TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 28, 2022

A new decade for social changes

www.techniumscience.com

ISSN 2668-7798

TECHNIUM SOCIAL SCIENCES JOURNAL

Technium Social Sciences Journal
Vol. 28, 551-560, February, 2022
ISSN: 2668-7798
www.techniumscience.com

Preparedness of the Bantul District Regional Disaster Management Agency for the tsunami at Parangtritis Beach, Indonesia

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Abstract. The subduction zone in southern Java Island causes areas in the south of Java Island prone to tsunami disasters. Bantul District is located in south of Java Island. Parangtritis Beach in Bantul District has the highest number of visitors than other beaches in D.I.Yogyakarta Province. As an area visited by many local and foreign tourists, preparedness needs to offer to local communities and tourists. In order to when a disaster occurs, there are not many casualties, both from local communities and tourists. This study uses parameters from LIPI-UNESCO/ISDR (2006). The result of this study is that the preparedness of the Regional Disaster Management Agency of Bantul Regency to face the tsunami disaster has an index value of 93.99 which means it is very ready. However, preparedness effort has not been carried out optimally and thoroughly. Preparedness is still a priority for the local community and has not prioritized tourists.

Keywords. Disaster Preparedness, Tsunami, Parangtritis Beach

1. Introduction

The subduction zone in southern Java Island causes areas in the south of Java Island prone to tsunami disasters. Bantul District is located in south of Java Island. Parangtritis Beach in Parangtritis Village, Bantul District, D.I.Yogyakarta Province has the highest number of tourists compared to other beaches in the D.I.Yogyakarta Province. In 1840 and 1859, the area

Technium Social Sciences Journal
Vol. 28, 551-560, February, 2022
ISSN: 2668-7798
www.techniumscience.com

experienced a tsunami. Scientists estimate that with a repeat interval of 30 to 50 years or even the next 200 to 300 years, the tsunami at Parangtritis Beach could happen again [1]. The National Disaster Management Agency revealed that Parangtritis Village has a high level of danger against a tsunami [2]. With the morphological condition, which is an open beach, the large number of tourists, the population, and the countryside location close to the beach, the Parangtritis Beach area is quite vulnerable to tsunamis. This is supported by the results of previous studies which revealed that the level of vulnerability of residential buildings in the tsunami-prone area of the Parangtritis region was dominated by a high level of vulnerability [3]. The tsunami that hit coastal tourist areas will result in many casualties from local communities and tourists. In 2006, Parangtritis Beach was hit by a tsunami with the epicenter in Pangandaran. The tsunami reached 100 meters inland [4]. Although the tsunami did not cause infrastructure damage or loss of life, it reminded us that a more significant tsunami hazard is possible. Currently, the Bantul District Disaster Management Agency is still prioritizing hydrometeorological and COVID-19 disaster preparedness [5], even though tsunami disaster preparedness should also carry out to anticipate tsunami disasters that may occur in the future. Based on this background, this paper analyzes the preparedness of the Regional Disaster Management Agency of Bantul District to face the tsunami disaster, especially in Parangtritis Beach.

2. Research Method

This study uses a qualitative descriptive method to provide a complete description related to preparedness carried out by the Regional Disaster Management Agency of Bantul District. Research data were analyzed using a checklist instrument that refers to the parameters and index values issued by LIPI-UNESCO/ISDR (2006).

Table 1. Disaster Preparedness Index

No.	Index Value	Category
1	**2**	**3**
1.	80-100	Very Ready
2.	65-79	Ready
3.	55-64	Almost Ready
4.	40-54	Not Ready
5.	0-39	Not Ready

Source: LIPI-UNESCO/ISDR (2006)

The maximum score of the parameter is obtained from the number of questions in the indexed parameter (each question is worth 2). The total actual score of the parameter is obtained by adding up the actual score of all questions in the parameter concerned. The index is in the range of 0-100, so the higher the index value, the higher the preparedness. This study was conducted in Parangtritis Village, Bantul District, D.I.Yogyakarta Province.

3. Theoretical Framework

3.1. Preparedness

Disaster preparedness is a series of actions to anticipate disasters by organizing and taking practical actions [6]. There are five parameters in preparedness [7], namely:

1) Disaster Knowledge

Technium Social Sciences Journal
Vol. 28, 551-560, February, 2022
ISSN: 2668-7798
www.techniumscience.com

Knowledge is a significant factor in disaster preparedness. Knowledge is related to the learning process, direct or indirect experience obtained through observation, hearing, and sight.

2) Disaster Preparedness Policy
Natural disaster preparedness policy is essential and is a substantial effort to carry out disaster preparedness activities.
3) Emergency Response Plan
Planning is an essential part of disaster preparedness, especially evacuation, rescue, and relief, to minimize casualties.
4) Disaster Early Warning
The system includes a disaster warning signal, whereby the public can take appropriate action to reduce casualties, property, and environmental damage.
5) Resource Mobilization
Existing resources, including human resources and emergency funding, can support or hinder natural disaster preparedness.

3.2. Tsunami

The term tsunami comes from the Japanese language, namely Tsu, harbor, and NAMI, ocean waves. The tsunami can be interpreted as a series of waves that are generally caused by activity on the seabed [8]. Tectonic earthquakes caused most of the tsunamis that occurred in Indonesia, the subduction pathways found in the western part of Sumatra, along the south of Java, to the Banda Sea [9].

3.3. Tourism

Tourism is defined as activities supported by various facilities and services provided by the community, business people, government, and local governments [10]. Tourism is a complex industry. The development of the tourism industry can have a chain influence on various sectors of community life where the industry develops. The relationship between tourism and disaster is a negative thing, where natural disasters can change tourists' interest in visiting a destination due to security factors [11]. The impact of natural disasters on tourist areas is threatened life, malfunction of the road network, economic facilities, scarcity of clean water, risk of disease. In addition, the impact of natural disasters that occur in tourist areas can also cause trauma to tourists and the local community [12].

4. Result and Discussion

To determine the level of preparedness of the Regional Disaster Management Agency of Bantul District in the face of a tsunami disaster, it is examined based on preparedness parameters, including disaster knowledge, policies, early warning systems, emergency response plans, and resource mobilization.

4.1. Disaster Knowledge

The knowledge parameter is measured using four indicators related to the knowledge of the Regional Disaster Management Agency of Bantul District on the tsunami disaster. The score for each indicator is 2 for "yes" answers, and 0 is for "no" answers. The maximum score for this parameter is 8.

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Table 2. Preparedness of the Regional Disaster Management Agency of Bantul District for Disaster Knowledge Parameters

Parameter		Indicators	Condition		Score
			Yes	No	
Disaster Knowledge	1.	Can explain the impact of the disaster caused	✓		2
	2.	Can explain the types, sources, causes, and scale of disasters	✓		2
	3.	Can explain the level of community vulnerability to the tsunami disaster	✓		2
	4.	Can explain critical facility conditions and plans	✓		2
	Total real score				8
	Maximum score				8
	Preparedness for knowledge = (total real score/maximum score) x 100				100
	The category of preparedness in the parameters of the Disaster Knowledge				**Very Ready**

Source: Processed by researchers (2022)

Based on Table 2, it is known that the preparedness of the Regional Disaster Management Agency of Bantul District on the disaster knowledge parameter is 100 or very ready. This is because the Regional Disaster Management Agency of Bantul District can provide explanations regarding the impact of disasters, the types and causes of disasters, the level of community vulnerability to tsunamis, and can explain the conditions and plans for critical facilities in Bantul District, especially in the environment around Parangtritis Beach.

4.2. Disaster Preparedness Policy

The policy parameter is measured using eight indicators related to policies and regulations used by the Regional Disaster Management Agency of Bantul District as a reference in making decisions. The score for each indicator is 2 for "yes" answers, and 0 is for "no" answers. The maximum score for this parameter is 16.

Table 3. Preparedness of the Regional Disaster Management Agency of Bantul District for Disaster Preparedness Policy Parameters

Parameter		Indicators	Condition		Score
			Yes	No	
1		**2**	**3**	**4**	**5**
Disaster Preparedness Policy	1.	Availability of policies and guidelines on disaster management organizations	✓		2
	2.	There is an action plan for emergency response	✓		2
	3.	There is an allocation of funds for disaster preparedness	✓		2
	4.	There are other policies that support preparedness, such as RTRW, Strategic Plan, IMB, SNI	✓		2
	5.	There are regulations regarding disaster management organizations and implementation procedures	✓		2

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1	2	3	4	5
	6. There are regulations regarding evacuation sites and buildings/buildings for temporary rescue, checking, and maintenance of evacuation sites	✓		2
	7. There are regulations regarding the fulfillment of basic needs (provision, storage, and distribution in an emergency) and implementation procedures	✓		2
	8. There are regulations regarding disaster warning systems and implementation procedures	✓		2
	Total real score			16
	Maximum score			16
	Preparedness for knowledge = (total real score/maximum score) x 100			100
	The category of preparedness in the parameters of the Disaster Preparedness Policy			**Very Ready**

Source: Processed by researchers (2022)

Based on Table 3, it is known that the preparedness of the Regional Disaster Management Agency of Bantul District on the disaster preparedness policy parameters is 100 or very ready. The Regional Disaster Management Agency of Bantul District already has regulations, policies, and guidelines related to disaster preparedness.

4.3. Emergency Response Plan

The emergency response plan parameter is measured using 17 indicators related to the emergency response plan already owned by the Regional Disaster Management Agency of Bantul District, primarily related to the tsunami disaster. The score for each indicator is 2 for "yes" answers, and 0 is for "no" answers. The maximum score on this parameter is 34.

Table 4. Preparedness of the Regional Disaster Management Agency of Bantul District for Emergency Response Plan Parameters

Parameter	Indicators	Condition		Score
		Yes	No	
1	2	3	4	5
Emergency Response Plan	1. Availability of disaster management division	✓		2
	2. There is a division of duties and responsibilities of members of the organization in the form of fixed procedures for implementation	✓		2
	3. Evacuation places are available for evacuation	✓		2
	4. Tsunami hazard maps and evacuation maps are available	✓		2
	5. There are danger signs and evacuation route signs	✓		2
	6. There is a plan to disseminate maps/places/buildings/evacuation routes to the public and tourists	✓		2
	7. Availability of disaster post and implementation procedures	✓		2

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1	2		3	4	5
	8.	Disaster information hotline number available	✓		2
	9.	There is a plan for the victim's first aid (drugs, medical personnel, equipment/ambulance)	✓		2
	10.	There is a disaster victim rescue plan and transportation/ambulance system	✓		2
	11.	SAR units available	✓		2
	12.	Available data on the allocation of materials and equipment for basic needs	✓		2
	13.	There is a list of storage areas for materials and supplies for basic necessities	✓		2
	14.	There are procedures for procuring materials and basic necessities in an emergency	✓		2
	15.	Procedures are in place for the distribution of materials and supplies in an emergency	✓		2
	16.	Equipment and supplies available for emergencies (tents, public kitchens, toilets)	✓		2
	17.	There are regular exercises and simulations (public and agency)	✓		2
	Total real score				34
	Maximum score				34
	Preparedness for knowledge = (total real score/maximum score) x 100				100
	The category of preparedness in the parameters of the Emergency Response Plan				**Very ready**

Source: Processed by researchers (2022)

Based on Table 4, it is known that the preparedness of the Regional Disaster Management Agency of Bantul District on the parameters of the emergency response plan is 100 or very ready. The Regional Disaster Management Agency of Bantul District already has and provides matters relating to emergency response plans, especially for the tsunami disaster. However, the number of evacuation route signs available is very few, and they are placed in locations that tourists do not readily see.

4.4. Disaster Early Warning

The disaster early warning system parameter is measured using six indicators related to the disaster warning system already owned by the Regional Disaster Management Agency of Bantul District to deal with the threat of a tsunami disaster. The score for each indicator is 2 for "yes" answers, and 0 is for "no" answers. The maximum score on this parameter is 12.

Table 5. Preparedness of the Regional Disaster Management Agency of Bantul District for Disaster Early Warning Parameters

Parameter	Indicators		Condition		Score
			Yes	No	
1	2		3	4	5
	1.	There is recognition of traditional and local disaster warning systems		✓	0

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Disaster Early Warning	2.	Availability of disaster warning system technology and implementation procedures	✓		2
1		**2**	**3**	**4**	**5**
	3.	There is an installation of equipment for disaster warning	✓		2
	4.	There is a disaster warning system maintenance procedure	✓		2
	5.	There is a disaster warning dissemination system available to the public and tourists, as well as implementation procedures	✓		2
	6.	There are training/seminars attended by staff	✓		2
		Total real score			10
		Maximum score			12
		Preparedness for knowledge = (total real score/maximum score) x 100			83,33
		The category of preparedness in the parameters of the Disaster Early Warning			**Very ready**

Source: Processed by researchers (2022)

Based on Table 5, it is known that the preparedness of the Regional Disaster Management Agency of Bantul District on the parameters of the disaster warning system is 83.33 or very ready. This is because the Regional Disaster Management Agency of Bantul District already has a disaster warning system for tsunami disasters in the form of tsunami radar and sirens along Parangtritis Beach. However, there is no recognition of the traditional disaster warning system because people only rely on disaster warnings issued by the Bantul District Government.

4.5. Resource Mobilization

The resource mobilization parameter is measured using 15 indicators related to resource mobilization that has been carried out by the Regional Disaster Management Agency of Bantul District to deal with the threat of a tsunami disaster. The score for each indicator is 2 for "yes" answers, and 0 is for "no" answers. The maximum score for this parameter is 30.

Table 6. Preparedness of the Regional Disaster Management Agency of Bantul District for Resource Mobilization Parameters

Parameter	**Indicators**		**Condition**		**Score**
			Yes	**No**	
1		**2**	**3**	**4**	**5**
Resource Mobilization	1.	There is an agreement between government agencies to mobilize resources (funds/equipment/officers) and implementation procedures	✓		2
	2.	There is an agreement between government agencies and the community at the disaster site	✓		2

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ISSN: 2668-7798
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	3. Mechanisms are available to manage external resources (private parties, donors, NGOs, volunteers.	✓		2

1	2	3	4	5
	4. There is a command for emergencies and a command system procedure	✓		2
	5. There are protocols for communication and coordination between government agencies and institutions	✓		2
	6. There is a protocol for public communication related to emergency information (regularly and responsibly)	✓		2
	7. There is a network outside the government to mobilize the private sector and NGOs in responding to disaster emergencies	✓		2
	8. There are personnel who have been trained in disaster preparedness and emergency response management systems	✓		2
	9. The types of plants that can use as alternative food ingredients have been identified during a disaster emergency		✓	0
	10. Provide technical guidance/disaster preparedness training for the community	✓		2
	11. Available materials and materials that are easily accessible for community and tourist preparedness		✓	0
	12. Socialization of materials and preparedness materials has been carried out for the community and tourists	✓		2
	13. Available information/documents of natural disasters that have occurred	✓		2
	14. Procedures are in place for allocating and mobilizing disaster preparedness funds	✓		2
	15. There is a plan to carry out monitor and evaluate and follow up on the results	✓		2
	Total real score			26
	Maximum score			30
	Preparedness for knowledge = (total real score/maximum score) x 100			86,66
	The category of preparedness in the parameters of the Resource Mobilization			**Very ready**

Source: Processed by researchers (2022)

Based on Table 6, it is known that the preparedness of the Regional Disaster Management Agency of Bantul District on the resource mobilization parameter is 86.66 or very ready. This is because the Regional Disaster Management Agency of Bantul District has

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mobilized its resources well, from mobilizing human resources to mobilizing funds for disaster preparedness. The table also shows that the Regional Disaster Management Agency of Bantul District has not provided materials related to disaster preparedness that are easily accessible to the public and tourists and have not identified plants that can use as alternative food ingredients. In addition, socialization to the community regarding the tsunami has only been carried out twice, and since 2018, there has been no re-socialization related to the tsunami.

Based on the scores obtained from each of the parameters above, the overall preparedness of the Regional Disaster Management Agency is as follows:

Table 7. Preparedness of the Regional Disaster Management Agency of Bantul District

No.	Parameters	Weight	Score	Weighted score (weight x score)
1.	Knowledge	0,08	100	8
2.	Disaster Preparedness Policy	0,16	100	16
3.	Emergency Response Plan	0,34	100	34
4.	Disaster Early Warning	0,12	83,33	9,99
5.	Resource Mobilization	0,30	86,66	25,99
Total weight		**1,00**		
Total weighted score (index)				**93,99**
Preparedness of the Regional Disaster Management Agency of Bantul District				**Very ready**

Source: Processed by researchers (2022)

Based on the table above, it can be seen that the weighted value or index value obtained is 93.99. Based on Table 1 regarding the preparedness index, the preparedness of the Bantul District Regional Disaster Management Agency is in the very ready category. Overall, the Regional Disaster Management Agency of Bantul District already has policies, infrastructure, and well-prepared resources. However, tsunami preparedness has not been implemented optimally and comprehensively. Currently, preparedness is still a priority for the local community and has not prioritized tourists.

5. Conclusion

Based on the research results, the conclusions in this study are that the preparedness of the Regional Disaster Management Agency of Bantul District to face the tsunami disaster got an index value of 93.99 which means it is very ready. Although the Regional Disaster Management Agency of Bantul District is very prepared to anticipate a tsunami disaster, this preparedness effort has not been carried out optimally and comprehensively. Preparedness is still a priority for the community and has not prioritized tourists.

References

[1] HANDOYO, G., PUTRO, AGUS A.D.S., SUBARDJO, PETRUS: Peta Kerawanan Tsunami serta Rancangan Jalur Evakuasi di Pantai Desa Parangtritis Kecamatan Kretek Kabupaten Bantul Daerah Istimewa Yogyakarta. *Jurnal Kelautan*. 10 (2), 136-146 (2017).

[2] BNPB: Katalog Desa Kelurahan Rawan Tsunami. Jakarta. National Disaster Management Agency (BNPB), 2019.

[3] NAJA, A. AND MARDIATNO: Analisis Kerentanan Fisik Permukiman di Kawasan

Rawan Bencana Tsunami Wilayah Parangtritis, Yogyakarta. *Jurnal Bumi Indonesia.* 7(1), 1-10 (2018).

[4] SHALIHAH, N. FITRIATUS: (2021) Hari Ini dalam Sejarah: Gempa dan Tsunami Pangandaran, 668 Tewas. Retrieved January, 18, 2022 from https://www.kompas.com/tren/read/2021/07/17/085500365/hari-ini-dalam-sejarah--gempa-dan-tsunami-pangandaran-668-tewas?page=all.

[5] BPBD KABUPATEN BANTUL: (2020). Tingkatkan Kesiapsiagaan, BPBD Kabupaten Bantul Laksanakan Penguatan Kapasitas Relawan. Retrieved September, 18, 2021 from https://bpbd.bantulkab.go.id/tingkatkan-kesiapsiagaan-bpbd-kabupaten-bantul-laksanakan-penguatan-kapasitas-relawan/.

[6] Law of The Republic of Indonesia Number 24 of 2007 concerning Disaster Management.

[7] LIPI-UNESCO/ISDR: Kajian Kesiapsiagaan Masyarakat dalam Mengantisipasi Bencana Gempa Bumi & Tsunami. Jakarta. LIPI Press, 2006.

[8] DUDLEY, W.C. AND LEE, M: Tsunami!. Bandung. Pakar Raya, 2006.

[9] MARWANTA, BAMBANG: Tsunami di Indonesia dan Upaya Mitigasinya. *Alami.* 10(2), 29-36 (2005).

[10] Law of The Republic of Indonesia Number 10 of 2009 concerning Tourism.

[11] SUTRISNAWATI, NI KETUT: Dampak Bencana Alam Bagi Sektor Pariwisata di Bali. *Jurnal Ilmu Hospitality Management*. 9(1), 57-66 (2018).

[12] ROSYIDIE, ARIEF: Aspek Kebencanaan Pada Kawasan Wisata. *Jurnal Perencanaan Wilayah dan Kota.* 15(2), 48-64 (2004).