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DISASTER MTIGATION STUDY IN SCHOOL PRONE TO EARTHQUAKE AND TSUNAMI DISASTER (CASE STUDY OF SMAN 4 PARIAMAN)

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ABSTRACT

SMAN 4 Pariaman is located in an area prone to disasters, especially the earthquake and tsunami. SMAN 4 Pariaman is located on the coast of the West Coast of Sumatra, which belongs to the tsunami red zone in Pariaman City. Based on this, all school residents must be prepared to face the disasters that will occur, especially the earthquake and tsunami. This type of research is a combination of research (Mixed Methods). This research is a step of research by combining two pre-existing forms of research namely qualitative research and quantitative research. The results of the study found 5 main priorities, namely 1) Optimization of meeting the basic needs of disaster management with a value of (5,000), 2) Application of evacuation routes and zones of vulnerability to our position or presence (4,556), 3) Socialization through facilities and infrastructure prepared by parties BPBD with grades (4,412), 4) Make maps to the evacuation sites of schools with grades (4,200), 5) Facilitate evacuation route signs such as posters with grades (3,587). The results of the FGD and data processing by data processing with Bayes method obtained 5 main priorities, namely 1) Schools must incorporate knowledge about disasters into the curriculum or subjects with values (5,100), 2) Improvement of earthquake resistant facilities (4,467), 3) Schools must enter disaster mitigation activities into extracurricular values (3,933), 4) Making maps of tsunami evacuation routes to TES with values (3,923), 5) Conduct TRC education and training with a value of 3,857.

Keywords: **Earthquake, Tsunami, Disaster Mitigation, Disaster Preparedness School**

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INTRODUCTION

Pariaman City is one of the cities prone to earthquake and tsunami because it is located on the west coast of the island of Sumatra (Hermon, 2019; Hermon et al, 2019). Although it has a very high disaster potential, the coastal area of Pariaman city is inhabited by many residents. This is because the coastal area has promising potential in supporting the community's economy, such as aquaculture, fishponds, agriculture, ports, tourism and others.

Geologically, Pariaman City is located between three major fault lines namely the Sumatran Fault (Oktorie et al, 2019), the Mentawai Fault and the subduction zone in the Indian Ocean so that Pariaman City is prone to earthquakes and tsunamis. Sumatra fault line which is also commonly called the Semangko Fault along the 1,900 Km is very active and in the form of a sliding slip (Hermon, 2012; Hermon, 2015; Hermon, 2016; Oktorie, 2017). This fault zone stretches along the western side of the island of Sumatra which causes the left side of the island of Sumatra to move north while the one on the right moves south and gives birth to the inner island arcs such as Nias Island, Mentawai, Enggano, Banana and so on (http: //Rovicky.wordpress.com/2013).

The coastal area of Pariaman City which is inhabited by many residents has made the need for education increase. To meet this need for education, schools were established ranging from play groups (KB), elementary schools (SD), junior high schools (SMP), senior high schools (SMA), to tertiary institutions (PT). Some schools in the coastal areas of Pariaman City include SDN 23 Balai Naras, SDN 03 Naras Hilir, SDN 15 Ampalu, SDN 03 Pauh Barat, SDN 11 Pauh Barat, SDN 09 Pauh Barat, SDN 01 Kampung Jawa, SDN 18 Karan Aur, SDN 02 Karan Aur, SDN 03 Taluk, SDN 11 Marunggi, MTsN Model Padusunan, and SMAN 4 Pariaman.

SMAN 4 Pariaman is located in an area prone to disasters, especially the earthquake and tsunami. SMAN 4 Pariaman is located on the coast of the West Coast of Sumatra, which belongs to the tsunami red zone in Pariaman City. Based on this, all school residents must be prepared to face the disasters that will occur, especially the earthquake and tsunami. Even though SMAN 4 Pariaman is in the tsunami red zone, the

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number of students is quite large, as many as 799 people, consisting of 331 men and 468 women with different characters and abilities and have different knowledge about the earthquake and tsunami.

METHOD

This type of research is a combination of research (Mixed Methods). This research was conducted at SMAN 4 Pariaman, Pariaman City, West Sumatra Province. The sample in this study was taken using proportional stratified random sampling technique. Based on the results of sampling obtained 28 students from class X, 43 students from class XI, and 43 students from class XII. Where to formulate the school disaster strategy the respondents were the Principal, Representatives of Curriculum and Students and Representatives from the BPBD. Data is collected through tests, observations, interviews, documentation studies and literature studies. Data analysis is performed by reducing data, displaying data, drawing conclusions and verification.

RESULTS AND DISCUSSION

Students' knowledge of natural disasters such as earthquakes and tsunamis is very important to know, because based on the location and conditions of SMAN 4 Pariaman located in the red tsunami zone. Based on the results of data processing based on test results on students' knowledge about disasters, the results are as shown in the table below:

Table 1. Student Knowledge Levels Based on Class Levels About Earthquake and Tsunami Disaster at SMAN 4 Pariaman

Knowledge	Very Good		Good		Enough		Less		Very Less		Total	
	F	%	F	%	F	%	F	%	F	%	**f**	**%**
Class X	-	-	1	3,57	8	28,57	14	50	5	17,86	**28**	**100**
Class XI	-	-	10	23,26	25	58,13	6	13,96	2	4,65	**43**	**100**
Class XII	3	6,98	20	46,51	18	41,86	2	4,65	-	-	**43**	**100**
Total	3	6,98	31	73,34	51	128,56	22	68,61	7	22,51	114	**400**

Source: Primary Data Processing 2019

As seen from the table the level of knowledge of students about the earthquake and tsunami disaster in the red zone of SMAN 4 Pariaman has sufficient knowledge with

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a frequency of 51 which means only 51 students whose grades are above average. Whereas for the lacking categories there were 22 students, and only 3 students with very good categories namely in class XII students. As for students' knowledge about earthquake and tsunami mitigation at SMAN 4 Pariaman can be seen in the table below:

Table 2. Student Knowledge Levels Based on Class Levels About Earthquake and Tsunami Mitigation at SMAN 4 Pariaman

Knowledge	Very Good		Good		Enough		Less		Very Less		Total	
	F	%	F	%	F	%	F	%	f	%	**f**	**%**
Class X	-	-	2	7,41	11	39,29	14	50	1	3,57	**28**	**100**
Class XI	3	6,98	12	27,91	11	25,58	16	37,21	1	2,32	**43**	**100**
Class XII	12	27,91	24	55,81	4	9,30	3	6,98	-	-	**43**	**100**
Total	15	34,89	38	91,13	26	74,17	33	94,19	2	5,89	114	**300**

Source: Primary Data Processing 2019

Based on the above table, it can be seen that students' knowledge of earthquake and tsunami mitigation at SMAN 4 Pariaman obtained the highest results in the good category, 38 students, which means 38 students have knowledge about earthquake and tsunami mitigation, 26 students in the sufficient category and 33 people in less category. Based on the results of processing values about disaster and earthquake and tsunami disaster mitigation, it can be concluded that the role of teachers as education is needed to increase students' knowledge of disasters that can occur at any time. In addition, SMAN 4 Pariaman is in the tsunami red zone and is also one of the disaster preparedness schools in Pariaman City.

The role of government and schools must be mutually sustainable in realizing disaster preparedness schools, so that school residents and students at SMAN 4 Pariaman are ready to face disasters, based on observations and interviews the condition of schools and school residents are not ready to face disasters, which is seen from the standby program programmed disasters are not carried out as they should. Based on the results of the FGD with the principal of SMAN 4 Pariaman, the Curriculum Representative and one of the class teachers, and attended by the BPBD, found 14 alternatives to be applied at SMAN 4 Pariaman 14 alternatives.

Pariaman City BPBD medium term policy for SMAN 4 Pariaman 1) Socialization through facilities and infrastructure prepared by BPBD, 2) Facilitating evacuation route signs such as posters, 3) Making maps to evacuation sites from schools, 4) Conducting simulations periodic disaster alert, 5) Application of evacuation routes and zones of

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vulnerability to our position or whereabouts, 6) Prepare appropriate and integrated information and communication systems, and 7) Optimization of meeting basic needs of disaster management. While the SMAN 4 Pariaman Policy in dealing with disasters 1) Schools must incorporate knowledge about disasters into curriculum or subjects, 2) Making earthquake resistant shalter or buildings for schools, 3) Implementation of Disaster Simulation once a year at the time of admission of new students, 4) Making maps tsunami evacuation route to TES, 5) Improvement of earthquake resistant facilities, 6) Schools must incorporate disaster mitigation activities into extracurricular activities, and 7) Conduct TRC education and training.

Based on the policy criteria for the disaster preparedness school at SMAN 4 Pariaman, there were 14 priorities. To determine the priority scale of the 14 alternatives that have been prepared using Bayes method can be seen in table 3.

Table 3. Alternative Priorities for Disaster Preparedness Schools from BPBD

No	Alternative	Value	Priority
1	Dissemination through facilities and infrastructure prepared by the BPBD	4,412	3
2	Facilitating evacuation route signs such as posters	3,857	5
3	Make a map to the evacuation site from the school	4,200	4
4	Conduct regular disaster alert simulations	3,600	7
5	Application of evacuation routes and zones of vulnerability to our position or whereabouts	4,556	2
6	Application of evacuation routes and zones of vulnerability to our position or whereabouts	3,923	6
7	Optimization of meeting the basic needs of disaster management	5,000	1

Source: Secondary Data Processing, 2018

Based on the results of data processing using the Bayes method obtained 5 main priorities, namely 1) Optimization of meeting the basic needs of disaster management with a value of (5,000), 2) Application of evacuation routes and vulnerability zones of our position or whereabouts (4,556), 3) Socialization through means and infrastructure prepared by the BPBD with a value (4,412), 4) Make a map to the evacuation site from the school with a value (4,200), and 5) Facilitate evacuation route signs such as posters with grades (3,587). Whereas alternative policies from the school can be seen in the table below:

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Table 4. Alternative Priorities From SMAN 4 Pariaman

No	Alternative	Value	Priority
1	Schools must incorporate knowledge about disasters into the curriculum or subjects	5,100	1
2	Making earthquake resistant shalter or buildings for schools	3.600	7
3	Disaster Simulation once a year at the time of admission of new students	3.714	6
4	Making maps of tsunami evacuation routes to TES	3,923	4
5	Increased earthquake resistant facilities	4.467	2
6	Schools must incorporate disaster mitigation activities into extracurricular activities	3.933	3
7	Conduct TRC education and training	3.857	5

Source: Secondary Data Processing, 2018

Based on the results of the FGDs and data processing by data processing with Bayes method, there are 5 main priorities, namely 1) Schools must incorporate knowledge about disasters into curriculum or subjects with values (5,100), 2) Improvement of earthquake resistant facilities (4,467), 3) Schools must incorporate disaster mitigation activities into extracurricular values (3,933), 4) Making maps of tsunami evacuation routes to TES with values (3,923), and 5) Conduct TRC education and training with a value of 3,857.

An earthquake according to Prager (2009) is a seismic vibration caused by the breaking or shifting of rocks somewhere in the earth's crust. Triutomo (2007) suggested that an earthquake is an event of energy release caused by a shift / movement on the inside of the earth (earth's crust) suddenly. Geologically, Pariaman City is located between three major fault lines namely the Sumatra Fault Line, the Mentawai Fault Line and the subduction zone path in the Indian Ocean so that Padang City is prone to earthquakes and tsunamis. Sumatra fault line which is also commonly called the Semangko Fault along the 1,900 Km is very active and in the form of a sliding slip. SMAN 4 Pariaman is located in an area prone to disasters, especially the earthquake and tsunami. SMAN 4 Pariaman is located on the coast of the West Coast of Sumatra, which belongs to the tsunami red zone in Pariaman City. Based on this, all school residents must be prepared to face the disasters that will occur, especially the earthquake and tsunami.

Based on that, SMAN 4 Pariaman has a total of 799 students, consisting of 331 men and 468 women with different characters and abilities and who have different

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knowledge about the earthquake and tsunami. The results of interviews with the principal of SMAN 4 Pariaman socialization and simulation of the earthquake and tsunami were carried out by the BPBD in 2010 and in 2018 a re-socialization was conducted by the BPBD but no simulation had yet been held. Judging from the results of processing the value of students' knowledge about the earthquake and tsunami disaster in the red zone of SMAN 4 Pariaman has sufficient knowledge with a frequency of 51 which means only 51 students whose grades are above average. Whereas for the lacking categories there were 22 students, and only 3 students with very good categories namely in class XII students. Student knowledge about earthquake and tsunami mitigation at SMAN 4 Pariaman obtained the highest results in the good category, 38 students, which means 38 students have knowledge about earthquake and tsunami mitigation, 26 students in the sufficient category and 33 people in the less category. Based on the results of processing values about disaster and earthquake and tsunami disaster mitigation, it can be concluded that the role of teachers as education is needed to increase students' knowledge of disasters that can occur at any time. In addition, SMAN 4 Pariaman is in the tsunami red zone and is also one of the disaster preparedness schools in Pariaman City.

Based on the results of the FGD, the medium term policy of Pariaman BPBD for SMAN 4 Pariaman 1) Socialization through facilities and infrastructure prepared by BPBD, 2) Facilitating evacuation route signs such as posters, 3) Making maps to evacuation sites from schools, 4) Conducting disaster alert simulations on a regular basis, 5) Application of evacuation routes and zones of vulnerability to our position or whereabouts, 6) Preparing appropriate and integrated information and communication systems, and 7) Optimizing the fulfillment of basic needs for disaster management. SMAN 4 Pariaman Policy in dealing with disasters 1) Schools must incorporate knowledge about disasters into curriculum or subjects, 2) Making earthquake resistant shalter or buildings for schools, 3) Implementing disaster simulation once a year at the time of admission of new students, 4) Making a map of the path tsunami evacuation to TES, 5) Improvement of earthquake resistant facilities, 6) Schools must incorporate extracurricular disaster mitigation activities, and 7) Conduct TRC education and training.

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CONCLUSION

Providing reading books as a source of knowledge about disasters. As one means of efforts to tackle disasters, the role of disaster education parks is to provide books on disaster for the community as a source of knowledge about disasters. The availability of these books is expected to be used by the community to increase community knowledge about disasters and increase awareness of disasters. So that the community participates in helping the government in disaster management. Establish a River School. The intended river school is to provide students with knowledge of the river, how to preserve the river, and how to make good use of the river. Based on the results of data processing using the Bayes method obtained 5 main priorities, namely 1) Optimization of meeting the basic needs of disaster management with a value of (5,000), 2) Application of evacuation routes and zones of vulnerability to our position or whereabouts (4,556), 3) Socialization through means and infrastructure prepared by the BPBD with a value (4,412), 4) Make a map to the evacuation site from the school with a value (4,200), and 5) Facilitate evacuation route signs such as posters with grades (3,587). The results of the FGD and data processing by data processing with Bayes method obtained 5 main priorities, namely 1) Schools must incorporate knowledge about disasters into the curriculum or subjects with values (5,100), 2) Improvement of earthquake resistant facilities (4,467), 3) Schools must enter disaster mitigation activities into extracurricular values (3,933), 4) Making maps of tsunami evacuation routes to TES with values (3,923), and 5) Conduct TRC education and training with a value of 3,857.

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