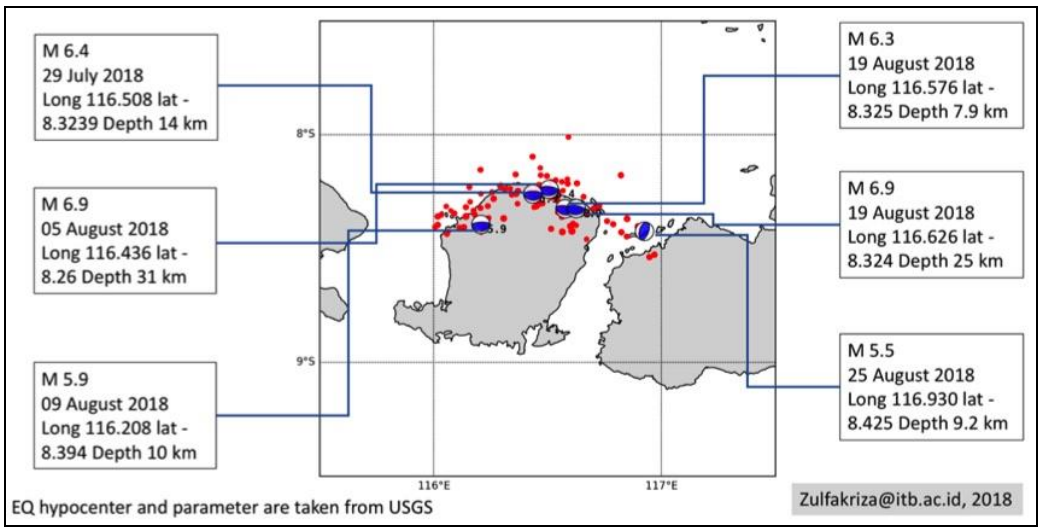

Figure 2. Distribution of Earthquakes in NTB (6 times large earthquake marked by Blue Circle)

Seismicity in North Lombok, which is dominated by shallow earthquakes, has been going on for decades until now, namely the earthquakes of 20 October 1979 (M5.9), 30 May 1979 (6.0), 17 December 1979 (M5.6), 20 January 2004 (M6.2), 22 June 2013 (M5.2), and 29 July 2018 (M6.4), 5 August 2018 (M7.0), and 19 August 2018 (M6.9) (Sasmi et al., 2020; Supendi et al., 2020). Earthquake year 2018 had a different epicenter position from previous years, but had a significant impact on North Lombok. This historical record of seismicity provides a new understanding that earthquakes have repeated cycles. Asrurifak et al. (2010) said that earthquake parameters can be studied to analyze their repetition period. Multiples of 50 years

for the repetition of large earthquakes (≥ 6.5) and small earthquakes with repetitions almost every day. Until now there is no technology capable of detecting in a timely manner, location, and how big the strength of an earthquake that will occur. Based on these matters, it is necessary to conduct a study on the tsunami hazard for the worst possible case that could occur in North Lombok. This study aims to analyze the potential for tsunami height, the estimated arrival time of the tsunami on land, and the potential for tsunami-affected areas in North Lombok

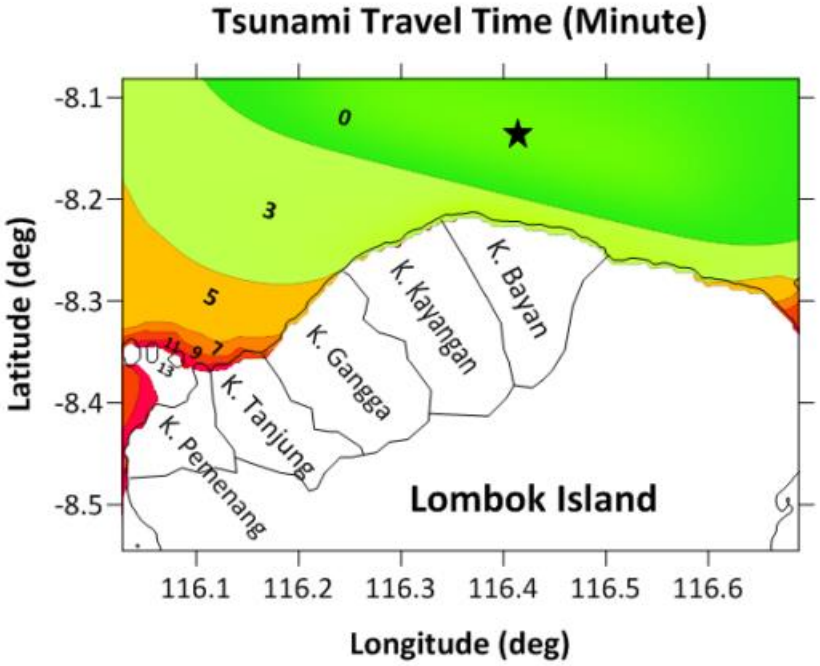

Figure 3. Map prediction of tsunami travel time in North Lombok

A tsunami is a rapid vertical shift in sea level that causes a body of water to move. Underwater volcanic eruptions, underwater landslides, at-sea earthquakes, and meteor strikes can all result in changes in sea level. Although tsunami waves can travel in all directions for thousands of kilometers, their devastating force is greatest on land near the disturbance's core. The closer to the mainland the speed of the tsunami will decrease at least until it reaches 35 to 50 km / h, but the waves are getting higher, which can reach 20 meters so that they can enter tens of kilometers into the mainland, so that they can destroy anything that comes in their way, such as vehicles and other materials. Large-scale waves from tsunamis can cause a substantial number of fatalities because their effect is so severe that it can injure whatever the waves sweep away, including people, plants, and structures. In addition, the tsunami can harm agricultural areas and clean water sources like wells because of salt water pollution when the waves came inland. Underwater earthquakes, underwater and underwater volcanic eruptions, underwater landslides, and meteor impacts are the primary triggers of tsunami happenings.

According to Law No. 24 of 2007, a disaster is an incident or series of occurrences that endangers and disrupts people's lives and livelihoods and is caused by both natural and/or non-natural forces as well as human factors. It may cause fatalities, property losses, damage to the environment, and psychological effects. A disaster, on the other hand, is described as a significant disruption to a community's or society's ability to operate that results in widespread

consequences and losses to people, property, the economy, and the environment that are more than what the afflicted community or society can bear (UNISDR, 2009). To defeat them with their own means. By implementing precautions as soon as feasible, catastrophe risk can be reduced (Ahn et al., 2021; Ohtsu & Hokugo, 2022; Righi et al., 2021). The primary objectives of disaster management are as follows: (a) to protect the community from the threat of disasters; (b) to harmonize current laws and regulations; (c) to make sure that disaster management occurs in a planned, connected, organized, and wide-ranging manner; (d) to respect local culture; (e) to build public and private participation and partnership; (f) to encourage the spirit of mutual working together, collaboration, and benevolence; and (g) to establish peace in the life of society. The implementation of disaster management, as per Law No. 24 of 2007 concerning Disaster Management, entails a number of actions, such as the creation of initiatives for development that increase the risk of disaster, disaster preventative measures, response to emergencies, and rehabilitation.

Disaster Planning Pre-disaster, during catastrophe, and post-disaster stages are the three phases of disaster management. The acts taken during the pre-disaster period result in disaster mitigation and preparedness measures. Being prepared entails being ready to deal with the prospect of calamity in every manner conceivable. Communities are prepared to put well-organized disaster management plans into effect and improve their teamwork, skill-building, forecasting, early warning, and evacuation procedures. Only through disaster preparedness, if calamities are unavoidable, may lives be saved and losses minimized by rapid rescue, fast aid, and coordinated responses (Bhandari, 2014; Pandey, 2018). According to Ramadhan et al. (2019) and Twigg (2015), there are many different types of disaster preparation plans, ranging from broad mitigation and preparedness strategies to specific contingency plans to address particular hazards. From another perspective, being prepared is arming people with tools that will increase their chances of survival and minimize financial and other losses. This is accomplished through equipping local government officials to deal with catastrophes and teaching the local populace about the actions they may take to lessen their specific vulnerabilities and hazards.

Through effective preventative measures, preparedness reduces hazard side effects and guarantees that an organization can conduct reaction and recovery operations in a timely, suitable, and efficient manner (Berke et al, 2012; Buchari, 2021; Copola & Maloney, 2009). According to a different viewpoint, preparation is an action taken by the government, society, and people before a tragedy strikes. When a calamity comes, the community will be better prepared due to its residents' readiness. (Dodon, 2013; Matsuba, 2022; Tian et al, 2022). Twigg (2015) notes that disaster preparedness has two basic objectives: assisting people in reducing the threat of an oncoming disaster, and creating strategies, resources, and systems to deliver necessary support. The primary components of disaster preparedness include event prediction and warnings, evasive action, and improving response through prompt and efficient rescue, help, and support (Twigg, 2015). Additionally, Twigg views this preparation using a nine-dimensional framework for catastrophe preparedness. The nine dimensions framework are a) Vulnerability Assessment b) Planning; c) Institutional Framework; d) Information System; e) Resource Base; f) Warning System; g) Response Mechanisms; g) Education and Training; and h) Rehearsal.

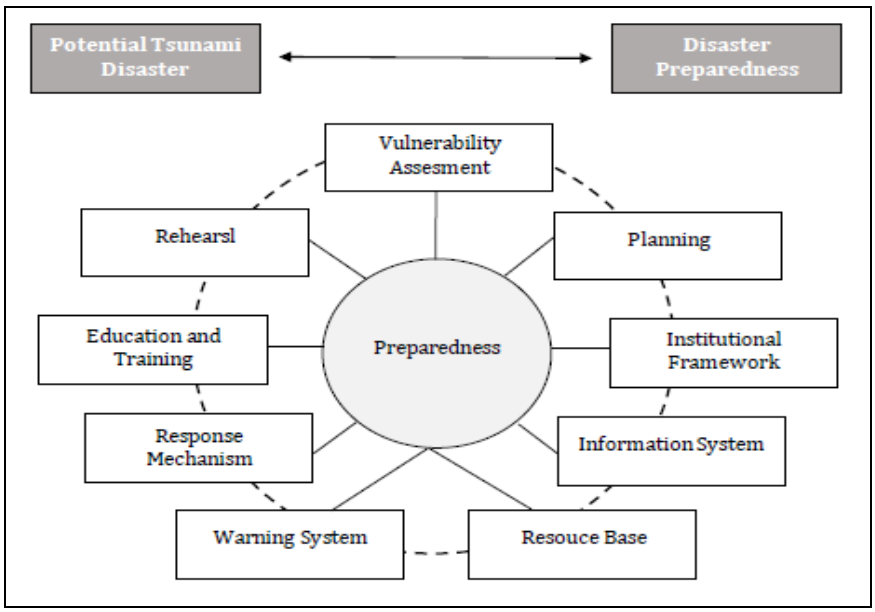

Figure 4. Research Framework

Some of Indonesia's most stunning locations are available for Lombok tourism. As a result of the presence of the Komodo National Park, the Ministry of Tourism has acknowledged Labuan Bajo as an important destination for halal tourism and the gateway to Indonesia's eastern region. Four infrastructure development plans are now in place in the region in compliance with President Regulation Number 32 of 2018 on operational processes in Labuan Bajo and Flores. Other programs in the four include: Strategic region Mapping for Tourism Labuan Bajo; Development of an international airport; Installation of 20 mooring bays in the Komodo dragon National Park region; and Construction of an integrated waste management system in Labuan Bajo (Kemenparekraf, 2021). The tourist industry on Lombok has expanded steadily over the past few decades, although at a slower rate. The area estimates there were 1,750,00 international visitors in 2017. In actuality, there were 1,430,249 fewer arrivals than expected. While this is happening, the number of domestic travelers has increased from around 1,750,000 to 2,078,654. Although the actual number of tourists exceeded the prediction, the increase was not very large.

Of course, genuine measures to decrease catastrophe risk are required to lower the likelihood that the tsunami would have an adverse effect and to protect the stability of the tourism sector. In order to develop a tourist sector that is robust to disasters, this study aims to assess the readiness of the tourism business group in North Lombok Regency in facing the threat of a tsunami. The problem of this research is how to prepare community groups in the tourism business world in North Lombok Regency. Given that an earthquake has occurred in North Lombok Regency, the absence of preparedness can cause panic. Therefore, knowledge and skills of the tourism business community are needed to prepare anticipatory steps for disaster events in disaster-prone areas. Disaster mitigation is very important for the safety of all citizens. Even though tsunami disasters cannot be avoided, with maximum disaster mitigation, the impact can be minimized. This research explores disaster mitigation in a more comprehensive and deep manner, especially for tourism business actors to maintain the stability of their tourism ecosystem.

Method

Methods of qualitative research were applied in this study. In case studies, qualitative research is used to examine and comprehend the significance of various persons or groups of people who are linked to social or humanitarian issues (Creswell, 2016). This study adopted a case study methodology as its method of choice. The case study technique involves gathering extensive data from a variety of rich information sources and exploring "a bound system" or "a case/multiple cases" through time (Creswell, 1998). Since this research is focused on a particular incidence involving the readiness of the tourism industry in the North Lombok area to deal with the tsunami, a case study technique was used.

This research examines the tourist industry's attempts to prepare the community for a tsunami disaster in North Lombok Regency. The resource individuals are tourist industry players, including up to 14 owners and/or managers of accommodations, restaurants, handicraft shops, and other services along the shore of North Lombok Regency. The information was gathered through in-depth interviews, focus groups, and observations. Purposive sampling was used to choose the study's informants, with the intention of learning more about how tsunami hazard mitigation is being implemented in the North Lombok Regency tourism sector.

Table 1. Aspects and Sub-Aspects of Tourism Business Preparedness against the Threat of a Tsunami Disaster

Aspect	Sub-Aspect	Indicator
Disaster Preparedness	Vulnerability assessment	Disaster knowledge Understanding of the value of preparedness
	Planning	Existence of disaster mitigation strategy
	Institutional Framework	There is a coordinated disaster preparedness and response system
	Information system	Have a disaster information system
	Resource Base	Anticipate resource needs during emergency response
	Warning System	Early Warning System availability
	Response Mechanism	a well-known and well-recognized disaster management organization
	Education and Training	Planning training sessions, workshops, and outreach initiatives for impacted organizations and volunteers
	Rehearsal	Disaster mitigation practice exercises

Source: (Twigg), 2015

In qualitative research, data analysis will occur concurrently with other phases of development, such as data gathering and writing of results. The Miles and Huberman model was then used to assess the data that was gathered during the data gathering step. According to Miles and Huberman (1984), data analysis is carried out constantly until it is finished, leaving the data saturated. Displaying data, decreasing data, and generating conclusions are the phases in data analysis. The key step that must be taken in qualitative research to avoid bias and provide a degree of trust in a study is data validation. By comparing the accuracy of the data collected from one respondent with another respondent who was thought to have a different point of view, data triangulation was used in this study to assess the data. Finding a

trustworthy degree of truth from a research requires taking pictures of a single phenomena from numerous angles (Flick, 2004; Rofiah & Bungin, 2021).

Results and Discussion

Due to its location on the Indo-Australian Ocean plate and the Eurasian Continental Plate, as well as the effect of the Flores back arc, the Lombok and Sumbawa segments in the north, the West Nusa Tenggara area is susceptible to earthquakes. According to information from the National Disaster Management Agency (BNPB), the earthquake caused 71,962 damaged homes, 671 damaged educational establishments, 52 damaged medical facilities, 128 damaged places of worship, and infrastructure damage. Meanwhile, data from the Regional Disaster Management Agency (BPBD) of KLU indicates that it is expected that 74,000 homes were destroyed, with 52,000 of those homes having significant damage.

People are in a great deal of worry when an earthquake happens and there is a chance that a tsunami may follow since they don't know what to do. People who work in the tourist industry left their houses and traveled to nearby highlands. Because there were no mountains to retreat to, the locals, officials, and visitors on Gili Meno and Gili Air were fearful. The mountains in the center of the island are accessible to visitors and locals alike when they are on Gili Trawangan. When the BMKG released a statement warning that an earthquake may trigger a tsunami, concern among the populace increased. People who had previously moved to the highlands after the earthquake persevered there until the shaking subsided, while some stayed out of fear of a tsunami.

According to the Meteorology, Climatology and Geophysics Agency (BMKG) the magnitude of the tsunami that occurred in Indonesia ranged from 1.5 to 4.5 on the Imamura scale with a tsunami wave height ranging from 4 to 24 meters and the reach of the waves to land ranging from 50 to 200 meters from the line beach. Earthquakes that have the potential to cause tsunamis are earthquakes that occur on the seabed. The depth of the epicenter is less than 60 km, the magnitude of the earthquake is more than 6.0 on the Richter scale, and the type of earthquake fault is classified as fault fault or fault fault. Most earthquakes that result in tsunamis are classified as dip-slip earthquakes, a majority of which are thrust earthquakes.

As catastrophe knowledge is not commonly paired with simulation exercises, people are left fearful and terrified when disasters strike. The population is so terrified of tsunamis because of the devastation they may do that they won't even talk about them. When the earthquake hit the Komba Bay region, sea level surged to the mainland, giving the impression that a tsunami had really occurred. The results of data collection by the informants show the results of comprehensive tourism business preparedness in the aspects of Vulnerability assessment, Planning, Institutional Framework, Information system, Resource Base, Warning System, Response Mechanism, Education and Training, and Rehearsal.

Table 2. Findings on the Preparedness of Tourism Businesses against the Threat of Tsunami Disaster in North Lombok Regency

Sub-Aspect	Indicator	Finding Summary
Vulnerability assessment	Disaster knowledge Awareness of the importance of preparedness	• Vulnerability assessment is a result of catastrophe mitigation planning and preparation. • The general public is well informed about the possibility of a tsunami tragedy.
Planning	Existence of disaster mitigation strategy	• A tiny portion of the tourism industry has confined planning for dealing with the possibility of a tsunami to the initial development of evacuation routes. • There are currently no tsunami evacuation signs in place. • A district-level contingency plan is created in North Lombok. • After the tsunami tragedy strikes, a new standard operating procedure for disaster response will be created.
Institutional Framework	There is a coordinated disaster preparedness and response system	• Contigency plans have been created at the North Lombok Regency level of government. • The recon has not been carried out in line with how each party's obligations and responsibilities were allocated to them.
Information system	Have a disaster information system	• The process for disseminating pre-tsunami information does not yet have an integrated information system. • Tourists have not received comprehensive information regarding what to do in the event of a tsunami or where to go for evacuation centers.
Resource Base	Anticipate resource needs during emergency response	• It has not been established whether there are any arrangements or formal agreements between employers and BNPB on the forecasting of resource requirements during emergency reaction. • These resources needed include budgeting. • Emergency response, budgets for emergency preparedness, incoming aid coordination methods, and supply logistics storage.
Warning System	Presence of an Early Warning System	• Information about disasters may be found on television • There is a hotel security team that

Sub-Aspect	Indicator	Finding Summary
		collaborates closely with the neighborhood security system • Not all villages have information boards yet.
Response Mechanism	A well-known and well-established disaster management organization	• Forming a TSBD team, Tagana • Form an evacuation team
Education and Training	Organizing disaster volunteers, outreach programs, training sessions, and workshops for impacted groups	• No simulation exercises, community education on disaster preparedness, or creation of paperwork for backup plans have been done for any tourism-related company ventures. • There is no SOP, no evacuation route, and no evacuation signs are placed, so when a calamity strikes, all employees and visitors panic. To better understand and learn about tsunami danger preparation, participants in the FGD activities from the tourist industry were invited.
Rehearsal	Disaster mitigation practice exercises	• The contingency plan scenario has not been tested for each business sector in North Lombok Regency. • There has never been a rehearsal or practice of tsunami catastrophe mitigation in each firm.

Disaster preparedness has not been a high concern for company owners in North Lombok Regency, West Nusa Tenggara, so when a disaster comes, anxiety still exists, especially among hotel and restaurant personnel, as it did after yesterday's earthquake that struck NTB. Panic occurs because there is no habituation in disaster mitigation to identify evacuation routes when a disaster occurs (Gadeng et al, 2017). Since yesterday's earthquake, it has aroused the desire of entrepreneurs to start making standard operating procedures related to tsunami disaster preparedness. In line with the opinion of Harood (2017) which states that the existence of a disaster SOP will be a guideline that is able to demand that the community be better prepared in dealing with the threat of a tsunami disaster. The SOPs that will be compiled are a source of understanding both in theory and practice of disaster response.

Disaster preparedness efforts will be able to assist people in avoiding the threat of disasters and be able to develop structured mechanisms to provide adequate assistance. Rob & Anyona (2022) argue that clear rules regarding preparedness will be able to direct people to know what, where, and how actions must be taken before, during, and after a disaster occurs. The community needs to have a good understanding of disaster, especially for business actors who are in disaster-prone areas. Prevention efforts can be made along with advances in technology and ease of communication. This of course requires a well-integrated Cooperation. All components in the tourism business world, starting from the government, business people, tourists, and local residents know well the understanding of disaster.

Planning is a process used in disaster response efforts to describe the goals and directions of preparedness, evaluate the roles and responsibilities of the community and

institutions in emergency response in greater depth. Requires order for business actors around the coast of North Lombok Regency to prepare a draft disaster mitigation action plan. All parties involved in the tourism industry, including visitors, need to be able to understand the action plan that has been created from the contingency plan that has been produced at the district government level. Socializing the contingency plan documents that have been approved must be carried out. Socialization needs to be done periodically and repeatedly (Kusumastuti et al, 2022). Simple planning to ensure everyone is safe from the tsunami disaster. This is important to anticipate the possibility of a high and unusual tsunami that has occurred so far. Disaster mitigation simulation is a part that cannot be missed. Regular practice and recognizing evacuation routes are very useful when a disaster strikes to avoid panic (Gadeng et al, 2017; Iskandar et al, 2022). The community did not panic when the tsunami occurred, because the community had often used evacuation routes to get to the gathering point which was used as a shelter in the hills. Without realizing it, people often carry out various practices in the tsunami evacuation route, and that is one of the most important attitudes to prepare themselves for a tsunami disaster.

Coordination activities between and within entrepreneurs are very important in disaster preparedness, both horizontally and vertically. There is also coordination in the Emergency Response Organizational Structure (STOD) which has been regulated in the division of tasks and responsibilities of each section. However, based on the results of observations and interviews, there is no one to regulate or inform them what to do and where to move and ask questions. Even business plaques do nothing. The results of this study corroborate previous research from Cai et al (2022) which stated that the existence of a disaster information system has the aim of coordinating equipment that can collect and disseminate early warnings about disasters and the results of measuring existing vulnerabilities both within institutions and between organizations involved to the wider community. A comprehensive information system related to the mechanism for delivering information from the government to tourists through business people and vice versa has not been seen. Collaborate with local government or NGOs to be able to move in disaster. So that the information system does not only expect from the government or other institutions outside the community but also how tourism business actors can increase their capacity to create their own information system.

Results of interviews with Prof. Ron Harris, a researcher from Brigham Young University, USA, said that the main issue was that the community, including business people, still depended on the government to provide warnings in the event of a disaster, business actors did not want to take responsibility for their own safety. They want someone else to be responsible for their security. They want sirens, warnings, where to go and what to do. But what must be understood is that when a disaster occurs the local government does not have that capacity, because they experience a disaster as well. So all groups in an integrated manner each must have their own resilience with tsunami disaster preparedness that may occur. Seminars, outreach programs for affected areas, training sessions, and disaster volunteers. Typically, public education and information systems are employed to disseminate information regarding threats and reaction measures. Education and training are given in an effort to increase the capacity of government employees, businessmen, and the greater society in general. Businesspeople have never engaged in a simulation of catastrophe prevention. For the purpose of creating a schedule of instructional and training activities known as Training of Trainers (TOT), The government should work with stakeholders in the tourist industry. The program's goal should be to prepare participants to serve as disaster cadres or trainers. Participants who have received training are obligated to impart their expertise to locals and

visitors to North Lombok Regency. Rumambi et al (2022) stated that the implementation and habituation of disaster mitigation will reduce the impact of disasters that occur more effectively and efficiently.

One of the policies in tsunami disaster mitigation is by increasing the understanding and participation of coastal communities in tidal wave disaster mitigation activities. This policy can be carried out in various ways, including socializing and increasing public awareness about natural disasters and the environmental damage they cause, developing information on disasters and the damage they cause including developing databases and disaster risk maps, exploring various local wisdoms in disaster mitigation. Indonesia, which consists of various tribes and entities, has a lot of local wisdom in an effort to maintain life and be friendly with nature. In addition, community preparedness for disasters can be implemented in the following ways, such as developing systems that support communication for early warning and emergencies, organizing training and simulations of responses to disasters and the damage they cause, as well as disseminating information on disaster stages and accompanying signs. disaster

As an effort to suppress the worse impact of a disaster event, a mitigation effort is needed. Tsunami disaster mitigation can be done with an early warning system to the community. The Tsunami Early Warning System (TEWS) based on advanced technology can be applied to tsunami-prone areas. Integrated systems such as earthquake monitoring with seismograph networks, wave monitoring, integrated DART (Deep-ocean Assessment and Reporting of Tsunamis) systems can be applied in an effort to provide early warning to the public in a tsunami event. Equally important is the outreach effort to the public and related officials, whether through print, electronic, mass media, and various other means on an ongoing basis to always be alert and understand the dangers and characteristics of the tsunami disaster.

Conclusion

The implementation of preparedness efforts for the tsunami disaster in North Lombok Regency still needs to be improved in terms of vulnerability assessment, planning, institutional framework, information system, resource base, warning system, response mechanism, education and training, and rehearsal, according to the research's findings and discussion. After the tsunami, the tourist industry was only partially prepared, with the creation of evacuation routes, installation of evacuation signs, and development of SOPs being the first steps. The contingency plan that has been prepared at the government level of North Lombok Regency has not been broken down into an action plan that contains strategic actions that can be taken if a tsunami disaster occurs. The disaster information system is limited to the existing mass media and has not been fully integrated. The existing preparedness efforts need to be maximized by continuing to collaborate with various groups to create a disaster emergency response environment. Tourism business actors together with the government, community, disaster volunteers, non-governmental organizations, and all parties coordinate with each other to form more effective and efficient preparedness efforts. Through the implementation of the results of research on the integration of tsunami disaster mitigation preparedness, it is hoped that it will be able to save the community as a preventive effort. Even though the tsunami disaster could not be avoided, its impact was minimized by maximizing preparedness efforts.

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