The Preparedness Level of School Community in Handling the Earthquake and Tsunami Threats in Banda Aceh City

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Abstract. Banda Aceh was an area hit by earthquake and tsunami. In 2009 the government sought the improvement of preparedness through education sector. This effort has been done by launching the disaster preparedness school program or SSB. This paper aims at investigating the degree of preparedness of school community in encountering the danger of earthquake and tsunami and the factors affected the preparedness. This study used the survey techniques; the sample consisted of students, teachers, and the principals. To analyse the data, independent t-test and linear regression was used. The result shows that the SSB community and non-SSB community have the preparedness in the degree of highly prepared. The independent t-test result shows that there is no significant difference between the SSB community and non-SSB community in their degree of preparedness. The effort to maintain the degree of preparedness can be done by increasing the intensity of preparedness training activity and socialization of the benefit of preparedness at school environment and increasing the role of Geographic teacher in preparedness activity on school community.

1. Introduction
Banda Aceh City is a region in Indonesia passed by active fault “The Sumatran Fault” (Semangko Fault) that extends to Lampung. The process of continuous tectonic plate movement can cause the potency of geological disasters in that area such as earthquake and tsunami. Referring to that physical condition, it needs an effort to build disaster resilience for the society in disaster prone area. To develop disaster resilience, it needs good human resource. Someone that is trained to have preparedness will be able to handle disaster. Preparedness is one of the most important parts as the initial step of disaster risk reduction effort. One of the efforts that can be conducted to increase preparedness is through education sector “Disaster management should be integrated in development program, including education sector” [1].

Based on the explanation above, the effort to increase preparedness can be conducted through school environment. School is an institution that has strategic position in providing important role in initial disaster prevention and its mitigation. It is an effective institution that provides information, knowledge, and ability for the school community and society. School is one of information and knowledge resources, so that it has role to enhance the knowledge and ability in handling disaster. School that is an education institution, has a function as effective information medium in changing mind-set and behaviour by giving mitigation education in school [2].
Disaster Preparedness School (Indonesian: Sekolah Siaga Bencana/SSB) is a school that has had a license of readiness to face the disaster. This readiness not only focuses on the school infrastructure, but also includes all components in the school. Disaster Preparedness School is a school that has the ability to manage disaster risks in its environment [3]. That ability can be measured by creating disaster management planning (before, during, and after the disaster), logistic supply, security and comfort in education environment, infrastructure, and emergency system, that are supported by the presence of knowledge and preparedness ability, regular procedure, and early warning system. Safe school is learner community that commits to the culture of being safe and healthy, aware on the risk, and having mature and established plans before, during, and after the disaster, and always being ready to respond dangerous situation and disaster [4].

Disaster education conducted in school can create readiness in facing disaster. The effort is conducted in implementable, systematic, and measurable ways, to increase the preparedness in school community. This effort is expected to decrease the impact of disaster risk both inside the school and outside the school. Therefore, by realizing the importance of preparedness in anticipating disaster threats as early as possible through education sector, Aceh government provided enhancement of preparedness for school community in 2009.

The effort of preparedness enhancement through education sector is conducted by pioneering 3 education levels, which are Elementary School, Junior High School, and Senior High School, to be SSB. The establishment of SSB aims at creating the culture of preparedness and safety in school environment. The culture of preparedness is expected not to be applied only to the students, but also it includes the whole school elements such as teachers, headmaster, parents, educators, committee of school, and the others. In addition, the establishment of SSB is expected to give contribution for every component of school community in order to understand the disaster signs and how to overcome them.

The existence of SSB in Banda Aceh City actually gives quite positive influence in increasing the knowledge about disaster and its counter-measures. So, the society is ready to handle the disaster threat. The level preparedness of school community is higher than non-SSB. Moreover, the effect of the implementation of the curriculum-based disaster issues in school can promote the school children’s preparedness behaviour”. Furthermore, the initial observation shows that through SSB program, all school communities know the fastest path to go to the rescue and the location to gather at school, so that it doesn’t create panic at the school [5].

Looking at the positive contribution provided by SSB in increasing the preparedness in the school, the existence of SSB in disaster prone area is really effective as the effort of decreasing disaster risk. However, the effort of disaster risk reduction through the enhancement of preparedness in school community has not done thoroughly, especially in Senior High School level. Based on the data from 2009 to now, there are only two schools that obtain accompaniment to be SSB in Banda Aceh City, which are SMA Negeri 1 and SMA Negeri 6 [6]. It shows that the effort to create the culture of preparedness and safety in the school is not fully applied for the school community located in disaster prone area. This condition might show the difference on the preparedness level between SSB community and non-SSB community in facing the disaster threat. Therefore, it needs investigation on the preparedness level in SSB community and non-SSB community to anticipate earthquake and tsunami threats.

2. Methods
The research employs descriptive method with survey technique. In accordance with the scope of the research, population in this research comprises school communities which consist of students, teachers, and educators of SSB and non-SSB in Public Senior High School in Banda Aceh City. The number of the sample is 90 students, 47 teachers, and 15 educators in SSB communities and 98 students, 87 teachers, and 57 educators in non-SSB communities that spread in four earthquake and tsunami prone districts in Banda Aceh City. Sample taking is conducted by using purposive random sampling based on the location of the school in the area that has high level of earthquake and tsunami risks. The data collection of this research uses primary and secondary data collection techniques. The
data analysis of preparedness is conducted through the conversion of five scales [7] in order to determine the categorization of preparedness and examine independent t-test to see the difference of preparedness level of school community.

3. Results and Discussion

3.1. Preparedness of school community
As a whole, the preparedness of school community in handling earthquake and tsunami threats in Banda Aceh City is very ready. Preparedness level is obtained through the respondents’ answers from the questionnaire given to them. The questionnaire contains 20 private questions that include basic knowledge of disaster, emergency response plan, early warning system, and resource mobility. The data of questionnaires result is obtained from the scores of every school community’s answers that are created to have interval from 0-2, so that the maximum score obtained is 40 and the minimum score is 0. The categorization of preparedness level is made by creating interval from very unready to very ready by considering the average score of every unsure of school community. The preparedness level of school community is provided in the table 1 and table 2.

Table 1. The preparedness of SSB community in anticipating the earthquake and tsunami threats in Banda Aceh City.

| Preparedness | Maximum Score | Minimum Score | SD    | Mean  | Category  |
|--------------|---------------|---------------|-------|-------|-----------|
| Students     | 40            | 22            | 4.36  | 34.71 | Very Ready|
| Teachers     | 40            | 23            | 4.17  | 35.21 | Very Ready|
| Educators    | 40            | 31            | 2.85  | 35.86 | Very Ready|

Table 2. The preparedness of Non-SSB community in anticipating earthquake and tsunami threats in Banda Aceh City.

| Preparedness | Maximum Score | Minimum Score | SD    | Mean  | Category  |
|--------------|---------------|---------------|-------|-------|-----------|
| Students     | 40            | 21            | 4.22  | 34.24 | Very Ready|
| Teachers     | 40            | 23            | 4.13  | 35.51 | Very Ready|
| Educators    | 40            | 22            | 2.62  | 35.54 | Very Ready|

Based on the analysis of the preparedness that should be done by school community, it is shown that preparedness level of the whole school community element stands in very ready category in facing earthquake and tsunami threats in Banda Aceh. The percentage (%) of the preparedness level of school community is provided completely in Figure 1.

![The Preparedness Level of School Community](image)

**Figure 1.** The preparedness level of school community.
Community has various forms and characteristics such as big or small, centralized or dispersed, in a long time or temporary, internal or external, heterogeneous or homogeneous, spontaneous or intentional, and unknown or under surveillance of institution. In addition, community is the combination between 1) scope, which is the place of a group of people to contribute and collaborate, 2) member, which is a group of people that interact with each other, develop togetherness and responsibility, and 3) practice. Based on that explanation above, it is discovered that school community consists of all school elements and the school has a role as the institution that reciprocally interacts with the other that has identity, purpose, and the same importance in the scope of school [8].

School community, that is the main stakeholder, has important role to increase preparedness. It needs to face disaster by developing preparedness, so that the number of fatalities and the damage during the disaster can be minimized. The psychological impact also can be prevented if school community has early readiness in handling disaster [9].

Based on the conducted research, it is shown that the two elements of school community possess very ready preparedness level. This finding shows that school community, which is the main stakeholder of preparedness, is able to possess high preparedness level. As the main stakeholder, the preparedness shown by the school community evidently gives positive influence to society’s preparedness in their surroundings. This is shown from respondents’ answers, stating that they are able to tell the signs of disaster occurrence and able to inform how early warning system for earthquake and tsunami occurrences go. Children who possess knowledge about natural disaster and its preparedness will be more confident in actively participating in the process of saving their own selves or people around them [10].

The high preparedness level in both of school community is not unrelated from the existence of every school community elements’ knowledge about natural disaster, therefore this knowledge contributes to the changing of people’s mindsets and behaviors in facing natural disaster. The contribution of the knowledge can be seen from the emergency response plans of school community elements. A community that knows about types of natural disasters, sources of natural disasters, signs of natural disasters and impacts caused by natural disasters will be able to know precise responses that should be done in anticipating natural disasters in the future. This also has correlation between knowledge and preparedness behaviors on flood and landslide which is strong and positive, meaning, the more knowledge someone possess, the high preparedness behavior he has [11]. The existence of knowledge about danger risks, individuals will start to prepare themselves in facing natural disaster that might happen [12]. The possession of preparedness is strongly affected by cognitive development of the child, in which the child develops his thinking process, evoking an initiative in doing skills which are taught and developing his psychology, causing the child to be able to anticipate, identify, and able to control himself in taking precise actions in being ready for natural disaster occurrence and raising his concern for others in facing natural disasters [7].

3.2. The differences of SSB and Non SSB community preparedness

Preparedness is the actions that allow the government, organization, society, and individual to be able to handle disaster quickly and accurately [13]. The Law of Republic of Indonesia Number 24 in 2007 states that preparedness is a set of activities that are conducted to anticipate disaster through organizing and some accurate and useful steps. Moreover, preparedness is an action that aims at increasing the life safety during disaster like the protective action during earthquake, dangerous material spill, or terrorist attack [14].

Based on the explanation above, it can be known that preparedness is the action that is done before the disaster happens by focusing the planning development to handle the disaster immediately and effectively. One of preparedness forms is preparing the equipment’s and the resources which are owned such as preparing medicines, providing food and beverage supplies, having communication device, serving alternative lighting equipment, and setting aside saving or having insurance as the form of disaster threat anticipation [15].
Based on the analysis of the independent sample t-test in seeing the comparison between SSB and non-SSB community preparedness, findings are gained on table 3 as follows:

| Preparedness | t   | dF  | Sig. (2-tailed) |
|--------------|-----|-----|----------------|
| Students     | -.744 | 186 | .458           |
| Teachers     | -.926 | 132 | .356           |
| Educators    | -.1848 | 70  | .069           |

The analysis of SSB and non-SSB community preparedness level shows that there is no difference among the preparedness of the students, teachers, and teaching staffs. This is shown from the obtained significance value that is > 0.05. The obtained result of this research is in line with stating that there is no significant difference between SSB and non-SSB community preparedness level [16]. However, this research results were not in line with the research result stating that schools that implement natural disaster curriculum are more effective in evoking preparedness [5].

This result shows that schools that possess a license as a safe school do not always have better preparedness than schools that possess no license as a safe school. The preparedness obtained by non-SSB community shows that schools that do not have a license as a safe school are able to raise the preparedness of its community as an effort in decreasing natural disaster risks. This pushes non-SSB community to increase its preparedness as the schools realize that they stand in prone to disaster area, thus the efforts to decrease natural disaster risks through increasing preparedness level is needed.

In no-SSB community, the efforts in increasing preparedness is done independently by integrating material about natural disaster into subject aside of geography, such as wave lesson in physics. Moreover, non-SSB community also try to increase the preparedness by doing natural disaster socialization involving geography teachers to socialize natural disaster education in new term as well as participating in natural disaster simulation training held by government and non-government. Meanwhile, SSB community’s efforts in reducing natural disaster risks have not been done optimally. This happens with the reason that the head master was moved to another school, causing the school policy changed and also with the reason regarding school financials issue. The school feels unable to do the efforts independently. Not to mention, it is found that SBB evacuation signs are not visible in school’s halls and evacuation map is only exist in teachers’ room.

4. Conclusions
The whole elements of SSB community possess preparedness with very ready category, the same goes with SSB community showing that it whole community elements stand in very ready category. Furthermore, both of the communities showed the nonexistence of significant difference in preparedness for its each element. This nonexistence of preparedness difference is caused by the lack of optimal efforts of SSB community in decreasing natural disaster risks. This is due to the lack of financial support in order to implement schools’ action plan, causing the socialization activities and natural disaster simulations to not work regularly and the move of the head master to another school also caused the uncertainty of collaboration among SBB program supporters and the school itself. Meanwhile, non-SSB community realized that it stands in prone to disaster area, thus, evoking the increase of preparedness level by doing natural disaster risks reduction activities independently. One of the efforts done by non-SSB is shown from school integrating materials regarding natural disasters into subjects and doing socializing in new terms regularly and participating in simulation activities held by government and non-government. The nonexistence of significant difference between SSB and non-SSB community preparedness can inflict motivations to other non-SSB communities to keep increasing its preparedness even with the nonexistence of license as a SBB. Efforts in sustaining the level of preparedness can be done through increasing the intensity of natural disaster socialization or simulation activities in facing earthquake and tsunami especially around school.
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