

Spatial Assessment of Community Tsunami Preparedness in the Mentawai Islands Regency

Assyiddiq Ibnu Eriza¹, Rusnardi Rahmat Putra²

¹ D III, Building Construction Engineering, Universitas Negeri Padang

². Faculty of Engineering, Universitas Negeri Padang

Correspondence: assyiddiqibnueriza1@gmail.com

Article Info

Article history:

Received April 06th, 2026

Revised April 07th, 2026

Accepted April 07th, 2026

Keyword:

Community Preparedness, Spatial, Tsunami Disaster.

ABSTRACT

Indonesia is an archipelagic country, which makes it highly vulnerable to undersea earthquakes that can trigger tsunami waves. One of the island regions with a high level of tsunami hazard is the Mentawai Islands Regency. Therefore, this study aims to examine the level of community knowledge, building conditions, and preparedness of the residents of the Mentawai Islands Regency toward tsunami disasters. The objectives of this study are: (1) to map the level of community knowledge regarding tsunamis, (2) to assess the safety condition of residential buildings against tsunami hazards, and (3) to map the level of community preparedness toward tsunamis in the Mentawai Islands Regency. The population of this study consists of residents living in the Mentawai Islands Regency, with a sample size of 61 respondents. Data collection was conducted using an online questionnaire distributed through social media platforms, namely Facebook and WhatsApp, to the residents of the Mentawai Islands Regency. Data analysis was performed using a descriptive quantitative method by calculating index values, percentages, and mean values. The results of the study indicate that the level of community knowledge regarding tsunami disasters is categorized as moderate. The condition of residential buildings in the Mentawai Islands Regency is considered less safe against tsunami hazards, while the level of community preparedness is categorized as prepared in facing tsunami disasters.



© 2026 The Authors. Published by Cendikia Publikasi Indonesia. This is an open access article under the CC BY license (<https://creativecommons.org/licenses/by/4.0/>)

INTRODUCTION

Geologically, Indonesia lies at the convergence of three active tectonic plates, namely the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate. Therefore, according to Setiawan [1], various phenomena such as earthquakes and volcanic eruptions frequently occur in Indonesia. Based on these conditions, Indonesia is exposed to multiple types of disasters that may occur at any time. A disaster is defined as an event or series of events that threaten and disrupt community life and livelihoods, caused by natural, non-natural, or human factors, resulting in loss of life, environmental damage, economic losses, and psychological impacts [2].

Indonesia is referred to as an archipelagic country because it consists of thousands of islands stretching from Sabang in the west to Merauke in the east. Due to its archipelagic nature, Indonesia is highly vulnerable to tsunami disasters. A tsunami is a very large sea wave generated by vertical displacement of water mass caused by sudden disturbances in the deep ocean [3]. Therefore, optimal preparedness of communities exposed to tsunami hazards is essential. This is particularly important because many coastal and island areas in Indonesia fall into the category of “near-source generated tsunami,” where tsunami sources are located relatively close to the affected areas [4].

The Mentawai Islands are classified as a disaster-prone region, including hazards such as earthquakes, tsunamis, coastal abrasion, and landslides. Among these, tsunami hazards pose a

significant threat. A major tsunami disaster struck Indonesia on October 25, 2010, in the Mentawai Islands Regency. The earthquake, with a magnitude of 7.2 (or 7.5 according to the United States Geological Survey), triggered a tsunami event. The relatively shallow depth of the earthquake and its location within a subduction zone beneath the seafloor contributed to the generation of tsunami waves. According to information from the regional disaster management agency, the tsunami reached wave heights of up to 3 meters and inundated land areas up to 1 km inland. This earthquake and tsunami event resulted in casualties, as well as damage and losses across various development sectors, affecting four sub-districts in the Mentawai Islands Regency: Sipora Selatan, Pagai Selatan, Pagai Utara, and Sikakap.

Therefore, it is essential to recognize the importance of preparedness. Preparedness is defined as a series of activities undertaken to anticipate disasters through organization and the implementation of appropriate and effective measures [2]. According to W. Nick Carter (1991), preparedness refers to actions that enable governments, organizations, families, and individuals to respond quickly and effectively to disaster situations in order to reduce losses and casualties. Preparedness actions include disaster planning, resource maintenance, and personnel training. The concept of preparedness emphasizes the ability to take prompt and appropriate actions in emergency situations [5]. Preparedness is closely related to disaster knowledge and the condition of community buildings. Knowledge of preparedness is fundamental and influences attitudes and awareness in anticipating tsunami hazards, particularly for communities living in coastal areas vulnerable to such disasters [6].

Buildings are among the most vulnerable elements in most disaster events. In addition to their economic value, buildings serve as places of residence. The characteristics of buildings significantly influence their behavior when exposed to hazards. For example, reinforced concrete structures tend to be more resistant to tsunami impacts compared to other types of buildings such as wooden structures. Therefore, understanding the spatial distribution and characteristics of building conditions is essential as a preparatory step in effectively facing disaster risks.

RESEARCH METHODS

1. Research Design

This study employs a descriptive quantitative research design. According to Sugiyono (2012:5) [7], a research method can be defined as a scientific approach used to obtain valid data in order to discover, develop, and verify certain knowledge, which can subsequently be applied to solve and anticipate problems.

In this study, data were collected using a questionnaire distributed through social media platforms. The data obtained were then analyzed based on relevant theoretical frameworks to provide a comprehensive description of the research object and to draw conclusions regarding the problem under investigation.

2. Research Location and Time

a. Research Location

This study was conducted in the Mentawai Islands Regency, which was categorized based on its sub-districts. The sub-districts included in this study are Siberut Utara, Siberut Barat, Siberut Tengah, Siberut Selatan, Siberut Barat Daya, Sipora Utara, Sipora Selatan, Pagai Utara, Sikakap, and Pagai Selatan.

b. Research Period

The distribution of the questionnaire was conducted over a period of 30 days, from April 23, 2020, to May 23, 2020. In distributing the questionnaire, the researcher utilized several social media platforms, such as WhatsApp and Facebook. The questionnaire was administered electronically using Google Forms, which could be accessed online via the internet.

3. Population and Sample

a. Population

The population refers to the total number of individuals or communities within a specific area. In this study, the population consisted of all residents living in the Mentawai Islands Regency.

Table 1. Population of Mentawai Islands Regency

No	Sub-District	Population
1	Pagai Selatan	9.827
2	Sikakap	10.277

No	Sub-District	Population
3	Pagai Utara	5.881
4	Sipora Selatan	9.332
5	Sipora Utara	12.744
6	Siberut Selatan	10.136
7	Siberut Barat Daya	6.885
8	Siberut Tengah	6.940
9	Siberut Utara	9.223
10	Siberut Barat	7.447
Total		88.692

The study area was grouped based on the sub-districts within the Mentawai Islands Regency, namely Siberut Utara, Siberut Barat, Siberut Tengah, Siberut Selatan, Siberut Barat Daya, Sipora Utara, Sipora Selatan, Pagai Utara, Sikakap, and Pagai Selatan.

b. Sample

A sample is a subset that represents a portion of the population. The sample in this study consisted of residents of the Mentawai Islands Regency, with a total of 61 respondents drawn from all sub-districts.

In general, studies using questionnaires commonly apply Simple Random Sampling techniques. However, this study did not employ Simple Random Sampling because the questionnaire was distributed online. As a result, the number of respondents obtained from each sub-district was relatively small and unevenly distributed, which represents a limitation of online data collection.

4. Preparedness Parameters

a. Knowledge

An individual's knowledge can influence attitudes and awareness in preparing for disasters, particularly for communities living in disaster-prone areas (Deny Hidayati et al., 2006:14).

Table 2. Knowledge Index Score

No.	Index Value	Category
1.	80-100	Tinggi
2.	60-79	Sedang
3.	< 60	Rendah

b. Preparedness

The level of community preparedness in facing disasters is categorized into three levels.

Table 3. Community Preparedness Level for Disaster

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

Preparedness is measured using an index value, which allows comparison across different categories. The index value is calculated using the formula proposed by LIPI–UNESCO/ISDR (2006:47) [6].

$$Index = \frac{\text{Number of Actual Parameter Scores}}{\text{maximum Parameter Score}} \times 100$$

To calculate the percentage of each response alternative provided in the questionnaire, a percentage formula is applied [8].

$$Percentage = \frac{\text{Partial Sum}}{\text{Total Sum}} \times 100\%$$

In the preparedness questionnaire, three response categories were used: always, sometimes, and never. The scoring system for each response is presented in the following table.

Table 4. Questionnaire Assessment Score

No.	Criteria	Score
1	Always	3
2	Sometimes	2
3	Never	1

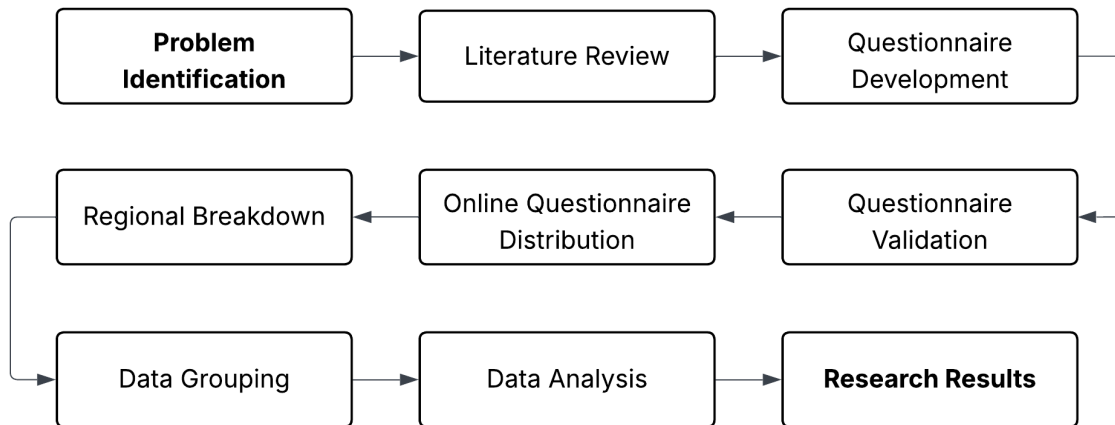


Figure 1. Research Flow Diagram

RESULTS AND DISCUSSION

The Mentawai Islands Regency is an archipelagic region located off the western coast of Sumatra in West Sumatra Province, Indonesia, consisting of several major islands such as Siberut, Sipora, North Pagai, and South Pagai. This region is characterized by its rich natural resources, tropical forests, and coastal ecosystems, as well as its unique indigenous culture. Geographically, the Mentawai Islands lie along an active subduction zone where the Indo-Australian Plate converges with the Eurasian Plate, making the area highly prone to natural hazards such as earthquakes and tsunamis. Due to its geographical and geological conditions, the Mentawai Islands Regency is considered one of the most disaster-prone regions in Indonesia, requiring strong community preparedness, effective disaster mitigation strategies, and sustainable development planning [9].

The final project consists of four main indicators: respondent characteristics, knowledge of tsunamis, building conditions, and community preparedness in facing tsunami disasters. The study was conducted in the Mentawai Islands Regency, as this region is highly vulnerable to tsunami hazards. Data collection was carried out by distributing questionnaires online over a one-month period, involving 61 respondents from the Mentawai Islands Regency. The following data were obtained from the study area [10].

The total number of respondents obtained was 61, categorized based on sub-districts within the Mentawai Islands Regency. The sub-district with the highest number of respondents was Pagai Selatan, with 15 respondents, followed by Sipora Selatan with 8 respondents. Pagai Utara and Siberut Barat Daya had the same number of respondents, with 6 each. Sipora Utara, Siberut Utara, Siberut Barat, and Sikakap each had 5 respondents, while Siberut Tengah and Siberut Selatan had the lowest number, with 3 respondents each.

The distribution of respondents across the Mentawai Islands Regency can be presented in the form of a map, as illustrated below.

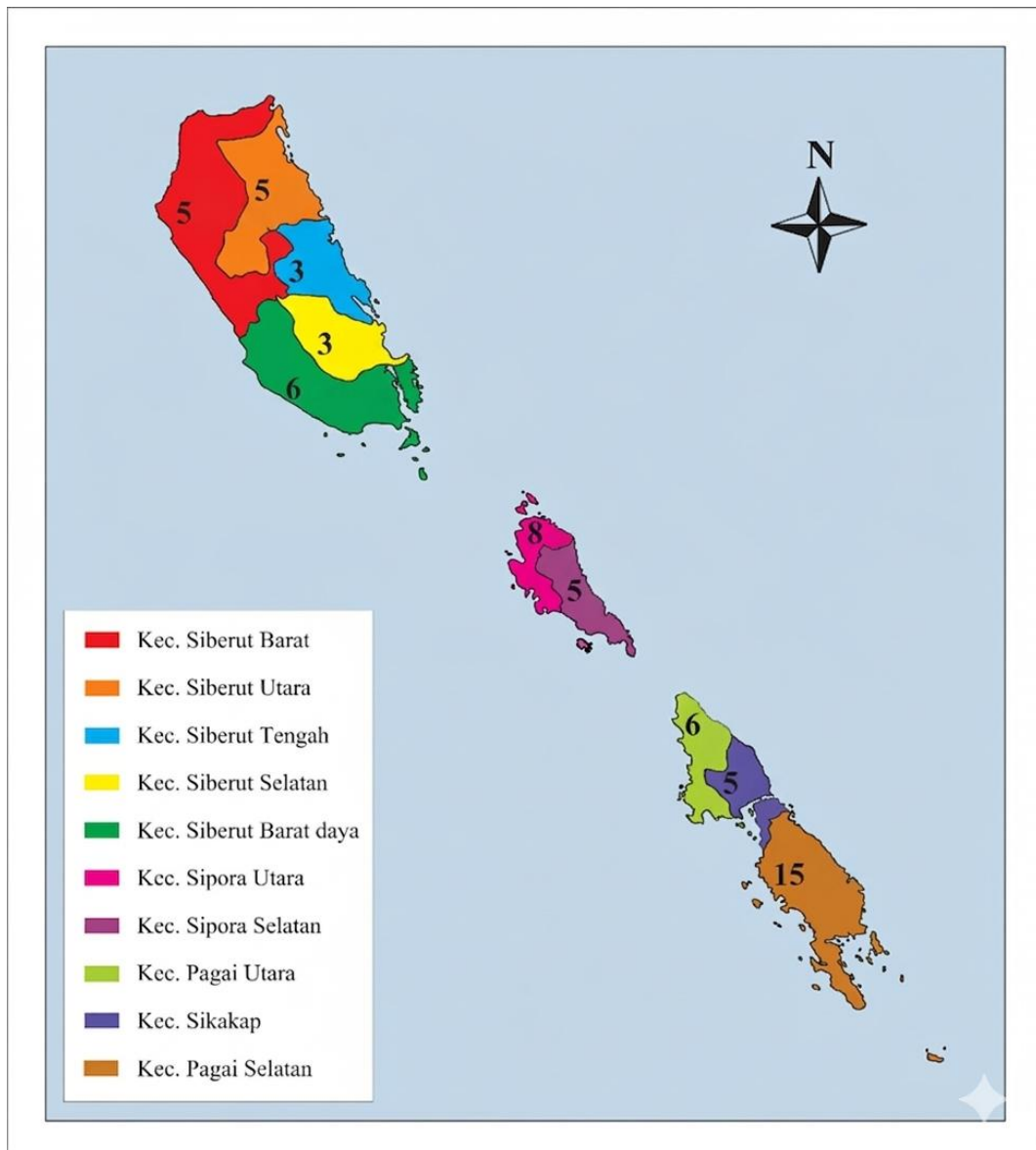


Figure 2. Numbers of Respondents by Sub-District

1. General Respondent Characteristic

a. Gender of Respondents

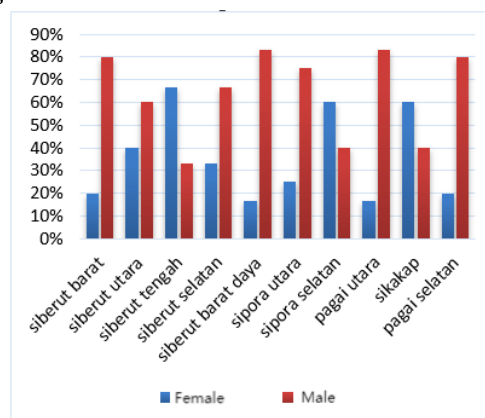


Figure 3. Comparison of Respondents Gender

From the diagram, it can be observed that among the 61 respondents who participated in this study, male respondents were more dominant than female respondents. Male respondents accounted for 69%, while female respondents accounted for 31%.

b. Age of Respondents

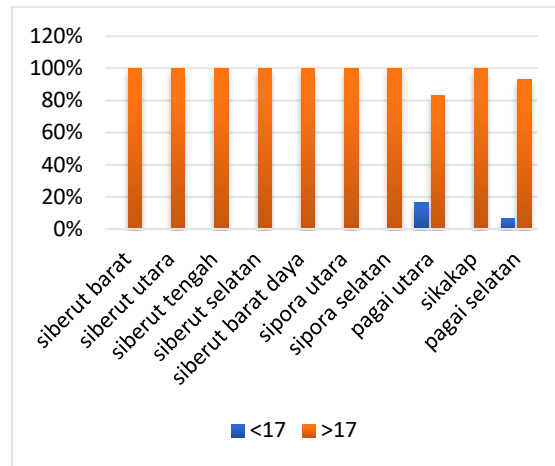


Figure 4. Comparison of Respondents Age

In terms of age, respondents aged over 17 years were dominant, comprising 97% of the total respondents, while those under 17 years accounted for only 3%.

c. Respondents Occupation

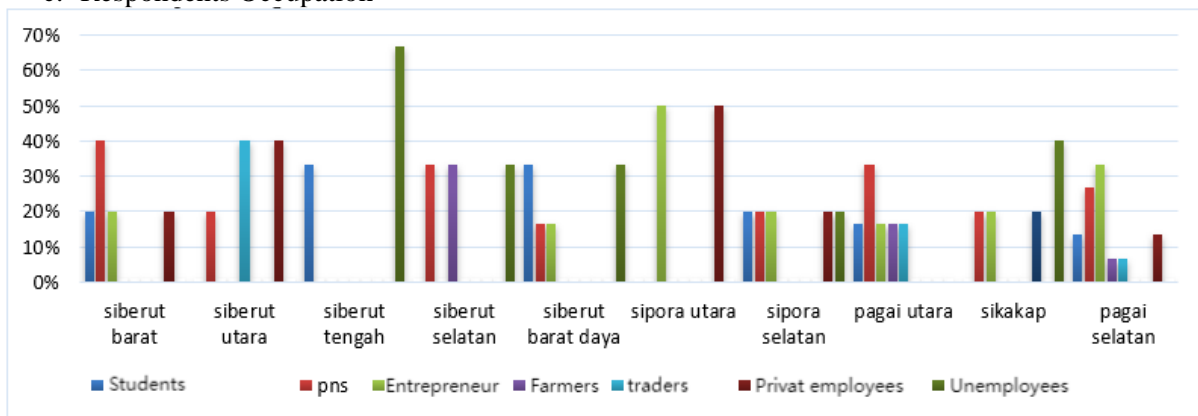


Figure 5. Respondents Occupation

Based on the diagram above, respondents with an entrepreneurial (self-employed) background constituted the largest group, with 14 respondents. This was followed by civil servants (13 respondents), private employees (10 respondents), students/university students (8 respondents), unemployed individuals (6 respondents), traders (4 respondents), and farmers (3 respondents), while no respondents were identified as livestock breeders or fishermen.

d. Monthly Income of Respondents



Figure 6. Respondents Monthly Income

Among the 61 respondents from the Mentawai Islands Regency, it was found that those earning less than IDR 500,000 and those earning between IDR 1,500,000–2,500,000 had the same number, each with 14 respondents. Furthermore, 12 respondents earned more than IDR

3,500,000. Respondents earning between IDR 500,000–1,500,000 and those earning between IDR 2,500,000–3,500,000 also had equal numbers, with 8 respondents each. Meanwhile, 5 respondents reported having no income.

2. Tsunami Knowledge

Knowledge of tsunamis is essential, particularly for individuals residing in the Mentawai Islands Regency, as this area is highly vulnerable to tsunami hazards. Therefore, tsunami knowledge is crucial for every individual living in this high-risk region.

a. General Knowledge Analysis

The mean level of community knowledge regarding tsunamis per sub-district was calculated using an index approach.

$$Index = \frac{\text{Number of Actual Parameter Scores}}{\text{maximum Parameter Score}} \times 100$$

The maximum parameter score was obtained by multiplying the number of questions (3) by the highest possible score (3), resulting in a maximum score of 9.

The actual parameter score represents the total score obtained from all questionnaire items.

$$Index = \frac{9}{9} \times 100 = 100$$

The mean index value was then calculated by dividing the total index score by the number of respondents.

$$Mean = \frac{1244}{15} = 82.96$$

Table 5. Analysis of the Average Level of individual Knowledge about Tsunami in Pagai Selatan Sub-District

No	1	2	3	Total Score	Value
1	3	3	3	9	100
2	2	2	1	5	55.56
3	2	3	2	7	77.78
4	2	3	3	8	88.89
5	2	2	1	5	55.56
6	3	3	1	7	77.78
7	3	3	3	9	100
8	2	3	3	8	88.89
9	2	3	2	7	77.78
10	3	3	2	8	88.89
11	2	3	2	7	77.78
12	3	3	2	8	88.89
13	3	3	3	9	100
14	3	3	3	9	100
15	2	3	1	6	66.67
Mean					82.96

b. Level of Tsunami Knowledge by Sub-District

Table 6. Average Level of Community Knowledge about Tsunami by Sub-District

No	Sub-District	Value	Category
1	Siberut Utara	68.89	Sedang
2	Siberut Barat	73.33	Sedang
3	Siberut Tengah	59.26	Rendah
4	Siberut Barat Daya	62.96	Sedang
5	Siberut Selatan	59.26	Rendah
6	Sipora Utara	73.61	Sedang
7	Sipora Selatan	64.44	Sedang
8	Pagai Utara	66.67	Sedang
9	Sikakap	62.22	Sedang
10	Pagai Selatan	82.96	Tinggi

- c. Spatial Mapping of Community Tsunami Knowledge in the Mentawai Islands Regency
 After analyzing tsunami knowledge across sub-districts, the results were spatially represented in a map.

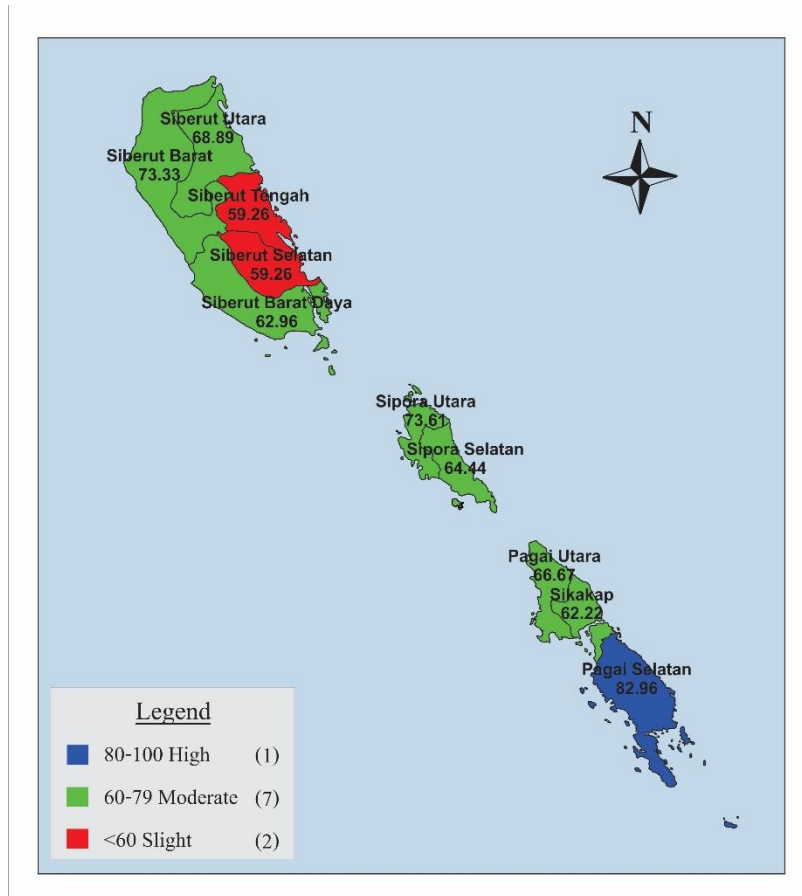


Figure 7. Map of the average knowledge level of the Mentawai Islands Regency Community Regarding Tsunamis

The findings indicate that Pagai Selatan Sub-district falls into the high knowledge category; Siberut Utara, Siberut Barat, Siberut Barat Daya, Sipora Utara, Sipora Selatan, Pagai Utara, and Sikakap fall into the moderate category; while Siberut Tengah and Siberut Selatan fall into the low knowledge category.

- d. Sources of Information Used by the Community to Obtain Tsunami Information

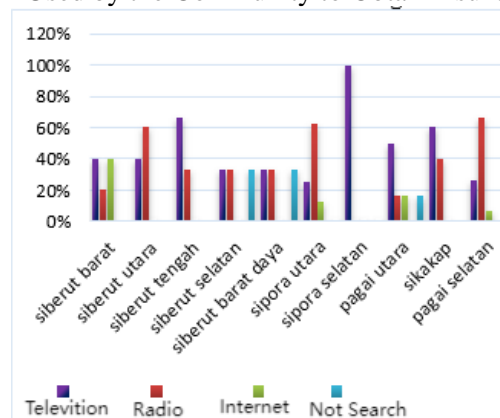


Figure 8. Tsunami Information Sources used by the community

From the survey results of 61 respondents across 10 sub-districts, it was found that the primary sources of tsunami-related information were television and the internet, each accounting for 43%. Radio accounted for 8%, while 7% of respondents reported not seeking any information.

3. Residential Building Conditions

The condition of residential buildings and the surrounding environment was assessed through several questionnaire items, and the percentage of each response was calculated from the 61 respondents.

a. Building Safety of Residential Buildings

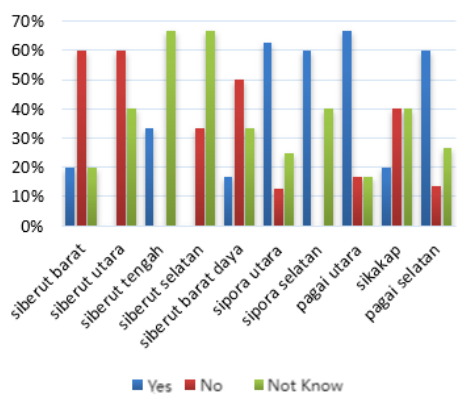


Figure 9. Community Response Regarding the Safety of their homes Against Tsunami Disaster

Given that the Mentawai Islands Regency is highly prone to tsunami hazards, building safety is a critical concern. A total of 41% of respondents considered their houses safe from tsunami hazards, 26% considered them unsafe, and 33% were unsure about the safety of their buildings.

b. Number of Floors in Residential Building

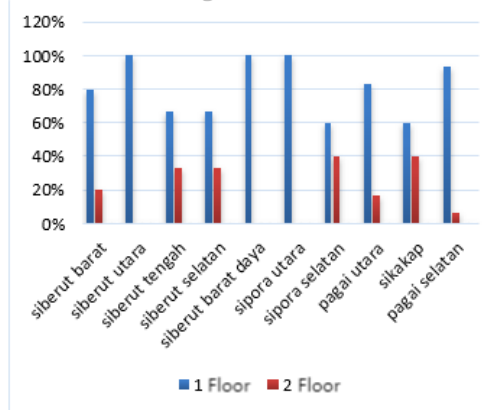


Figure 10. number of Floors in Residents Home

According to the results of a survey conducted among 61 respondents from 10 subdistricts in Mentawai Islands Regency, the majority of Mentawai homes are single-story, accounting for 85%, while 15% are two-story homes.

c. Type of Residential Building

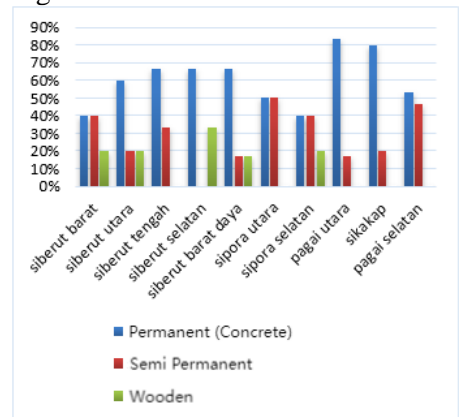


Figure 11. Type of Residence

Most residential homes are permanent structures (59%), followed by semi-permanent homes (31%), and 10% are wooden homes.

d. Insurance Ownership

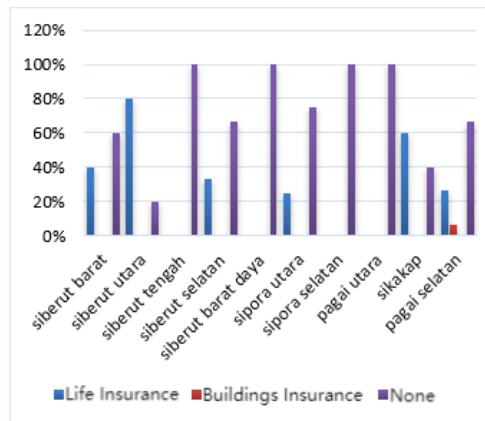


Figure 12. Residents with Insurance

Regarding insurance ownership, 72% of respondents do not have any form of insurance. Meanwhile, 26% have life insurance, only 2% have building insurance, and none of the respondents reported having vehicle insurance.

e. Distance of Houses from the Coastline

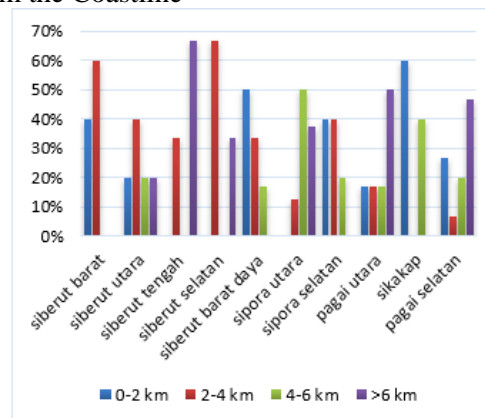


Figure 13. Distance of Homes from the Shoreline

In terms of proximity to the coastline, 26% of respondents live within 0–2 km, 25% within 2–4 km, 21% within 4–6 km, and 28% more than 6 km from the coast.

f. Availability of Evacuation Sites in the Area

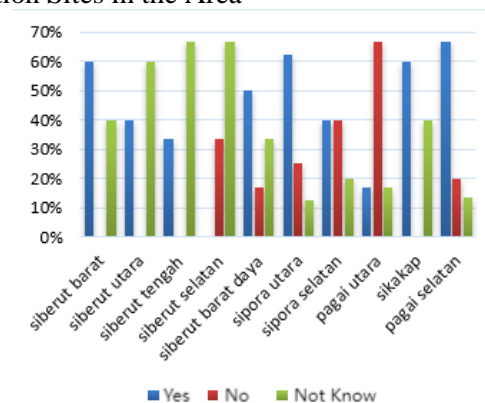


Figure 14. Availability of Evacuation sites in the area

Evacuation shelters are critical structures for minimizing loss of life during a tsunami. According to data collected by researchers, 49% of residents in their respective areas have access to tsunami evacuation shelters, 21% do not have such shelters in their areas, and 30% are unaware of whether evacuation shelters exist in their areas.

g. Distance to the Nearest Evacuation Site

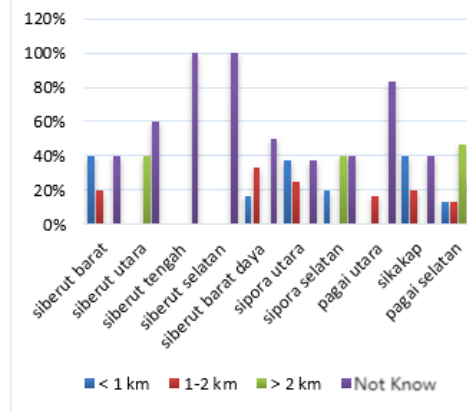


Figure 15. Distance of Residences From Evacuation Sites

Regarding the distance to evacuation facilities, 18% of respondents live less than 1 km away, 15% live within 1–2 km, 18% live more than 2 km away, and 49% do not know the distance from their residence to the nearest evacuation site. The distance to evacuation facilities plays a significant role in ensuring safety during tsunami events, as closer proximity allows for faster evacuation.

4. Community Preparedness for Tsunami Disasters

This indicator also includes community preparedness for tsunami disasters.

a. Availability of Tsunami Warning Sirens and Detection Systems

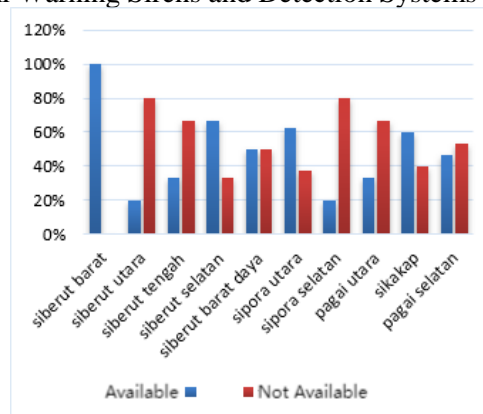


Figure 16. Safety Preparedness at Residents Homes (Tsunami Alert Sirens and Tsunami Detection Devices)

As the Mentawai Islands are highly vulnerable to tsunamis, the availability of tsunami detection systems and warning sirens is essential. In this study, 49% of respondents reported the presence of such systems in their area, while 51% reported their absence.

b. Preparation of Food and Water Supplies

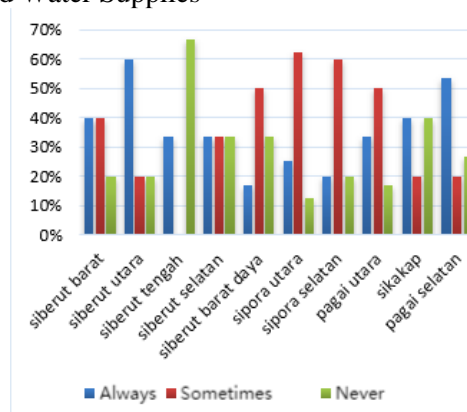


Figure 17. Food Supply Preparedness

In preparation for tsunami disasters, households are expected to maintain essential supplies. The study shows that 38% of respondents always prepare food and water supplies, 36% sometimes prepare them, and 26% never prepare such supplies.

c. First Aid (Medical Supplies) Preparedness

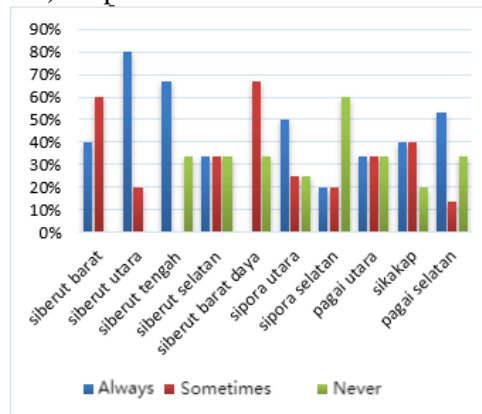


Figure 18. First Aid Kit Preparedness

Preparedness in terms of first aid (P3K) is relatively good, with 43% of respondents always preparing medical supplies, 30% sometimes preparing them, and 28% not preparing them at all.

d. Preparation of Radio Communication Media

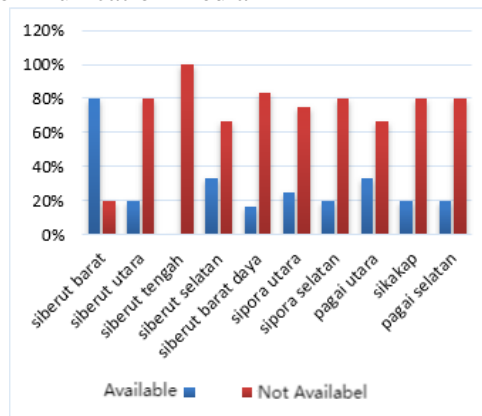


Figure 19. Preparations for Radio Information

In terms of communication preparedness, access to information through radio and official sources such as Meteorology, Climatology, dan Geophysical Agency is essential. However, only 26% of respondents reported having a radio, while 74% did not.

e. Availability of Flashlights Equipment

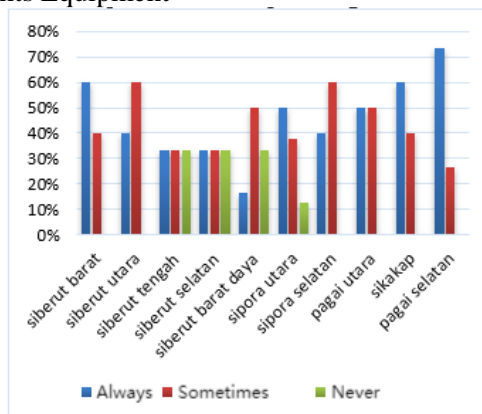


Figure 20. Preparations for Flashlighting/Lighting Equipment

Flashlights are also important during power outages caused by disasters. A total of 51% of respondents always prepare flashlights, 41% sometimes prepare them, and 8% never prepare them.

f. Access to BMKG Services

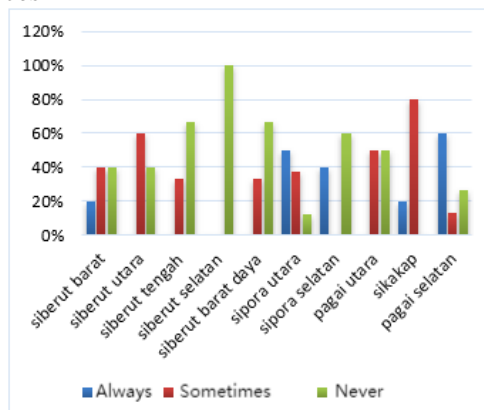


Figure 21. Access to BMKG Information

Finally, in terms of accessing tsunami-related information, awareness remains relatively low. Only 28% of respondents consistently access information or use applications related to tsunami warnings, 33% occasionally access such information, and 39% never access tsunami-related information in their area.

5. Tsunami Preparedness Analysis

The example in Table 7 uses a 3-point Likert scale.

$$Index = \frac{\text{Number of Actual Parameter Scores}}{\text{maximum Parameter Score}} \times 100$$

The maximum score for the parameter (the number of questions multiplied by the highest possible response score) is calculated as follows: with 4 questions and a maximum response score of 3, the calculation is $4 \times 3 = 12$.

The total actual score for the parameter is the sum of all question scores.

$$Index = \frac{12}{12} \times 100 = 100$$

The average is calculated by dividing the total index score by the number of respondents.

$$Mean = \frac{1192}{15} = 79.44$$

Table 7. Analysis of the Average Level of Tsunami Preparedness in Pagai Selatan Sub-District

No	1	2	3	4	Total Score	Value
1	3	3	3	3	12	100
2	3	3	3	2	11	91.67
3	2	2	3	2	9	75
4	3	3	3	1	10	83.33
5	1	1	2	1	5	41.67
6	3	3	3	3	12	100
7	3	3	3	3	12	100
8	1	1	2	3	7	58.33
9	1	1	2	3	8	66.67
10	1	1	3	1	8	66.67
11	3	3	3	3	11	91.67
12	3	3	3	3	12	100
13	3	3	3	3	12	100
14	2	2	2	3	8	66.67
15	1	1	3	1	6	50
Mean						79.44

6. Tsunami Preparedness Level by Sub-District

Table 8. Average Level of Community Preparedness for Tsunami by Sub-District

No	Sub-District	Value	Category
1	Siberut Utara	76.67	Ready
2	Siberut Barat	68.33	Ready
3	Siberut Tengah	61.11	Almost Ready
4	Siberut Barat Daya	55.56	Almost Ready
5	Siberut Selatan	58.33	Almost Ready
6	Sipora Utara	76.04	Ready
7	Sipora Selatan	66.67	Ready
8	Pagai Utara	68.06	Ready
9	Sikakap	75	Ready
10	Pagai Selatan	79.44	Ready

7. Spatial Mapping of Tsunami Preparedness

After conducting an analysis of community preparedness based on the subdistricts in Mentawai Islands Regency, the preparedness scores are presented in the form of a map as follows.

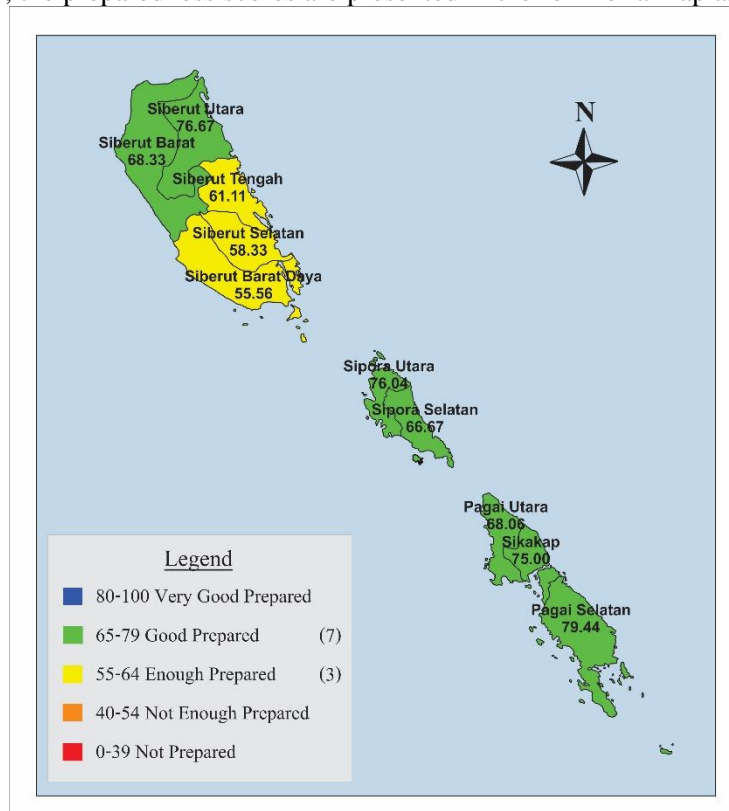


Figure 22. Map of Average Community Preparedness for Tsunami

For this indicator, the researcher mapped the responses to the questions regarding community preparedness for tsunami disasters in the form of index values corresponding to the subdistricts in Mentawai Islands Regency. Two categories were identified: the subdistricts of West Siberut, North Siberut, North Sipora, South Sipora, North Pagai, Sikakap, and South Pagai fall into the “prepared” category. Meanwhile, Central Siberut, South Siberut, and Southwest Siberut fall into the “nearly prepared” category.

CONCLUSION

Based on the results of data analysis from 61 respondents in Mentawai Islands Regency, the following conclusions can be drawn:

1. In terms of tsunami knowledge, the residents of Mentawai Islands Regency fall into the moderate knowledge category. This applies to all 10 subdistricts in Mentawai Islands Regency.
2. Regarding building conditions, 41% of respondents in Mentawai Islands Regency stated that their buildings are safe from tsunami disasters, while 59% stated that their homes are unsafe and expressed doubt that their residences are safe from tsunami disasters.
3. In terms of preparedness, Mentawai Islands Regency falls into the “prepared” category for facing tsunami disasters. It was found that the subdistricts of West Siberut, North Siberut, North Sipora, South Sipora, North Pagai, Sikakap, and South Pagai are in the “prepared” category, while Central Siberut, South Siberut, and Southwest Siberut are in the “nearly prepared” category. This indicates that the preparedness of Mentawai Islands Regency is relatively good, with the average subdistrict being prepared to face a tsunami.

REFERENCES

- [1] D. Hermon, *Geografi Bencana Alam*, Jakarta: Rajawali Pers, 2015.
- [2] B. RI, Undang-Undang No. 27 Tahun 2004 Tentang Penanggulangan Bencana, Jakarta: BPK RI, 2007.
- [3] Sunarto and dkk, *Penaksiran Multirisiko Bencana di Wialayah Kepesisiran Parangtritis*, Yogyakarta: UGM Press, 2014.
- [4] H. Z. Anwar, "Fungsi Peringatan Dini dan Kesiapan Masyarakat Dalam Pengurangan Resiko Bencana Tsunami di Indonesia," *Jurnal Riset Geologi dan Pertambangan*, vol. 21, no. 2, p. 76, 2011.
- [5] LIPI and UNESCO/ISDR, *Pengembangan Framework untuk Mengukur Kesiapsiagaan Masyarakat*, Jakarta: LIPI, 2006.
- [6] LIPI and UNESCO/ISDR, *Kajian Kesiapsiagaan Masyarakat Dalam Mengantisipasi Bencana Gempa Bumi dan Tsunami*, Jakarta: LIPI, 2006.
- [7] Sugiyono, *Statistik untuk Penelitian*, Bandung: Alfabeta, 2012.
- [8] D. Hidayati, *Panduan Mengukur Tingkat Kesiapsiagaan Masyarakat dan Komunitas*, Bandung: LIPI, 2011.
- [9] D. Hidayati, *Kajian Kesiapsiagaan Masyarakat dalam Mengantisipasi Bencana Gempa Bumi dan Tsunami*, Jakarta: LIPI-UNESCO, 2006.
- [10] BPS, *Kepulauan Mentawai Dalam Angka*, Sipora Utara: BPS, 2018.