Analysis of senior high school student preparedness in dealing with earthquake disaster in the Mentawai island

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Abstract. The purpose of this study was to identify disaster preparedness level of high school students in Mentawai Islands in the face of earthquake disaster. The type of research used is survey with quantitative descriptive approach. The study population is all high school students of the SMAN 1 Pagai Utara Mentawai islands as many as 154 students and the number of samples of 30 students. Sample selection using purposive sampling technique. Data collection techniques used questionnaires, observations and interviews. The data collected were analyzed using quantitative descriptive analysis through scoring and percentage. Based on the results of the study, it can be concluded that the index of preparedness of students for each parameter of preparedness in facing earthquake disaster are (1) knowledge and attitude 63.5 which is categorized almost ready, (2) emergency planning 59.8 which is categorized almost ready (3) warning system 47.7 are categorized as less prepared and (4) resource mobilization is in index 59.3 with almost ready category. So that the average index value of the four parameters of earthquake disaster preparedness is 60.84 with the category almost ready.

1. Introduction
Geographically Indonesia is an archipelagic country located at the confluence of three tectonic plates namely the eurasian plate, the indo-australian plate, and the pacific plate. One of the consequences of the three-plate meeting has caused Indonesia to be vulnerable to the impact of the earthquake, especially in the Mentawai Islands region of West Sumatra province. Mentawai Islands District is one of the districts located in the province of western Sumatra, the undersea passing tectonic plates, one of which became the cause of earthquakes in the event of movement. So it is potentially affected by the earthquake disaster. One of the great earthquakes of Mentawai earthquake that occurred on October 25, 2010 with the magnitude 7.7 magnitude earthquake. SMAN 1 Pagai Utara located on Pagai Island Pagai Utara District Mentawai Islands District is a school located in the area affected by the earthquake in 2010. The northern island of Pagai is the region with the most casualties during the earthquake of 2010. Earthquakes occurred released coast of Sumatra. Occurred off the coast of Sumatra, the earthquake occurred at 21:42 local time (14:42 UTC), about 150 miles (240 km) west of Bengkulu, close to the Mentawai Islands. The earthquake epicenter occurred at a depth of 28 miles (206 km) and initially estimated the magnitude of the magnitude 7.4 magnitude earthquake before it was revised to 7.7 on the Richter scale. This earthquake also caused a tsunami as high as 3-10 meters and caused damage and casualties[1].

Disaster is an event or series of events that threaten and disrupt people's lives and livelihoods caused by both natural and/or non-natural factors and human factors resulting in the occurrence of human casualties, environmental damage, property loss, and psychological impacts [2]. Disaster is a serious disruption to the functioning of a society, thus causing widespread harm to human life from a material, economic, or environmental perspective and beyond the ability of the community concerned to cope with the use of their own resources[3].
An earthquake is a natural phenomenon in the form of a shaking or vibration of the ground caused by the presence of ground vibration sources resulting from a fault or cesarean due to tectonic activity [4]. Earthquakes are a relatively common natural disaster in Indonesia, mainly due to plate tectonic interactions. Indonesia is an archipelago country located at the meeting of 4 (four) tectonic plates of the world, namely the Eurasian plate; Australian plate; the Pacific plate; and the Philippine plate [5].

Preparedness is a series of activities undertaken to anticipate disasters through organizing and through appropriate and efficient measures[6]. Preparedness is important and should be built on every group in the community. Disaster prevention is one focus in schools by empowering children and adolescents to understand disaster warning signs and steps that can be taken to reduce risks and prevent disasters[7].

The level of community preparedness in the face of disasters can be measured by (1) knowledge and attitudes of the community in building the capability of disaster or potential disaster quickly and appropriately, (2) emergency response plans prepared by the community for quick action (3) community disaster warning system to establish a disaster warning system in order to improve the ability to deal with disasters, and (4) resource mobilization undertaken by communities in preparing resources either in individual or collective in the context of disaster preparedness. [8]

School is expected to be a source of knowledge related to the earthquake natural disasters that often occur in the Mentawai. Good knowledge of the earthquake disaster will also improve student preparedness in the face of disaster. However, after the earthquake in 2010 in mentawai until now has never done research in knowing the preparedness of students in the face of earthquake disaster that any time can happen. Therefore, based on the background of the above problems, inspired the author to conduct research on the analysis of the level of preparedness of students in the face of earthquake disaster with the object of research students SMAN 1 Pagai Utara Mentawai islands. Researchers do this to know the preparedness of SMAN 1 Pagai Utara Mentawai archipelago in Facing Earthquake Disaster.

2. Methods
The type of research used is survey with qualitative descriptive approach. Sampling in this study using purposive sampling technique/sample with the aim that the sample taken is not emphasized on the number but emphasized on the quality of his understanding to the problem under study [9]. With the sampling of 30 students as respondents from the population of 154 students in SMAN 1 Pagai Utara and using questionnaires (questionnaires), observation, and interviews as a means of data collection.

This research uses descriptive quantitative approach. Where is the quantitative research of collecting data using questioner which is distributed to the respondent containing the research variable that is students' preparedness in facing earthquake with parameters: knowledge and attitude (KAP), emergency planning (EP), warning system (WS), and resource mobilization capacity (RMC).

This research was conducted in Regency of Mentawai Islands West Sumatera Province at SMA Negeri 1 Pagai Utara. The study was conducted in the even semester of the academic year 2018/2019. Subjects in this study were students of class X and XI SMA Negeri 1 Year Lessons 2018-2019 in Pagai Utara. The selection of this research subject is based on the consideration that the students of class X and XI are in a condition not facing national final examination, so it is expected to give a clear and clear explanation related to earthquake disaster preparedness.

Data collection techniques in this study using questionnaires, observation, and interviews. The questionnaire instrument was developed based on four parameters of disaster preparedness. The distribution of indicators for the four parameters of disaster preparedness can be seen in the table below.

| Table 1. Distribution of questions for each student preparedness parameter |
|-----------------------------|----------------|----------------|----------------|
| School Community | KAP | EP | WS | RMC |
| Student | 20 | 2 | 1 | 1 |

The data analysis technique used in this research is the analysis of school community preparedness level of SMAN 1 North Pagai which has been taken samples. Then a quantitative descriptive analysis
of the four parameters of disaster preparedness was conducted. By categorizing based on assessed aspects to determine the level of preparedness of students in dealing with the earthquake as a whole and analyzing the preparedness of students by using the average calculation is by using the value of the preparedness index. The score of the questionnaire was given the criteria: "Yes" was given a score of 1 and "No" was given a score of 0. After the calculation then classified the level of preparedness of each school community based on the index value is as follows:

| No | Index Value | Category       |
|----|-------------|----------------|
| 1  | 80 – 100    | Very ready     |
| 2  | 65 – 79     | Ready          |
| 3  | 55 – 64     | Almost ready   |
| 4  | 40 – 54     | Less ready     |
| 5  | <40 (0 – 39)| Not ready      |

Problems given to the respondents sideway totaled 24 questions. If the value of preparedness of respondents ≥80 then the level of school students preparedness is categorized very ready. The results of the school community preparedness scores of 65-79 are categorized as ready, 55-64 are almost ready, 40-54 are less prepared, and if the student's preparedness score is ≤ 40 then it can be concluded that the preparedness of the students in the school is categorized not yet ready.

3. Results and discussion

3.1 Impact of the earthquake October 25, 2010

Mentawai Islands District consists of four large islands plus 252 small islands. The four big islands are Siberut Island, Sipora Island, North Pagai Island, and South Pagai Island. One of the islands affected by the worst earthquake that occurred on 25 October 2010 in the islands mentawai is on the island of North Pagai, precisely in North Pagai District. North Pagai district has an area of 342.02 km² with the capital district is Saumangayak. SMAN 1 Pagai Utara is the only SMA located in the northern part of Pagai which is the area affected by the earthquake of 2010. Based on the report of BPBD West Sumatra Province recorded the number of heavily damaged houses as many as 442 units, with details of 248 units in Kec. North Pagai, 114 units in Kec. Sipora Selatan, 63 units in South Pagai and 17 units in Sikakap. Meanwhile, lightly damaged houses recorded as many as 200 units, mostly located in North Pagai. In addition to damaged homes, in District Sipora Selatan recorded 5 bridges heavily damaged, ie 3 units in Bosua sub-village, 1 unit in the hamlet Mongan Bosua and 1 unit in Saumangannyak Hamlet. Other damage data are 4 units of education facilities and 1 unit of house of worship in Kec. South Pagai was severely damaged. While in the district, South Sipora 5 units of worship house also severely damaged. Data for the death toll were 343 people, the missing 338 people, 264 seriously wounded, 140 minor injured and 4,000 refugees. The death toll was mostly from Batumonga Village, Kec. North Pagai as many as 164 people. In the village reportedly also the largest lost victims of 275 people, of the total loss of 338 people lost. Here is a picture of the damage caused by the earthquake of 2010.

![Damage caused by earthquake and tsunami in North Pagai District Year 2010](image1)
3.2 Level of Student Preparedness in Dealing with Earthquake Disaster

Based on the data obtained from the respondents, then dialakukan analysis. From the analysis results obtained level preparedness SMA N 1 Pagai Utara students in dealing with earthquake disaster based on data obtained through the questionnaire showed the level of preparedness of students in the category almost ready with the index value of 60.84. The index score of 60.84 is based on the accumulated score of preparedness of 30 respondents (students) per knowledge and attitude parameters, emergency response plan, disaster warning system and resource mobilization in the prepared category as much as 2 people (6%), ready 8 people (27%), almost ready 14 people (47%), less ready 8 people (20%) and not ready 0 people (0%). While the distribution result of each parameter of preparedness index is obtained that is (1) knowledge and attitude 63.5 which is categorized almost ready, (2) emergency planning 59.8 which is categorized almost ready (3) warning system 47.7 which is categorized less ready and (4) resource mobilization is in the 59.3 index with almost ready categories. Here is the calculation of index and graph of students preparedness level SMA N 1 Pagai North South in the face of earthquake disaster.

![Graph of percentage of High School Student Preparedness in Facing Earthquake Disaster](image1.png)

**Figure 2.** Graph of percentage of High School Student Preparedness in Facing Earthquake Disaster

![Distribution of the index value of each parameter of student preparedness in facing earthquake disaster](image2.png)

**Figure 3.** Distribution of the index value of each parameter of student preparedness in facing earthquake disaster

4. Conclusion

Based on the results of the above research and discussion, it can be concluded that students' preparedness to earthquake disaster measured using student preparedness questionnaires to earthquake disaster got the result of index value of student preparedness to earthquake disaster from four
The parameters of earthquake disaster preparedness that is (1) knowledge and attitude 63.5 are categorized as almost ready, (2) emergency planning 59.8 that is categorized as almost ready (3) warning system 47.7 are categorized as less prepared and (4) resource mobilization is in the 59.3 index with almost ready categories. So that the average index value of the four parameters of earthquake disaster preparedness is 60.84 with the category almost ready. The low preparedness of students in the earthquake disaster is also caused by the fact that the school has not provided any training or socialization about how the steps should be taken in the event of an earthquake and the school has not integrated the earthquake disaster preparedness material into the classroom subjects. The results of the study are expected to be useful for schools in understanding the importance of preparedness for earthquake disaster, so as to reduce casualties and damage caused by the earthquake disaster.

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