

COMMUNITY VULNERABILITY LEVELS IN THE COASTAL AREA OF PARIAMAN BEACH IN FACING EARTHQUAKE DISASTERS

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ABSTRACT

This study aims to obtain data, process, analyze and discuss the Community Vulnerability in the Coastal Areas of Pariaman City in Earthquake Disaster Mitigation. This type of research is descriptive qualitative. The population in this study are villages along the coast of Pariaman. Total population of 1117 households (KK). Sampling of respondents based on Proposional Random Sampling, namely 10% of the total population, so that the respondents totaled 117 people. Data collection techniques using questionnaires and interviews. Descriptive qualitative data analysis used frequency and percentage tables. The results of this study indicate the level of community vulnerability in the coastal area of Pariaman in earthquake mitigation shows a high vulnerability category. The general public must always be given outreach on a regular basis to be able to understand about knowledge before a disaster, during a disaster and after a disaster.

Keywords: *Vulnerability; Earthquake Disaster; Mitigation*

A. INTRODUCTION

Indonesia is geographically located in an area prone to natural disasters. Geographically, Indonesia is at the confluence of three active plates in the world, namely the Eurasian, Indo-Australian and Pacific plates (BNPB, 2015). This resulted in a large number of volcanic and tectonic activities, some of which resulted in subsequent disasters such as tsunamis. (LIPI-UNESCO/ISDR, 2006) Identified the most frequent disasters in Indonesia such as floods, droughts, forest and land fires, hurricanes, earthquakes, tsunamis, volcanic eruptions, technology, technological failures, and

epidemic disasters (Maryani & Yani, 2001).

(Aydan, 2008) States that Indonesia has experienced thousands of earthquakes and hundreds of tsunamis in the last four earthquakes in a hundred years. In Indonesia as a whole, no sea coast in Indonesia is safe from tsunamis except the west coast of Kalimantan and the east coast of Sumatra (Muhari, Diposaptono, & Imamura, 2007).

The pattern of development and activity centers which are mostly located in coastal areas causes the level of vulnerability to disasters to be very high in the majority of regions in Indonesia. The

potential hazards of this natural disaster are large-scale accompanied by the vulnerability of social conditions, infrastructure, economy, policies, and local bureaucracy as an effect of their complexity and rapid growth (Chikoto, Sadiq, & Fordyce, 2013). This resulted in the largest number of coastal districts in tsunami prone areas which often neglected aspects of natural disaster mitigation in their development.

West Sumatra Province is located on the west coast of the island of Sumatra, which has historically been well known as a disaster-prone area, especially earthquakes (Alfi, Darsiharjo, & Maryani, 2019). This vulnerability is inversely proportional to the community's low vulnerability in the face of an earthquake. Meanwhile, the domination of population activities is mostly centered in coastal areas (Danny Hilman Natawidjaja, 2007). The earthquake hazard that threatens the province of West Sumatra is triggered by the presence of a megathrust zone (subduction zone) in the Mentawai (McCloskey et al., 2008).

On September 30, 2009 an earthquake measuring 7.9 on the Richter scale occurred in southwest Pariaman. The result is a very dire impact on all sectors of the economy, transportation, government, health, education and communication. (Spittal, McClure, Siegert, & Walkey,

2008) States that the damage to community facilities and infrastructure includes: 9,432 units of public buildings, 442 government offices, 4,748 educational buildings, 153 health buildings, 68 bridges and 2,851 places of worship. All access and public facilities were paralyzed after the big earthquake hit.

There are several sectors that experienced a large loss impact, including the infrastructure sector which suffered a loss of up to Rp. 963 billion, the social sector 1.52 trillion, the economic sector Rp. 2.3 trillion, and cross-sector (the government and environment sub-sector) experienced a loss of 674,6 billion, so that the total loss value was recorded at Rp. 20.86 trillion (Spittal et al., 2008).

The suffering caused by the disaster was the loss of life and the destruction of the physical environment including houses and public facilities which had an impact on economic and social losses (BNPB, 2017). This disaster caused 1,179 casualties in all cities and districts in West Sumatra, 1,214 people were seriously injured and 1,688 people were slightly injured (McCloskey et al., 2008).

This incident became a valuable lesson for the people of West Sumatra, especially Pariaman. This is because Pariaman is one of the areas that suffered severe damage and the highest number of victims. The public must always be

vigilant because we cannot predict natural events, what we can do is try to minimize the damage that will occur with these events.

In order to know the risks that are around, it is necessary to know the hazards, vulnerabilities and capacities that exist in the community (Röbke & Vött, 2017). States that vulnerability is a condition that is determined by physical, social, economic and environmental factors or processes that result in a decreased ability to face hazards (Rahmi & Satria, 2013). Explains that the level of vulnerability is a concept in which a certain community group does not or lacks the capacity and ability to respond to a crisis / conflict situation (emergency response) (Rahmi & Satria, 2013).

There are three factors that influence this condition. First, socio-culture and human resources in facing the crisis, the second is economic aspects related to poverty levels, access to basic food, and types of work, and the third aspect of infrastructure and housing (Bullock, Haddow, & Coppola, 2013). The relationship between community vulnerability to natural disasters has been widely discussed and studied by a number of researchers including (Twigg, Greig, & Lanka, 2001), (Mileti, 1999), (Cutter, Boruff, & Shirley, 2003), (Cardona, 2005), and (Wisner, Blaikie, Cannon, &

Davis, 2003), who Among other things, emphasizing the need to conduct a community vulnerability assessment in the micro scope to determine the level of risk it will face.

Who published the BBC framework for vulnerability assessment linked disaster risk reduction to efforts to build community capacity (Amri, Bird, Ronan, Haynes, & Towers, 2017). Community capacity building can be carried out through various activities, including: 1) dissemination of disaster impacts and hazards; 2) education to the public regarding disaster hazards; and 3) disaster mitigation carried out by related parties. The main hope is to reduce the impact of disasters on society in both material and non-material forms (Carley, Malik, Landwehr, Pfeffer, & Kowalchuck, 2016).

Then the final goal is to foster a culture and awareness of disasters in the midst of the Pariaman community so that they are always able to face various possibilities during disasters. This encourages researchers to conduct research that aims to determine the level of vulnerability of coastal communities in the city of Pariaman in the face of earthquakes.

B. MATERIALS AND METHODS

The method used in this study is a survey research method with a qualitative

approach. (Kankam, 2020 in Creswell) defines qualitative research as “an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem”.

Qualitative research enables researchers “to conduct in-depth studies about a broad array of topics” (Kankam, 2020). Argues that survey research is research that takes a sample from one population and uses questionnaires and tests as the main data collection tools (Singarimbun, 2007).

This research was conducted for 1 month, from 28 November to 28 December 2018. The research locations were in Kota Pariaman, namely Pasir Sunur Village, Marunggi Village and Manggung Village. The population in this study were all people living along the coast of Kota Pariaman as many as 1,117 people. The research sample was taken by proportional random sampling with a proportion of 10% so that the sample totaled 117 people.

The data in this study were obtained by means of a questionnaire. The data obtained in the field were then analyzed using the scoring method, namely by scoring each of the assessed vulnerability parameters and then describing each result. The analysis technique used in this study is a percentage to determine the level of vulnerability of the community in the

coastal area of Pariaman in the face of an earthquake.

C. RESULTS AND DISCUSSION

The results of research data in this study, there are several factors that indicate the level of community vulnerability, including factors of education, genre, age, marital status, livelihood, economy, socio-culture, infrastructure, and preparedness which are packaged in the following figure.

Educational Factors Affecting Vulnerability Levels

Based on the results of the research on the variable level of vulnerability, there are 3 categories according to (LIPI-UNESCO/ISDR, 2006) with each score, namely: low vulnerability (54-44), moderate vulnerability (43-33) and high vulnerability (32-22). Based on these categories, the results in Table 1.

Table 1. Education Affects Vulnerability Level

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	39	33.3
2	Moderate	58	49.6
3	High	20	17.1
Amount		117	100

Source: Primary Data Processing, 2018

Table 1 shows that education affects the level of vulnerability of society after analyzing the results of the measurement can be categorized as moderate with respondents who answered as many as 58

people (49.6%). For more details, see Figure 1.

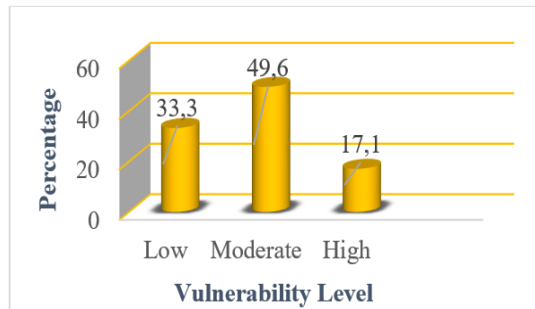


Figure 1. Education Influences Vulnerability Level
Source: Primary Data Processing (2018)

Genre Factors Affecting Vulnerability Levels

The vulnerability of society in terms of genre can be seen in Table 2.

Table 2. Genre Affects Vulnerability Level

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	17	14.5
2	Moderate	33	28.2
3	High	67	57.3
Amount		117	100

Source: Primary Data Processing, 2018

Table 2. Shows that the factors of different genres affect the level of vulnerability of society. After analyzing the measurement results can be categorized as high with respondents who answered as many as 67 people (57.3%). For more details, see Figure 2.

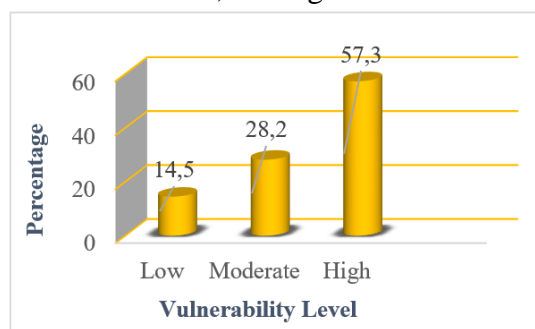


Figure 2. Genre Affects Vulnerability Level
Source: Primary Data Processing (2018)

Age Factors Affect Vulnerability Level

The vulnerability of the community in terms of age can be seen in Table 3.

Table 3. Age Affects Vulnerability Level

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	15	12.8
2	Moderate	27	23.1
3	High	75	64.1
Amount		117	100

Source: Primary Data Processing, 2018

Table 3. Shows that the age factor affects the level of community vulnerability. After analyzing the measurement results can be categorized as high with respondents who answered as many as 75 people (64.1%). For more details, see Figure 3.

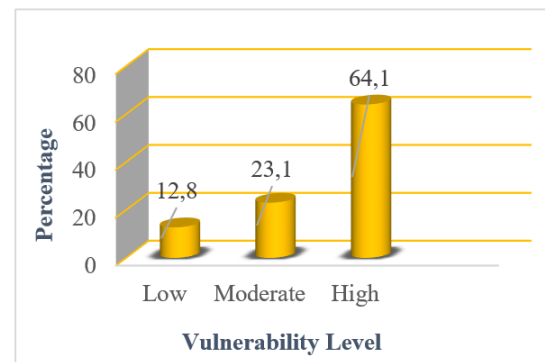


Figure 3. Age Affects Vulnerability
Source: Primary Data Processing (2018)

Marital Status Factors Affecting Vulnerability Levels

The vulnerability of the community seen from their marital status can be seen in Table 4.

Table 4. Marital Status Affects Vulnerability Level

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	26	22.2
2	Moderate	34	29.0
3	High	57	48.8
Amount		117	100

Source: Primary Data Processing, 2018

Table 4. Shows that the factor of marital status affects the level of

vulnerability of society. After analyzing the measurement results can be categorized as high with respondents who answered as many as 57 people (48.8%). For more details, see Figure 4.

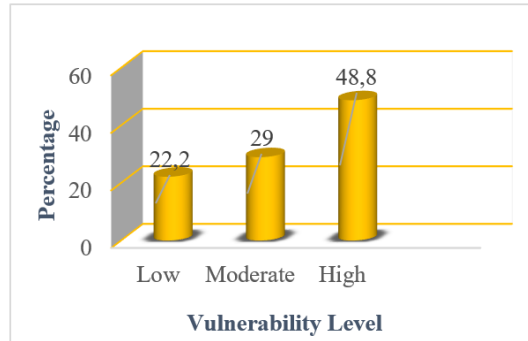


Figure 4. Marital Status Affects Vulnerability Level
 Source: Primary Data Processing (2018)

Livelihood Factors Affecting Vulnerability Levels

Community vulnerability in terms of livelihood can be seen in Table 5.

Table 5. Livelihoods Affect Vulnerability Levels

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	16	13.7
2	Moderate	24	20.5
3	High	77	65.8
Amount		117	100

Source: Primary Data Processing, 2018

Table 5. Shows that livelihood factors influence the level of vulnerability of the community. After analyzing the measurement results can be categorized as high with respondents who answered as many as 77 people (65.8%). For more details, see Figure 5.

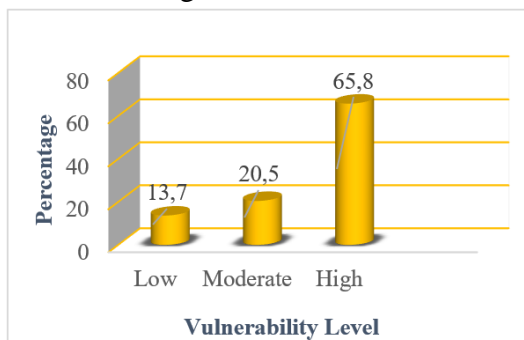


Figure 5. Livelihoods Affect Vulnerability Level
 Source: Primary Data Processing (2018)

Economic Factors Affecting the Level of Vulnerability

The vulnerability of society seen from economic factors can be seen in Table 6.

Table 6. Economic Influence Vulnerability Level

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	13	11.1
2	Moderate	20	17.1
3	High	84	71.8
Amount		117	100

Source: Primary Data Processing, 2018

Table 6. Shows economic factors affecting the level of community vulnerability. After analyzing the measurement results can be categorized as high with respondents who answered as many as 84 people (71.8%). For more details, see Figure 6.

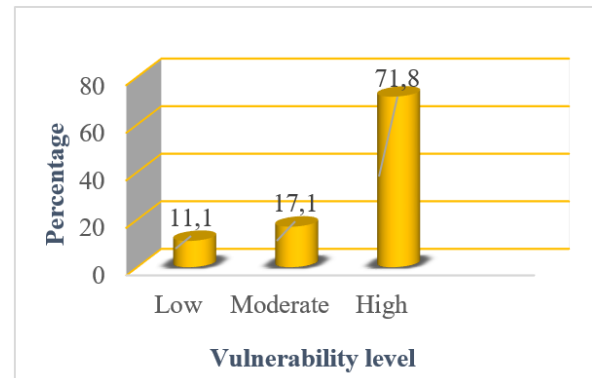


Figure 6. Economy Affects Vulnerability Level
 Source: Primary Data Processing (2018)

Socio-Cultural Factors Affecting Vulnerability Levels

Community vulnerability seen from the socio-culture can be seen in Table 7.

Table 7. Socio-Culture Affects Vulnerability Levels

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	37	31.6
2	Moderate	50	42.7
3	High	30	25.7
Amount		117	100

Source: Primary Data Processing, 2018

Table 7. Shows the socio-cultural factors affecting the level of vulnerability of the community. After being analyzed the measurement results can be categorized as moderate with respondents who answered as many as 50 people (42.7%). For more details, see Figure 7.

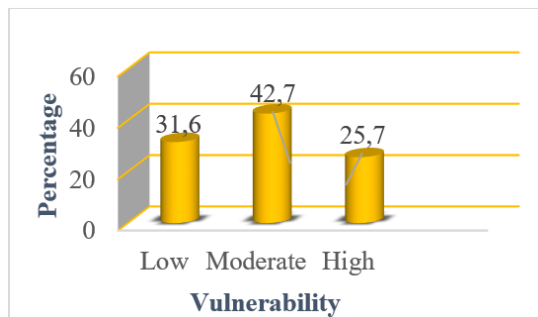


Figure 7. Socio-Cultural Influencing Vulnerability Level

Source: Primary Data Processing (2018)

Infrastructure Factors Affecting Vulnerability Levels

The vulnerability of the community in terms of infrastructure can be seen in Table 8.

Table 8. Infrastructure Affects Vulnerability Levels

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	24	20.5
2	Moderate	63	53.8
3	High	30	25.7
Amount		117	100

Source: Primary Data Processing, 2018

Table 8. Shows that infrastructure factors influence the level of vulnerability of the community. After analyzing the measurement results can be categorized as moderate with respondents who answered

as many as 63 people (53.8%). For more details, see Figure 8.

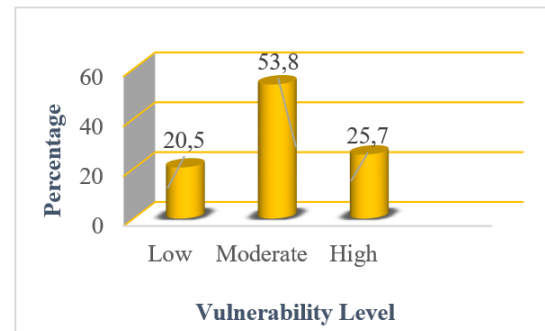


Figure 8. Influencing Infrastructure Vulnerability Level

Source: Primary Data Processing (2018)

Preparedness Factors Affecting Vulnerability Levels

Community vulnerability seen from preparedness can be seen in Table 9.

Table 9. Preparedness Affects Vulnerability Levels

No	Vulnerability Level	Frequency (f)	Percentage (%)
1	Low	22	18.8
2	Moderate	31	26.5
3	High	64	54.7
Amount		117	100

Source: Primary Data Processing, 2018

Table 9. Shows the preparedness factors affecting the level of community vulnerability. After being analyzed the measurement results can be categorized as moderate with respondents who answered as many as 64 people (54.7%). For more details, see Figure 9.

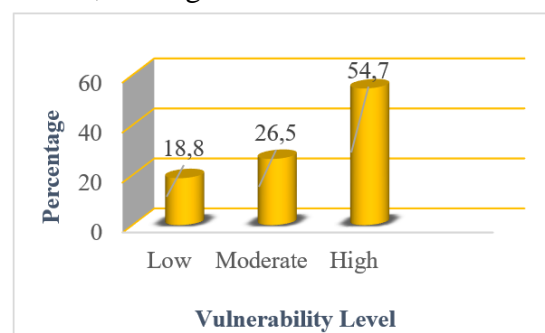


Figure 9. Preparedness Affects Vulnerability Levels

Source: Primary Data Processing (2018)

D. CONCLUSIONS

The average percentage of respondents' answers regarding the level of vulnerability of communities in coastal areas of Pariaman in facing disasters shows a high level of vulnerability. The high level of vulnerability in the community can be classified into 3, namely: a) social and cultural; b) economy and c) infrastructure.

The results in the field show that the level of community vulnerability in the coastal area of Pariaman in the face of earthquake disasters in terms of education factors with moderate levels of vulnerability (49.6%), genre factors with high levels of vulnerability (57.3%), age factors with high levels of vulnerability (64.1%), marital status factors with a high level of vulnerability (48.8%), livelihood factors with a high level of vulnerability (65.8%), economic factors with a high level of vulnerability (71.8%), socio-cultural factors with a moderate level of vulnerability (42.7%), infrastructure factors with a moderate level of vulnerability (53.8%), and a preparedness factor with a moderate level of vulnerability (54.7%).

There are several things that can be done to minimize the vulnerability of the community in the face of earthquake disasters, including the government through related agencies providing

education and socialization on strategies to improve preparedness. Socialization and education regarding this preparedness strategy were provided continuously and then formed in each disaster preparedness group village as a pioneer in the community. This socialization and education material covers conditions before a disaster, during a disaster and after a disaster. The goal is to form a calm mental and psyche when faced with disasters and this is expected to reduce vulnerability in dealing with disasters.

Based on the results of the research that has been done, the results of this study are expected to become material for information and reference in adopting policies by the Pariaman government regarding the vulnerability of society in the face of earthquake disasters and become one of the materials for further research in the future.

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