

# PROFILE OF COMMUNITY AND STUDENT KNOWLEDGE IN THE DISASTER AREAS(Landslide, Flood, Volcano Eruption, and Earthquake)

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## **Abstract**

*This study aims to determine the level of understanding of public and elementary school students in disaster prone areas against potential landslides, floods, volcanic eruptions and earthquakes. This research uses quantitative method and descriptive percentage. The subjects of this study are the community and elementary school students in the disaster-prone areas selected at random. In collecting the data, the researcher uses observation techniques, interviews, documentation, and questionnaires / questionnaires given to the respondent. Data analysis technique uses descriptive data analysis technique percentage. The results shows that the initial knowledge of the community about landslides, floods, volcanic eruptions and earthquakes is still low; it can be seen from the results of interviews and questionnaires that have been given to the people in disaster-prone areas. Where > 70% of people have a cliff knowledge about the threat of landslides, floods, volcanic eruptions and earthquakes and mitigation efforts when disaster strikes in the area. Early knowledge of students in disaster-prone areas about landslides, floods, volcanic eruptions and earthquakes is also low because more than 70% of students have low knowledge of disaster and mitigation efforts.*

**Keywords:** Knowledge, Disaster, Society, Primary School

## **1 INTRODUCTION**

Indonesia is one of the countries located in disaster prone zone. There has been a significant increase of natural disasters in Indonesia compared to the previous year. The disasters caused various losses and changes to the environment. The regional changes in temperature have affected the natural environment (Kurniawan, 2009). Global warming can cause tropical cyclones and can improve bad weather (Goebbert & Leslie, 2010). The unique geographical position of the Indonesian archipelago has made Indonesia an especially vulnerable area. The Indonesian archipelago, including the Pacific Ring of Fire region, is also located at the confluence of three tectonic plates of the world and is influenced by three movements, namely the Sundanese system movement in the west, the East Asian periphery system movement, and

the Australian circus movement. These factors make Indonesia vulnerable to natural disasters such as volcanoes, earthquakes and tsunamis (Oktarina, 2008).

Application of plate tectonic theory for the Indonesian archipelago, explains that this archipelago is a place of clash of earth's crust: Eurasian / Southeast Asia, Pacific, and Dutch East Indies. In addition to the complexity of demographic, social and economic conditions in Indonesia that contribute to the high level of community vulnerability to disaster threats, and the lack of capacity of communities in dealing with disasters, the risk of disaster in Indonesia is high. In 2010, Indonesia was ranked 7th from a number of countries most affected by natural disasters (ISDR 2006-2009, World Disaster Reduction Campaign, UNESCO).

Indonesia experienced a major disaster in the last 10 years, namely: 1). the devastating earthquake and tsunami of Aceh in December 2004 resulting in the death of 165,708 people and loss of Rp 48 trillion; 2). the Yogyakarta and Central Java earthquakes that occurred in May 2006 resulting in the deaths of 5,716 people, damaged houses by 156,162 and estimated losses of Rp 29.1 trillion; 3). Pangandaran tsunami that occurred in July 2006 resulting in the deaths of 649 people, as many as 1,908 houses damaged and estimated losses reached Rp 138 billion; 4). Jakarta floods, in February 2007 resulting in 145,742 houses flooded and losses of Rp 967 billion. (Bappenas 2007).

Indonesian territory also consists of valleys, land, mountains, and also volcanoes, has 2 seasons, namely drought and rain, and in tropical climates. Therefore, the areas of Indonesia prone to floods, landslides, volcanoes and wind storms. Bantul, for example, was the worst affected district in the earthquake of 27 May 2006. The death toll was 4,141 inhabitants (Source: Media Center Satkorlak DIY); Damage to houses, land 71,683 units, 70,796 heavily damaged and lightly damaged 66,512 units (Source: Nuclear Technology High School BATAN, 2008).

The education sector was one of the development sectors affected by the earthquake of 27 May 2006 because a lot of schools were damaged based on the data from Bantul District due to the tectonic earthquake natural disaster. From 1,116 schools among kindergarten, elementary / junior high school, MTs, SLB, SMA / MA and SMK, there were 197 schools destroyed, 421 schools were severely damaged, 344 schools were slightly damaged, and 154 schools were in good condition. The data on damages of schools in Bantul Regency were caused by tectonic earthquake disaster, from 1,116 schools

ranging from kindergarten, elementary / junior high school, SMP / MTs, SLB, SMA / MA and SMK, 197 schools were destroyed, 421 schools were severely damaged, 344 schools were slightly damaged, and 154 schools were in good condition. (Source: Dikdasmen Bantul, 2009).

In 2007, it was born the Law no. 24/2007 on Disaster Management. At the end of 2006, Bappenas launched the 2006-2009 National Action Plan for Disaster Risk Reduction (RAN PRB). Currently, there is already BNPB; RENAS PB 2010 - 2014 and NAP PRN 2010-2012. In addition, the Government has also allocated budget for disaster risk reduction program as stated in the Development Work Plan (RKP). In addition to regulation, the Government established BNPB, followed by the establishment of regional BPBD.

To minimize disaster risk into the development process is carried out through four pillars: 1). Implementation of policies, regulations and regulatory framework of disaster risk reduction, 2). Strengthening of disaster risk reduction institutions and partnerships among them, 3). Understanding disaster risks and actions that can be taken to reduce those risks by communities and policy makers through education and public awareness, 4). Demonstrated disaster risk reduction as part of the development program.

The importance of education on disaster mitigation in schools is related to education and public awareness on disaster risk reduction, for several years, a number of institutions and organizations such as Government agencies, NGOs, and educational institutions at national and local levels have made various efforts in disaster education includes inserting material disaster into local content, teacher training, campaign and advocacy up to school road show for simulation drill activities at school. However, these

activities have not been well coordinated and not yet integrated into a mutually agreed framework. On the other hand, the mapping of educational activities in various disaster prone areas in Indonesia as well as support and capacity building interventions for education is still minimal and concentrated in Java and Sumatra. Community Preparedness Studies need to be conducted in various areas as an effort to increase school community preparedness compared to community and apparatus (LIPI, 2006-2007). This is important because schools are the basis of a community of children who are vulnerable groups who need to be protected and simultaneously need to improve their knowledge and skills.

## 2 METHODS

This research uses quantitative method and descriptive percentage. The subjects of this study were community and elementary school students in randomly selected areas prone to disaster. Data collection techniques used in this study is observation techniques, interviews, documentation, and questionnaires / questionnaires given to the respondents. Data analysis techniques used is descriptive data analysis techniques.

## 3 RESULTS AND DISCUSSION

The importance of disaster mitigation education in schools is related to education and public awareness on disaster risk reduction. Over the years, several institutions and organizations such as government agencies, NGOs and educational institutions at national and local levels have made various efforts in disaster education including disaster materials into local content, teacher training, campaign and advocacy up to the school road show for simulation drill at school. However, these activities have not been well coordinated and not yet integrated into a mutually agreed framework. On the other hand, the

mapping of educational activities in various disaster prone areas in Indonesia as well as support and capacity building interventions for education is still minimal and concentrated in Java and Sumatra. Community Preparedness Studies need to be conducted in various areas as an effort to increase school community preparedness compared to community and apparatus (LIPI, 2006-2007). This is important because schools are the basis of a community of children who are vulnerable groups who need to be protected and simultaneously need to improve their knowledge and skills. Government efforts to provide disaster education in schools through intra or extra-curricular activities have not been fully realized. Until the realization of the curriculum 2013 disaster learning educational devices at the elementary to university level has not been evenly socialized. Efforts to provide disaster education to students in schools are more often done by researchers. Research on disaster mitigation at the primary level is conducted and published by Private and Ayu (2008). Research on disaster education at elementary and junior high schools has been conducted by Rusilowati, et al. (2012). For high school level research on new disaster education (1) is provided at SMK level by Astuti (2012). All the results of the study indicate the increased awareness and positive response of school residents to disaster education.

Disaster mitigation capability is one of the important products that can be generated through contextual disaster education. The ability of disaster mitigation becomes an absolute necessity for students in an age of change of nature and uncertain climate. Over the past decade, many Southeast Asian countries have sought to redesign their educational systems in order to generate students' thinkers and respond to disasters for their future (Imamura, F., Muhari, A., Mas, E., Pradono, MH, Post,

J., & Sugimoto, M. 2012). Disaster mitigation capabilities need to be supported by adaptation and speed of responding to disasters. This mitigation ability is very important to be owned and controlled by the students and society that is in disaster prone area, but what happened is on the contrary ability of student and society in disaster prone area still less and very need to be improved. The community's initial knowledge about the disaster and its mitigation efforts is still low. This can be seen from interviews and questionnaires in some disaster prone areas. Based on the results of interviews and spreading of questionnaires in the community in some disaster prone areas in Indonesia obtained the initial knowledge profile of the community against disasters that may occur in the region. Knowledge profile of Tiengvillage community of KejarWonosobo to Landslide disaster is still very less. This can be seen in Figure 1 where the percentage of early knowledge of the community where > 70% of the public lacked knowledge about the threat of disaster landslide and mitigation efforts when disaster struck in the area.

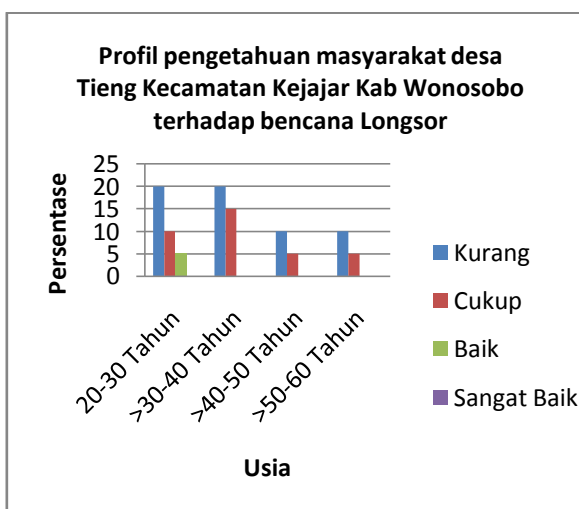


Figure 1. Community Knowledge Profile About Landslide

The second, threatening and frequent disaster in Indonesia is flood

disaster. Flood is the most frequent disaster in Indonesia, especially in areas where large rivers are prone to overflow. Based on the result of interview and spreading of questionnaire to the community in Pegerwesi Village, Trucuk Sub-district, Bojonegoro Regency to Flood Disaster, the earliest knowledge profile of the community is still in the category of less and enough to flood disaster and mitigation efforts as shown in Figure 2.

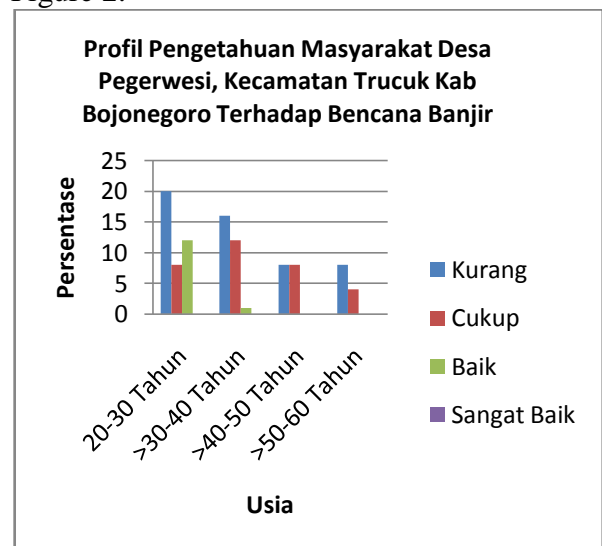


Figure 2. Community Knowledge Profile of Flood

The third disaster that is often experienced by the state of Indonesia whose territory has many volcanoes is a volcanic eruption. Based on the results of interviews and questionnaires distributed to the community in Banyubiru Village, Magal District Dukun District, it is known that > 70% of the people do not have good knowledge on volcanic eruptions and their mitigation efforts well. This can be seen in detail in Figure 3. Initial knowledge of the motivation and readiness of the general public on volcanic mountain lava disasters is essential in mitigating the eruption, in accordance with opinion (Corwin et al, 2017) which reveals that "Household preparedness motivation in lahar hazard zones: assessing the adoption of preparedness behaviors among laypeople and response professionals in

communities downstream from Mount Baker and Glacier Peak (USA) volcanoes".

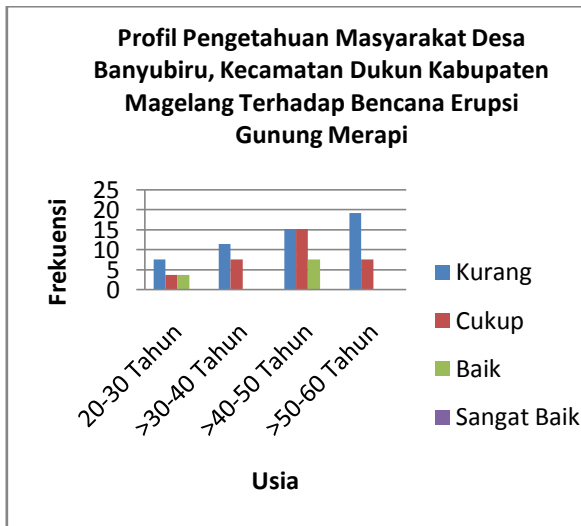


Figure 3. Community Knowledge Profile of Volcano Eruption Disaster.

The fourth type of disasters that often occur and threaten the territory of the archipelago country located in the meeting area of three tectonic plates of the world such as Indonesia is an earthquake disaster. The result of interview and dispatch of questionnaire in Bojongsari Village, Kedungreja Regency of Cilacap shows that > 80% of society does not have good knowledge about earthquake disaster and its mitigation effort as shown in Figure 4.

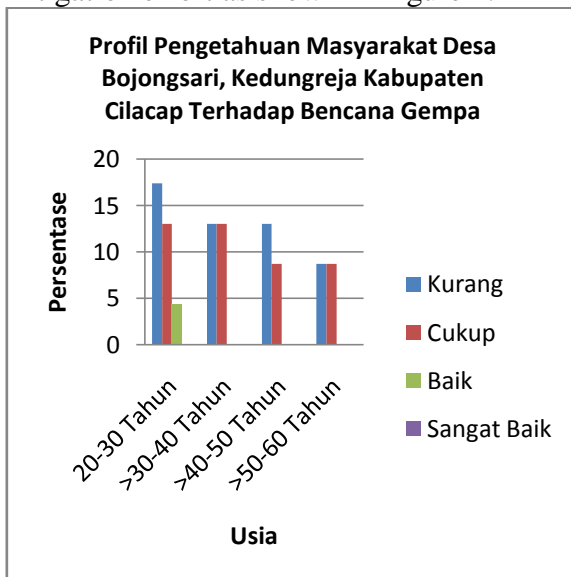


Figure 4. Community Knowledge Profile of Earthquake Disaster

In addition to the low knowledge of communities about disasters and their

mitigation efforts, interviews and questionnaires to elementary students in disaster prone areas show low student knowledge of disasters and disaster mitigation efforts in their areas. This can be seen in Figure 5.

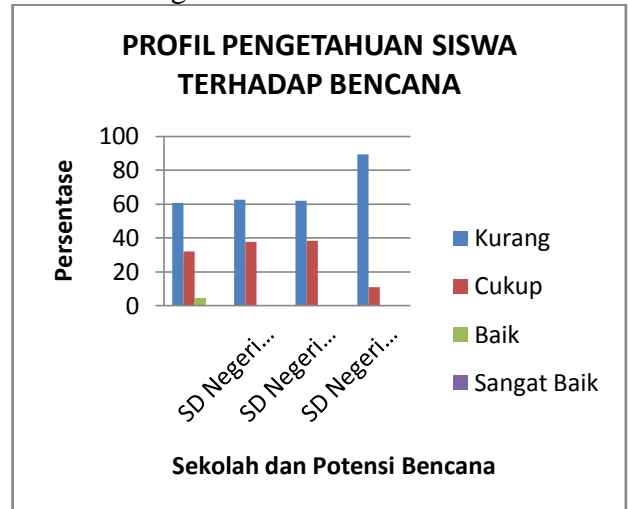


Figure 5. Student Knowledge Profile of Disaster

Based on Figure 5 it is known that > 70% of students have low knowledge of disaster and mitigation efforts. Various efforts to overcome these problems continue to be done, including the formation of a tough village disaster. In order to instill students' and community's understanding of the need for an appropriate model of disaster education in the region it is in accordance with the opinions of (Cutter, SL, Barnes, L., Berry, M., Burton, C., Evans, E., Tate, E., & Webb, J. 2008) who stated that "A place-based model for understanding community resilience to natural disasters". Based on this case, in this research the developed model is focused on four places, namely landslide prone areas, floods, earthquakes and volcanic eruptions. To improve mitigation capability, adaptation and speed of response to disaster required a contextual learning model involving the environment as the main source of learning.

One of the learning models that relate the environment as a learning resource is a vision model of Science,

Environment, Technology and Society (SETS). SETS vision learning model has characteristics that connect science with other elements, namely technology, environment, and society (Binadja, 2005).

The development of disaster learning model with the vision of SETS needs to be done to improve adaptation mitigation capability and accuracy to respond during disaster. Based on the research result from Nurmaulita (2010), it can be stated that SETS learning insight on physics learning process can bring education system to produce graduates who can apply knowledge which he obtained to improve the quality of human life without having to endanger his environment. Other research results that also supports this opinion is the result of research conducted by Fauziah (2011) which concludes that the learning model of vision of SETS able to increase student activity and learning outcomes. According to Binadja (1999), the Vision of SETS is a learning vision that brings the message that to use science (S-first) to form technology (T) in meeting the needs of society (S-2), it needs various implications on the environment (E) physically as well mentally. This indirectly illustrates the direction of SETS education which is relatively concerned about the living environment or life system (human) which also contains elements of SETS in addition to the environment (E).

SETS visionary teaching builds students' thinking skills on how technology affects the rate of development of science, and affects the environment and society. The teaching of SETS should make students aware that the needs of society and the things that happen to society also play a role in the development of science and technology. SETS vision teaching not only teaches science or knowledge, but also must guide students to know how to solve problems arising from the

development of science and technology, which is actually to solve problems related to society. The number of disaster-prone areas in Indonesia and the importance of increasing disaster risk reduction is a strong foundation for the Indonesian nation to jointly make such efforts in an integrated and directed manner. As educators, researchers will contribute to improving public awareness of disaster, through integrated learning in some subjects in primary school. Natural disaster education programis developed by SETS-based disaster education model. This model can be used to transfer information and knowledge about disaster and its mitigation efforts to students and community in disaster-prone areas. In this disaster education school as one component of society has a strategic role in preparing young people early on to better understand natural disasters and mitigation efforts. The concept of this natural disaster will be easily understood if it is explained by using the SETS-based model of natural disasters, the integration of science, environment, technology, and society.

This educational model is packed and integrated into the school curriculum that begins at the level of primary school education on the grounds that: (1) education outcomes are long-lasting and long-term, (2) reaching large populations for the future of the nation, 3) is a very appropriate time to give values to learners (Rusilowati, et al. 2012). Disaster education is not only required and should be controlled by public school students only, but knowledge about disaster and mitigation efforts is also required and must be understood by students who have special needs with environmental conditions in disaster-prone areas. Special needs students who are in disaster prone areas will need more knowledge about mitigation efforts in the event of natural disasters due to their limitations. In order

to provide knowledge about natural disaster mitigation efforts to students with special needs is required a model of disaster education in accordance with the characteristics of students with special needs and can be applied in school schools in full and in accordance with the special needs of disaster prone areas. This SETS-based disaster education model can be an alternative to embedding disaster concepts and mitigation efforts on elementary school students including students with special needs. With the characteristics of this SETS model students will be able to better understand the concept of disaster and mitigation efforts. Through this model it is expected that students with special needs will also be able to understand disaster materials and disaster mitigation efforts before the disaster, during a disaster, and after the disaster ends in their neighborhood.

#### 4 CONCLUSION

The results showed that the initial knowledge of the community about landslides, floods, volcanic eruptions and earthquakes is still low, this can be seen from the results of interviews and questionnaires that have been given to communities in disaster prone areas. Where > 70% of people are knowledgeable about the threat of landslides, floods, volcanic eruptions and earthquakes and mitigation efforts during disasters in the area. Early knowledge of students in disaster prone areas about landslides, floods, volcanic eruptions and earthquakes is also low, where 70% of students have low knowledge about mitigation and mitigation efforts.

This SETS-based disaster education model can be an alternative to embedding disaster concepts and mitigation efforts on elementary school students including students with special needs. With the characteristics of this SETS model students will be able to

better understand the concept of disaster and mitigation efforts.

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