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## **EARTHQUAKE RISK REDUCTION FOR ELEMENTARY SCHOOL IN THE CITY OF PALU**

**<sup>1</sup>Fatmawati Amir, <sup>2</sup>Muhammad Yusuf Amir**

*<sup>1</sup>Tadulako University, Palu, Sulawesi Tengah  
fatmastructureuntad@gmail.com*

*<sup>2</sup>Muhammadiyah University of Palu, Palu, Sulawesi Tengah  
y454f\_4545@yahoo.com*

### **Abstract**

One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is a sudden movement of the Earth, caused by the abrupt release of strain that has accumulated over a long time. Worldwide, 450 cities with populations over 1 million face recurring earthquakes. Palu, the capital city of Central Sulawesi is one of the areas where earthquake to be affected. We are not able to prevent the earth from shaking. However, with assessment and planning, physical and environmental protection and response preparedness we can prevent this event from becoming disasters. Since schools are our universal institution for sharing knowledge and skills, the expectations for schools to be role models in disaster prevention is high. Successful disaster mitigation is one of the ultimate tests of the success of the education should provide over generations, safe schools attain very high importance with a view to ensuring their safety and well being.

This paper describes a series of course for Palu city elementary school as appropriate, in the aspects of school disaster prevention. The course divide into four stages: 1. The introduction of the earthquakes mechanisms through animation, video and images; 2. Standard operating procedures and training for disaster response; test mitigation and preparedness plans and skills in the event of an earthquake; 3. Realistic simulation processes and procedures; 4. Evaluation and monitoring activities. The fourth stage should be carried out continuously and sustainably and should be implemented in all elementary schools in Palu.

**Keywords:** Earthquake risk reduction, disaster mitigation, elementary school, city of Palu

### **INTRODUCTION**

'Disasters', are defined as a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. Due to a range of factors, including age, physical ability, gender, health conditions and, dependency on care givers, many children are extremely vulnerable in the event of a disaster. Such events cause a serious disruption in their healthy growth and development as well as overall well-being.

Education is a key mechanism through which children can participate in disaster risk reduction (DRR). There is rowing anecdotal evidence that when children are supported by adults and are provided with sufficient knowledge and skills, they can protect themselves, save others from danger, and promote significant changes in their communities to reduce the risk of disasters.

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Many research works have also examined that the effect of student's participation in disaster risk reduction programmes is always promising, and the outputs have been very effective (Ronan et al. 2010, Nathe SK. 2000, and Shaw et al. 2004)

This paper reports the results of a series of course for Palu city elementary school as appropriate, in the aspects of school disaster prevention from earthquake through these stages: introduction of the earthquakes mechanisms through animation, video and images; implementing standard operating procedures and training for disaster response; test mitigation and preparedness plans and skills in the

event of an earthquake; realistic simulation processes and procedures; evaluation and monitoring activities.

**METHODOLOGY**

The process adopted was one which had been used successfully globally; integrating the physical science of earthquake (during groundshaking and aftershock) with social science, including evidence based research into school community behaviour in response to warnings, preparedness messages and disaster management planning. The process used recognises the importance of school community input into planning, as the best results can be expected when school communities understand the issues and work together with support agencies to create solutions that will work locally.

The methodology is based on an end-to-end risk reduction training collaborate system, which emphasises that a successful hazard early warning system is one that includes all stages of the process (Figure 1). Children as prepared and empowered citizens helps to reduce immediate impacts of disasters on children.

**ACTIVITIES BASE ON COMPONENTS OF AN EFFECTIVE EARLY WARNING SYSTEM ON THE EVENT OF AN EARTHQUAKE**

**Stage 1: The introduction of the earthquakes mechanisms through animation, video and images**

The first stage was The introduction of the earthquakes mechanisms through animation, video

and images (Figure 2). These activities starts at the most commonly understood level of child-focused DRR, looking at interventions or behaviours that enable children to situate their own lived experience within newly acquired knowledge earthquake (Figure 3 and 4).



Figure 2. Example of material for earthquake risk reduction

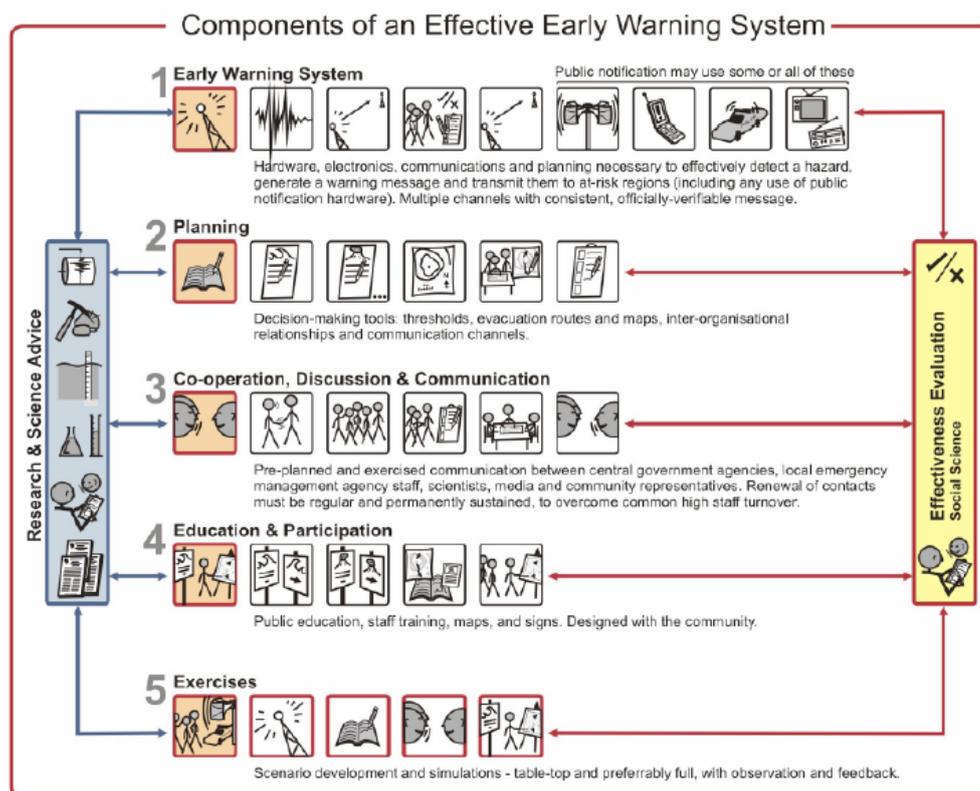


Figure 1. Components of an Effective early warning system (Wright K. et.al, 2011)

This often includes facilitating the use of tools to analyse, plan and implement risk reduction and adaptation measures. risk reduction was used in the dissemination. Examples include: training and awareness raising; knowledge based exchanges (e.g. through schools); the use of analytical tools such as vulnerability and capacity assessments (VCA); and basic disaster preparedness drills (Figure 3 and 4)



Figure 3. Stages looking at interventions or behaviours that enable children to situate their own lived experience within newly acquired knowledge earthquake at MI Muhammadiyah Al-Haq Palu



Figure 4. Stages looking at interventions or behaviours that enable children to situate their own lived experience within newly acquired knowledge earthquake at SDN 5 Palu

These activities are valuable in their own right, and are also important foundations for more ambitious efforts. Here, we involve two elementary schools (MI Muhammadiyah Al-Haq Palu and SDN 5 Palu) through four stages explain in previous section. The first step in any disaster-prone community is to secure the environments in which children live, play and learn. This is often an entry point to engaging children in discussions about disaster risk in the classroom, though this is most effective when specialist curriculum materials are developed and used. There is a wealth of case studies using children's schools as the focal point for DRR efforts, addressing both the physical infrastructure and the curriculum, alongside extra-curricular or out-of-school activities.

## Stage 2: Standard operating procedures and training for disaster response; test mitigation and preparedness plans and skills in the event of an earthquake

In order to increase awareness of school-age children against disasters, some training practises are conducted in two schools (SDN 5 Palu and SD Muhammadiyah Al-Haq Palu) during the week of the disaster that is repeated every year (Figure 5 and 6) and represented on the next stage. It was include standard operating procedures and training for disaster response; test mitigation and preparedness plans and skills in the event of an earthquake. These practices start with sudden and unannounced ringing of school bells as if a disaster had happened.



Figure 5. Engaging children in discussions about earthquake risk reduction in the classroom at MI Muhammadiyah Al-Haq Palu

This practice is often considered as a formality and is not taken seriously. Although teachers have very good attitudes during training, they do not have sufficient knowledge in detail for disaster preparedness. The training must be supported by visual materials to enhance their effectiveness (Figure 2,4 and 5).



Figure 6 Engaging children in discussions about earthquake risk reduction in the classroom at SDN 5 Palu

## Stage 3: Realistic simulation processes and procedures

During disaster practice, the students in the classrooms stop writing and drawing immediately, and drop, hold and cover themselves near chairs or lie in a foetal position called the life triangle on the

floor under chairs. Afterwards, with instruction from their teacher, they calmly go out of the classrooms toward the school garden in order to stand together.



Figure 7 Realistic simulation of drop, hold and cover during an earthquake at MI Muhammadiyah Al-Haq Palu



Figure 8 Realistic simulation of drop, hold and cover during an earthquake at SDN 5 Palu



a. Hold, drop, and cover simulation



b. life triangle on the floor under chairs



c. Evacuation standar operation procedure after the event of an earthquake



d. Evacuation standar operation procedure on the stairs

Figure 9. Real Simulation with all school community involve

#### Stage 4 : Evaluation and monitoring activities

Evaluation and monitoring activities undertaken by all members of the trainees to come directly to partner schools with the approval of the principal and at recess with the interactive dialogue with the student who are directly involved in the activities (Figure 10 and 11)



Figure 10. The process of interactive dialogue with educational partners in stage 4



Figure 11. The process of interactive dialogue with students in stage 4

Development and monitoring of partner schools conducted to determine the direct application of the results of the implementation of the program, whether training, simulation and given module implemented by them. In this stage the program managers evaluate and find a way out of the problems found in the field, such as by providing feedback to the partner schools.

#### RESULT AND DISCUSSION

After all the training process and the simulation is completed and the evaluation of the implementation

of the program activities for Elementary School Earthquake Risk Reduction in the city of Palu, the following result and discussion are drawn:

- a. Material about mechanism of the earthquake were easy to understand by all of students through the two elementary schools partner because it was delivered by video animations, stories and pictures;
- b. Implementation of the simulation can be performed by primary school partners as well, although there are some drawbacks that are not to interfere with the implementation of the simulation, such as the size of the table is too small make it difficult for students to practice the life triangle simulation;
- c. Need more cooperation and participation from both schools (teachers and principals) in the implementation of the results of the program activities for Elementary School in the city of Palu in the future.
- d. The fourth stage should be carried out continuously and sustainably and should be implemented in all elementary schools in Palu

## **CONCLUSION AND SUGGESTION**

### **Conclusion**

After the training process and the integrated simulation carried out the conclusion can be drawn that all of stage of the program could understood by the students of the school partners and can be applied in the site of the school respectively and implementation of program activities are generally going well.

### **Suggestion**

- a. Keep socialized in the face of the earthquake preparedness procedures to another school by conducting training and simulation for more intensive and extensive, given the position of Palu city prone to earthquake as a result of its position through which the active fault of Palu Koro;
- b. Inconsistencies in student knowledge and the lead partner school knowledge made the transfer of knowledge was running slow so that the required standard module that is easily to understood and practiced by students partners;
- c. Application of modules earthquake risk reduction require the support of local government and schools (principals and teachers) in practice for the safety of the school community, in addition to the required high level supporting fund from the policy makers in socializing.

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