Communication Strategy for Tsunami Disaster Mitigation in Tourist Areas on the South Coast of Java Island
(Case Study of the South Coast of Kebumen Regency)

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ABSTRACT. Indonesia is an archipelagic country with a large maritime landscape that lies between the Asian and Australian continents. Indonesia is surrounded by two oceans, the Indian and Pacific Oceans, and is prone to tsunami disasters due to the intersection of three tectonic plates. Kebumen is one of the districts on Java's southern shore that has a high risk of being hit by a tsunami. Given that the beaches in Kebumen Regency are tourist sites with local, national, and international visitors, it is essential to educate the community to be prepared through disaster mitigation activities in order to deal with the tsunami danger. The goal of this research is to look into disaster mitigation measures used in Kebumen Regency. Surveys, interviews, and field observations were used in the data collection process. The District Government, in partnership with BMKG and PNPB, organized a series of activities in the midst of the tsunami tragedy, inviting diverse groups of society, from children to adults. Disaster communication is critical in disaster mitigation because it provides for factual and well-received information to be delivered to the community.

KEYWORD : communication strategy, disaster communication, disaster mitigation, tsunami

INTRODUCTION

Indonesia is the world's largest archipelagic country, with thousands of tiny islands and the world's longest beach. Natural disasters, which are a combination of tectonic earthquakes, tsunamis, hurricanes, floods, volcanoes, and landslides, can strike Indonesia's coasts and small islands due to its geographical and geological conditions, as well as non-natural factors such as technological failures and human activity. It is impossible to predict when a disaster will strike in a certain location. Natural and/or unnatural factors, as well as human influences, can generate disasters that threaten and disturb the lives of living individuals and communal resources, resulting in the loss of human life, environmental damage, loss of ownership, and psychological effects. (UU No. 24 tahun 2007).

Indonesia is located of the 40,000-kilometer ring of fire, which is one of the world's most active seismic zones. Indonesia is situated at the convergence of three tectonic plates: the Indo-Australian plate, the Eurasian plate, and the Eurasian plate. Tectonic plates are hard chunks of the Earth's crust that float in a hot, liquid environment. Off the beaches of Sumatra, Java, and Nusa Tenggara, the Indo-Australian Plate collides with the Eurasian Plate. In northern Papua and Maluku, the Pacific Circum Plate collides with the Eurasian Plate. In Indonesia, plate collisions resulted in the formation of a variety of mountains, some of which were volcanoes. A volcanic arc spans from the islands of Sumatra – Java – Bali – Nusa Tenggara – Sulawesi in the southern and eastern sections of Indonesia, with old volcanic mountains and lowlands dominated by marshes on both sides. In Indonesia, the path where the plates meet is under the water, putting the country vulnerable to tsunamis if a big earthquake happens at a shallow depth. According to data, Indonesia has one of the highest seismicity rates in the world, with a rate more than ten times that of the United States. (Arnold, 1986).

Tsunamis threaten 46% of Indonesia's coastline, with the southern coast of Java being one of the most susceptible. Indonesia is the most dangerous to natural disasters in the world, according to the Global Facility for Disaster Reduction and Recovery (2020), and is at high risk of a variety of hazards, including a tsunami (BNPB, 2020). In Indonesia, geological disasters such as earthquakes and tsunamis pose a serious threat; while these disasters do not occur frequently on a big scale, their impact will be devastating and result in a huge number of victims. A tsunami is a natural disaster characterized by

extremely huge ocean waves induced by vertical changes in water masses and unexpected disruptions of deep sea water masses (Utomo, 2018). Tsunamis are waves that form in the water as a result of an earthquake, volcanic eruption, ocean earthquake, or meteor strike. When the tsunami is still far out in the middle of the ocean, the waves are mostly not visible, but as it gets closer to the coast, the waves will become more noticeable (Yakub, 2019). A tsunami is a big sea wave caused by underwater eddies caused by plate tectonics, landslides, volcanic eruptions, or meteors falling from the sky. Tsunamis can reach a height of up to 30 meters and hit land at rapid velocity.

According to the results of a study published in the journal Scientific Report by several researchers from Institut Teknologi Bandung (ITB)[1], a massive tsunami with a height of 20 meters could occur in the south of Java Island. Because it is part of the ring of fire and has a history of historic tsunamis, a tsunami of this magnitude might strike an area right opposite the island of Java's south coast, which includes the provinces of West Java, Central Java, the Special Region of Yogyakarta, East Java to Bali, and NTT.

The issue is that some beaches in the south of Java Island, which are highly prone to tsunamis, have become a tourist destination that draws visitors from all over the world, not just from the area, but also from other places, both local, national, and international. When one side discovers that certain beaches are vulnerable to tsunamis, which we never know when they will strike, and that these regions should be avoided, the situation becomes ironic. On the other hand, the beach is a tourist attraction and a source of income for locals who rely on visitors to support their families. To respond to this, a strategy is required to reduce disasters in tsunami-prone coastal areas in order to avoid large-scale fatalities. We can't stop a disaster from happening, but we can try to save the community when it does. As a result, disaster mitigation is a critical task for all parties involved, including the government, stakeholders, and people at all levels of society.

A lack of preparation in the face of danger is the most common cause of casualties and damage. Readiness is crucial in disaster risk management because it reduces the possibility of negative consequences from disasters and makes it easier to mitigate disaster risks (Hasrul, 2019, p.30-40). Disaster mitigation is used to carry out preparedness. Disaster mitigation is defined as a set of activities to reduce disaster risk, both through physical development as well as knowledge and capacity building in coping with disaster threats, according to Article 1 paragraph 6 of PP No. 21 of 2008 about the Implementation of Disaster Management. Disaster mitigation refers to a set of actions taken before, during, and after a disaster to lessen disaster risk.

The potential for a 20-meter tsunami, which is predicted to strike off the southern shore of the island of Java[2], drew the attention of researchers, prompting them to perform this study. The first year's research looked at how to combine the SOR communication model and the ASSURE learning design to create a new disaster education strategy.

This research was conducted in 3 stages, namely: (1) designing learning using the ASSURE model, (2) designing Stimulus Organism Response (SOR) in learning and (3) analyzing learning outcomes data using 9 response indicators. Research shows that educational communication in the SOR model is synchronous with the ASSURE design so that reasoning, learning motivation and direct experience in understanding disasters are more developed. The results of the evaluation of the new strategy using 9 response indicators, namely: Relevance, Consistency, Concise, Method, Analysis, Data Sources, Information, Conclusions, References show that 58% of students choose topics that are relevant to the learning material, 69% of students write short scientific papers that are appropriate. with the chosen topic, 74% of students develop experiments using statistics, and 53% of students Presenting data in visual form such as pictures and maps. This research shows that the new strategy of disaster education by combining SOR communication model and ASSURE learning design at all school levels is very effective.

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[1] Implications for megethrust earthquakes and tsunamis form seismic gaps south of Java Indonesia https://www.nature.com/articles/s41598-020-72142-z diakses pada 27 Mei 2022.

[2] Riset ITB Ungkap Potensi Tsunami 20 Meter di Selatan Jawa https://www.kompas.com/sains/read/2020/09/25/160200423/riset-itb-ungkap-potensi-tsunami-20-meter-di-selatan-jawa-begini?page=all diakses 26 Mei 2022

This research is a 2nd-year follow-up on disaster communication in tsunami disaster mitigation in the South of Java to Bali. The focus of this study is on the coastal area in Kebumen Regency in order to determine communication strategies for reducing the tsunami disaster on Pulan Java's south coast.

METODHS

The study used a qualitative descriptive approach by describing the findings in the field. This research was conducted in Kebumen Regency. This study was carried out by examining coastal locations with a large number of visitors but no vegetation or highlands near the coast. On the evacuation route, researchers notice signs or directions. Researchers had spoken with representatives from BMKG Central Java, BPBD Kebumen Regency, Kebumen Destana Management, local inhabitants selling on the beach, and tourists. In addition, audio visuals for documentaries and public service advertising are used as documentation. Interviews were done to obtain information about each stakeholder's work program, to learn about mitigation activities, to learn about the community's perspective, and to determine the level of community understanding about the tsunami and mitigation actions in the coastal tourism region.

DISCUSSION

Disaster Mitigation in the Coastal Tourism Area of Kebumen Regency.

Kebumen is one district on the southern coast of Central Java with a high disaster vulnerability level. In the southern coastal area, there are 12 sub-districts that are included in the zone prone to the threat of a tsunami. The stretch of the sea trench along the southern coast of Kebumen is 250 KM and mostly, there is no natural barrier between the sea trench and the mainland, such as mountain ranges or hills. This condition makes Kebumen vulnerable to the tsunami disaster. In addition, Kebumen has a history of ancient tsunamis, we can see the evidence of which in Karangsambung-Karangbolong. The 2020 Disaster Risk Index states that the level of tsunami vulnerability in Kebumen is at high risk because of its coast, which is directly opposite the Indian Ocean. There are 31 villages in 8 sub-districts which are high potential tsunami-prone areas.

Most of the beaches in Kebumen are beach tourist destinations that have beautiful views, so many domestic and foreign tourists visit them. This is a dilemma. On the one hand, this is a disaster-prone area, but this area is the center of livelihood for the local people around the coast. Therefore, it is important to have disaster mitigation in tsunami-prone zones. Based on the results of field observations and interviews with informants from both government agencies and residents, researchers found mitigation efforts had been carried out by parties and residents as well. The following are the forms of disaster mitigation in Kebumen:

1. Destana Formation
   In mitigating the BPBD plan (Disaster Resistant Village/ Desa Tahan Bencana), namely villages that form the ability to recognize threats in their respective areas and can organize community resources to reduce vulnerability and increase capacity to reduce disaster risk.
2. Field School
   Field School is s an activity held by BMKG whose purpose is to educate the public regarding the information on the potential dangers of an earthquake and tsunami. Apart from this, the field school also trains the community to know what to do when a disaster strikes. In this field school activity, participants are not only given theoretical material but also simulations in the field. This activity is also a forum for BMKG to form a Tsunami Ready Community.
3. Tsunami Disaster Mitigation Socialization
   BMKG, BPBD and BNPB carried this socialization activity out. They carried this socialization out in schools, PKK, Karantaruna, and other community groups to provide education about the tsunami disaster.
4. Early Warning System Installation and Simulation
   Facing the threat of a tsunami that could come without warning, BPBD Kebumen will install a tool to detect and provide early warning in the event of a tsunami, namely the Early Warning System (EWS) at several points along the south coast. Kebumen Regency. This routine activity of testing the activation of the Tsunami Early Warning Sirens is carried out every 26th at 10:00 every month by sounding sirens along the south coast of the Kebumen area. Its purpose is for the maintenance and upkeep of the EWS equipment. Every few months, BPBD conducts disaster response

simulation activities when a tsunami arrives. This simulation activity sounds EWS so all levels of society, whether active at home, at work, at the market, or at school, immediately run to the gathering point or shelter by moving away from the southern coastal area. Apart from running to the shelter, some residents also-run to the hills, which are higher than the residents' residential areas. The TNI, Polri, BPBD, and volunteers involved assisted in the evacuation. This activity increases preparedness efforts which are the key to safety in the event of a tsunami.

Figure 1: Early Warning System

5. Disaster Preparedness School
   This activity is an activity held by the Indonesian Red Cross (PMI) in collaboration with schools in Kebumen Regency. The Disaster Preparedness School aims to build a culture of awareness and safety in schools, as well as to build a culture of resilience in the face of disasters by school residents.
6. Making an Evacuation Route Guide on the Beach as a Tourist Area
   Almost all beaches on the south coast of Kebumen are tourist attractions that are certainly visited by many tourists. While these beaches are beaches that are in a tsunami-prone zone. Therefore, BPBD together with Pokdarwis made a route for evacuation. Some beaches do not have barriers such as hills, so the tsunami comes, and residents have to run farther to find higher ground. Therefore, it is very important to have directions and warning boards. So far, tourist beaches have installed warning boards not to swim to the middle, signboards to find routes and information boards for tsunami-prone areas.

Figure 2: Early Warning System

7. Creating an Evacuation Map
   The height of the beach waves, the shape of the beach, the topography of the land behind the beach, and the density of vegetation on the coast affect the magnitude of the land invasion. Curved coasts (bays) experience a stronger invasion than flat beaches, as tsunamis accumulate on these curves.

Similarly, the beaches that emptied into the river experienced a massive invasion, and the river became a toll road for the tsunami to reach the mainland. Different coastal vegetation densities have different fates for the two beaches with the same form of persistence. The denser the plants, the greater the tsunami energy reduction, reducing the invasion.

In Kebumen there are three zonings based on the evacuation route. The first area is Tanjung Karangbolong. If a tsunami occurs with the status of "Alert" or "Watch out", then anyone on the beaches of Pedalen, Menganti, Karangbata, Pecaron (Srati), and Pasir can immediately evacuate to the hills behind each of these beaches and do not need to travel far.

While the second area is a flat beach area that is in two places. The first place is between the mouths of the Telomoyo and Luk Ulo rivers and includes the districts of Puring, Petanahan, and Klirong. The tourist objects covered include the Petanahan beach (Karanggadung). In this area, there are no hills, so when a tsunami occurs, evacuation can only be carried out to the north up to a minimum of 1,000 meters. The second place is the young beach area, which includes Buluspesantren, Ambal, and Mirit sub-districts. The villages covered include Setrojenar, Brecong, Entak, Ambalresmi, Petangkuran, Miritpetikusan, and Tlogodepok. Sights covered include the Bocor Beach (Setrojenar). There are no hills in this area. If a tsunami occurs, they will do evacuation to the north, but to a minimum of 1,000 meters.

The third or final area is the beach, which empties into the river. There are four locations, the mouths of the Bodo, Telomoyo, Luk Ulo, and Wawar rivers. The mouth of the Bodo river is in Ayah District and the border between Kebumen Regency and Cilacap Regency. The main principle of providing evacuation in the estuary area is to avoid as much as possible from the river bank with a minimum distance of 500 meters and not to cross bridges that cross the river. If a tsunami occurs, residents or visitors must evacuate to the east towards the limestone hills of Tanjung Karangbolong. Because it is quite close, the distance is relatively short.

Figure 3: Evacuation Map of Kebumen Regency

The main disaster mitigation activities are increasing community preparedness in dealing with disasters (Prihadi, 2007: 3), namely (1) Efforts to increase understanding of disaster management for local government officials. Here, the Kebumen Regency Government is aware of the tsunami disaster and, through the BPBD, the government facilitates the needs of disaster mitigation, such as budgeting for socialization, building shelters, installing an Early Warning System. (2) Provide training to the community for disaster response. This is done through activities and field school programs from Destana. So that the training provided can improve community preparedness in dealing with tsunamis. (3) Disaster education package for the community, got from Destana activities. (4) Making maps and evacuation routes. Install warning signs and evacuation directions along the coast. This is certainly useful for tourists who come from outside Kebumen who do not know the direction and location of evacuation. (5) Manufacture and installation of tsunami signs. The government has made this effort well for the disaster mitigation process. (6) Simulating the early warning system and periodic evacuation (from BMG to BPBD, BPBD to the community, and the government evaluates). It was explained from the findings in the field, BPBD and related parties had implemented this strategy well. (7) Training for school students is done through the Disaster Preparedness School program. (8) Campaign through print and electronic media. This seems to have not been implemented properly by the government or other parties to carry out social campaigns.

Disaster Communication in Disaster Mitigation Efforts

In disaster mitigation efforts, effective communication is needed by various parties involved in implementing disaster mitigation. Communication in disasters is not only needed during a disaster emergency, but also during pre- and post-disaster situations. Pre-disaster means that communication plays a role in preparing everything carefully before a disaster occurs, such as education, delivery of information and appeals to the community. The important thing in pre-disaster is to prepare people in disaster-prone areas about potential disasters in their area, provide training and build habits in dealing with disaster situations. The role of communication is to make the community ready because preparedness is the key to safety in the event of a disaster. Community preparedness is useful for anticipating disasters through organizing and developing appropriate steps towards mutual safety.

There are five main foundations in building disaster communication (Haddow, 2008:2):

(1) Customer Focus, namely how communicators understand the information needed by consumers. In disaster communication, disaster information needs to be communicated accurately. In disaster mitigation, communicators in this case BMKG, BPBD, BNPB and other organizations involved must be able to provide good and accurate information. So far, these institutions do not operate independently, but can collaborate even with volunteers. In previous studies, the research team found data that some people felt bored and sometimes did not understand the socialization material presented by related parties. So, from this data, the research team made materials as audio visuals, picture storybooks, and information through public service advertisements.

(2) Leadership Commitment, this relates to the role of leaders in disaster response who are committed to communicating. This means that to move the community, there needs to be a leader who can communicate well with the community. The role of the opinion leader is also important in this situation, because people are usually more willing to listen to what their opinion leader has to say.

(3) Situational Awareness, namely communication based on an effective situation analysis that occurs. In carrying out this disaster mitigation, it is necessary to analyze the environmental situation so that mitigation can be carried out optimally. For example, in determining the gathering point or shelter, it is necessary to see whether the area is safe from the threat of a tsunami. The survey method to the community can be carried out to find out how many people know the information conveyed in this disaster mitigation.

(4) Media Partnership is a collaboration between mass media, namely television, radio, news and social media, to convey accurate information to the public. Socialization about disaster mitigation does not always have to come from door to door, but can take advantage of mass media and social media.

In every strategy implemented for disaster mitigation, the researcher sees that (1) communication here is a form of a verbal exchange of ideas, there is an interaction process to provide information to each other, provide understanding and reduce uncertainty (uncertainty reduction) and connect with each other. (2) communication is a process that encourages an action to master by using the media to transmit information, provide a stimulus to respond expectedly, and encourage the desired behavior of a communicator.

The hazard information provided during socialization or training sessions did not appear to be sufficient to alert the people to the dangers of the looming disaster. Communication between all sections of society is required in this disaster mitigation effort, from before the disaster until after the event. In order to fulfill the purpose of communication, disaster mitigation requires an effective communication plan. As a result, this communication strategy is a set of actions that have been carefully prepared in order to attain objectives through the use of communication methods and approaches. According to Berger, there are three methods to communication strategy: passive strategy, active strategy, and interactive strategy (Griffin, 2006, p.13).

The Importance of Mitigation Plans in Tourist Places

One of the tourist destinations that attracts people to visit is the beach, especially in Indonesia. The sea surrounds the islands with a variety of beautiful beaches. On the island of Java itself, there are many beach tourism objects, starting from the north coast of Java and the south coast of Java. However,

the characteristics of the north coast and south coast of Java are very different. The southern coast of Java is more disaster-prone than the northern coast of Java. Natural disasters that may occur on the coast or the coast with a high hazard are earthquakes and accompanied by a tsunami. On the southern coast of Java Island, it is very vulnerable to tsunamis when an earthquake occurs under the sea because of shifts in the earth's plates. A tsunami is a long wave that causes great damage if the wave hits the coast and the water reaches distant lands (Maghfiroh, 2014, p.7-10). Taking risks that occur from a tsunami, it is important to raise awareness of tsunamis, especially on the coast, which is in a tsunami-prone zone to minimize the risks that may occur.

Of course, the government or other parties cannot close beach tourism along the southern coast of Java. Although these beaches are included in the tsunami-prone zone, that is where the sustainability of the life of the local community takes place. The results of interviews with several residents who sell on several beaches in Kebumen, most of them already know about the threat of a tsunami where they live and work. They have received education about the ins and outs of a tsunami and what they should do if a tsunami occurs. Residents who sell these tend to "accept fate" if a tsunami hits, especially if on some beaches there are no hills or highlands for them to run to, even though there are hills or highlands, they are quite pessimistic that they can reach the hills. In less than 20 minutes. There were many people who would definitely run to the nearby hills together. Residents have realized that the area where they live and work is a tsunami-prone area, therefore "accepting destiny" is the last decision if they cannot save themselves.

Therefore, what can be done by the government or community groups is how to mitigate disasters in tourist areas by compiling a disaster-resilient tourism development plan. In planning the plan, there are several things that must be considered, namely

(1) Regional Vulnerability Analysis, structural adaptation plans to improve regional preparedness for disasters such as guard posts, SAR teams, signs or warning boards, signboards, assembly point signs, early warning systems and shelters. Beach tourism in Kebumen has carried out a vulnerability analysis so that the required preparedness has been fulfilled properly.

(2) Non-structural adaptation which includes efforts to increase community capacity, the need for local wisdom in dealing with the threat of a tsunami, certification of rescue teams, certification of preparedness. In addition, it is important to update information related to disaster activities, and what is important is to be aware of local environmental conditions.

(3) Ancillary services, providing hospitals, health centers, clinics, doctors or pharmacies, because this beach destination is quite far from the city center, additional services here are still lacking.

Tourist destinations in tsunami-prone areas We have prepared standard operational mitigation procedures that refer to the UNWTO (United Nations World Tourism Organization) which in its mitigation plan) is divided into three stages, namely the Emergency Response Stage, Recovery Stage and Normalization Stage. This mitigation plan seeks to equalize the perception that the development of tourist areas, such as natural tourism, cannot be separated from disaster mitigation. The results of this study have all competencies involved in disaster mitigation in Kebumen Regency (BMKG, BPBD, BNPB, Destana Group, and the community) have collaborated in this disaster mitigation process, and so far have prepared themselves in case of a tsunami.

CONCLUSION

Communication during a disaster is not only needed when a disaster occurs, but also plays an important role in pre-disaster before the disaster strikes. For local communities who are prone to disasters, this must be done considering that preparedness is an important key to disaster mitigation. As in Kebumen Regency, which is along the southern coast of Java Island and is an area that is included in the tsunami-prone zone, given that the Kebumen Regency has a history of Ancient Tsunamis. Disaster mitigation is the first step in pre-disaster to educate the public about tsunamis, prepare people to be prepared to face the threat of a tsunami that never knows when it will occur. Collaboration between government agencies, the private sector, stakeholders, and the community itself is important. BMKG, BPBD, PNPB, and PMI have carried out disaster mitigation strategies starting from the Establishment of Villages, Field Schools, Socialization on Tsunami Disaster Mitigation, Installation of Early Warning Systems and Simulations, Disaster Preparedness Schools, Making Directions for Evacuation Routes on the Beach as Tourist Areas, Create an Evacuation Map.

In disaster communication, things that need to be considered are (1) how communicators understand the information needed by consumers, (2) the role of leaders in disaster response who are committed to communicating, (3) conducting situation analysis, (4) collaboration between media to convey information properly to the public. In addition, the importance of standard operating procedures that need to be owned by the government and tourism awareness groups in managing coastal tourist destinations in tsunami-prone zones, in order to minimize casualties if a tsunami occurs. The results of this study show that disaster mitigation in Kebumen Regency is carried out by interactive communication strategies that involve various levels of society and related institutions.

REFERENCES

Arnold, E.P. (1986) Southest Asia Association on Seismology and Earthquake Engineering. Indonesia: Series on Seismology Volume V.

Badan Penanggulangan Bencana Daerah Kabupaten Kebumen. 2021. "Peta Resiko Bencana", https://bpbd.kebumenkab.go.id/index.php/web/post/194/peta-resiko-bencana, diakses pada 27 Mei 2022 pukul 15.27 WIB.

Griffin, R. W. (2006). Business (terjemahan: Sitha Wardhani). Jakarta: Penerbit Erlangga

Haddow, G. D, dan Kims. (2008). Disaster ComMunications, In A Changing Media World. London. Elsevier

Hasrul, H., Sri, A., & Arnim, S. 2019. Penguatan Kesiapsiagaan Stakeholder Dalam Pengurangan Risiko Bencana Gempabumi. Jurnal Geodika.

Maghfiroh Asti, K. S. & H. D. A. 2014. Simulasi Penjalaran dan Prediksi Run-Up Gelombang Tsunami di Pantai Malang. Jurnal Teknik Kelautan.

Prihadi, P.J..2007. "Bahaya dan Upaya Penanggulangan Bencana Tsunami". Makalah Seminar Nasional Manajemen Bencana, Universitas Tarumanagara, 26 Juli 2007.

Widiyantoro, S., Gunawan, E., Muhari, A. *et al.* Implications for megathrust earthquakes and tsunamis from seismic gaps south of Java Indonesia. *Sci Rep* **10,** 15274 (2020). https://doi.org/10.1038/s41598-020-72142-z