

Alert and Response of Earthquake and Tsunami for Community Based Disaster Risk Reduction

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Alert and Response of Earthquake and Tsunami for Community Based Disaster Risk Reduction

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Abstract. Indonesia had been suffered by earthquake and tsunami for many centuries. Since many lives have taken by tsunami strikes, alert and response system are very important as important part of Disaster Risk Reduction, especially in area with high population density. This research conducted in Kangkung fishing village in Bandar Lampung coastal area which is an earthquake and tsunami prone area. The aim of the research is to study alert and response of Community Based Disaster Risk Reduction. The research conducted by qualitative method and purposive-descriptive approach. There were 53 respondents which participated in the survey and interview. It is reported that “Smart Resilient City” model suitable for community needs of alert and response of earthquake and tsunami disaster. This research meets conclusion that “Smart Resilient City” model may become a great solution in Community Based Disaster Risk Reduction to cope with the hazard of earthquake and tsunami comprehensively and sustainably.

1. Introduction

It is known that Indonesia is a prone area of earthquake and tsunami. History had noted big earthquake and tsunami that hit Indonesia regions such as those happened in Nanggroe Aceh Darussalam (2002), Yogyakarta and surroundings (2006), Padang (2007), Mentawai (2010), Sumatera Island (2012), Lebak, Banten (2018), Lombok, Palu, Donggala (2018), Banten (2019) [1,2]. Since many lives have taken by tsunami strikes, alert and response system are very important as important part of Disaster Risk Reduction, especially in area with high population density. It is no doubt that Sumatera Island have significant hazard of earthquake and tsunami. Since Lampung Province is also an earthquake and tsunami, Bandar Lampung city also has vulnerability of those disasters. Kangkung fishing village in Bandar Lampung coastal area could be a good example of how alert and response of earthquake and tsunami can support the disaster risk reduction. When community participatory become a key in disaster risk reduction, good response of community will integrate with government program to mitigate the earthquake and tsunami.



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Disaster risk reduction has endorsed adaptation as previous studies as well as resilience issues; mitigation studies, methods and policies [3–9]; materials, building, and construction innovations [10–12,19–25] for safer, stronger and sustainable housing [26–28]; early warning systems [7,29–31]; and many actions of other efforts in disaster risk reduction. Instead of many models implemented city resilience to disaster, this paper try to find a new approach to construct the model [5,32–35].

The aim of the research is to study alert and response of Community Based Disaster Risk Reduction. It should be noted that this paper is a preliminary study of the whole research project funded by Ministry of Research and Technology/National Research and Innovation Agency, Republic of Indonesia in 2020 [36]. In progress, the result of this preliminary study has been developed by and reported in [37].

2. Method of Research

This research was conducted in Kangkung fishing village, Bandar Lampung city, Lampung Province as described its satellite map by Figure 1. A qualitative method and purposive-descriptive approach is going to be applied. The aim of the research is to study alert and response of people to earthquake and tsunami. A model of “Smart Resilient City” will be proposed as solution as Community Based Disaster Risk Reduction. Hence, the analysis is going to confirm whether the model is suitable or not to Community Based Disaster Risk Reduction. There were 53 respondents which participated in the survey and interview.

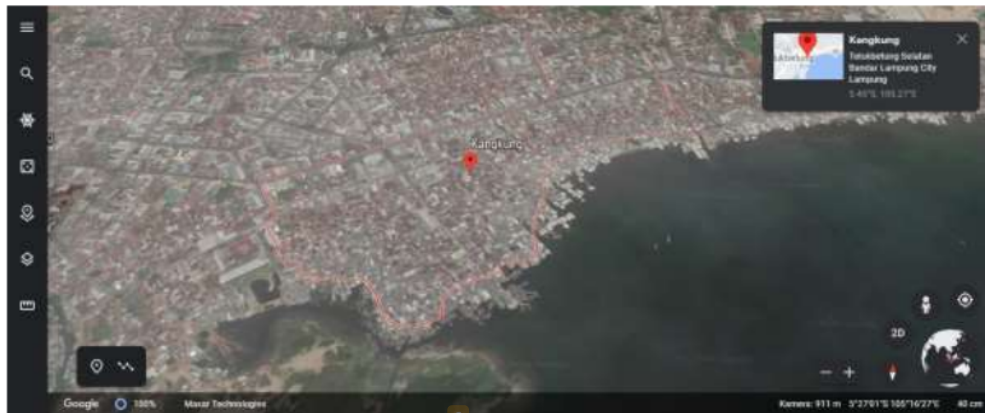


Figure 1. Satellite photograph of map of Kangkung fishing village in Bandar Lampung City, Lampung Province

(https://earth.google.com/web/search/Kangkung,+Bandar+Lampung+City,+Lampung/@-5.45050555,105.26911471,4.11269788a,1283.41339477d,35y,-2.03555256h,45.01342868t,-0r/data=CpEBGmcSYQolMHgyZTQwZDK3ZmQxZmI3ZGVhOjB4NzFjYTY1YzlkYTU0YTE0MBloZ-JnbewVwCH_F3TnLIFaQComS2FuZ2t1bmcsIEJhbmRhciBMYW1wdW5nIENpdHksIExhbXB1bmcYASABliYKJAmOp7yKUBiVwBGVKAjd3NYVwBlgSuuqvVJaQCG2DlpKJk9aQA)

3. Results and Discussion

3.1. Results

Kangkung fishing village is located in Bumi Waras sub-district in coastal area of Bandar Lampung city, Lampung Province. There is a fish market in the middle of village (Figure 2) which start its activity since afternoon to late night. Population of Kangkung fishing village is about 14.500 persons. Survey and interview (Figure 3) conducted to 53 respondents in the fishing village.



Figure 2. Fish market and the boats in Kangkung fishing village

It was reported that there were 58% of respondents are above 40 years old and 75% of them have low level of education of elementary school (75.5%) and there were only 7.5% that had high school education and no one (0%) went to the university. Most people in Kangkung fishing village are fishermen (79.2%, male) and there were 13.2% of respondents are house wife (female) and only 7.5% are entrepreneurs. There were only 32.1% of respondents that noticed they live in earthquake and tsunami prone area, but they remain live there because they already have job there (60.4%), feel comfortable (28.3%), and others don't have money to move to safer place (11.3%).

Most respondents (64.2%) in Kangkung fishing village said that there were no briefings or workshops or trainings about the hazard of earthquake and tsunami. There were also few respondents that know the emergency numbers (1.9%), most of them have no information about the emergency number (90.6%). Most respondents (66%) know the nearest safe place to go if the disaster happened.

All respondents (100%) said that Lampung doesn't have Early Warning System of earthquake and tsunami. Most of respondents (77.4%) don't have enough information of the hazard of disaster. There were few respondents (7.5%) that have intention to join the disaster preparedness team called "Tagana" (Tagana is "Taruna Siaga Bencana" in Indonesia language that means young people that is resilient to disaster events), most of them refuse to join in (79.2%).



Figure 3. Survey and interview to respondents in Kangkung fishing village [36]

3.2. Discussion

Results of survey and interview have demonstrated the need of alert system of disaster in Bandar Lampung City. Lack of information of earthquake and tsunami, little awareness, and the absence of early warning system technology, has emphasized that a comprehensive model needed to bring the city to adaptation and sustainability by becoming smart and also resilient. Hence, this paper proposes model of "Smart Resilient City" as described by Figure 4 to fulfil the need.



Figure 4. "Smart Resilient City" Model

"Smart Resilient City" Model (Figure 4) has 8 (eight) supporting aspects which come from the community. Those eight aspects divided into 2 parts, physical aspects and non-physical aspects. The physical aspects consist of human, resources, institution, and infrastructure, while the non-physical aspects consist of environment, governance, culture, and technology. All aspects will promote adaptation and bring them to sustainability. In this model, alert system and response of community are parts of infrastructure and technology, as well as human, resources, and environment, which give strong impact to adapt and achieve resilience. Therefore, "Smart Resilient City" model may become a great solution in Community Based Disaster Risk Reduction to cope with the hazard of earthquake and tsunami comprehensively and sustainably. Since many life have taken by tsunami strikes, alert and response system are very important as important part of Disaster Risk Reduction, especially in area with high population density.

4. Conclusions

Alert and response of earthquake and tsunami can support the community based disaster risk reduction. Since community participatory become a key in disaster risk reduction, good response of community will comprehensively bring community and the city to adaptation and then build resilience to sustainability. "Smart Resilient City" model may become a great solution in Community Based Disaster Risk Reduction to cope with the hazard of earthquake and tsunami comprehensively and sustainably.

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