

Community Social Adaptation Strategy to Face Earthquake with Tsunami Potential Disaster Hazard in Red Zone Area (Ketaping Village, Padang Pariaman District, West Sumatera Province)

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ABSTRACT

The study of earthquake and tsunami threats state that the number of their occurrence probability and their impact risk which is come up are four from a scale of five in West Sumatera. This research is important to do because the magnitudes of the probability and impact that are caused by them, hence the aims of this research to obtain the information about: (1) People perceptions and knowledge toward earthquake with tsunami potential threats in Ketaping Village, (2) People social adaptation strategies against earthquake with tsunami potential threats, (3) The values of local wisdom that affect people social adaptations. The research is conducted by using qualitative method with phenomenological approach since it analyses about individual perception and knowledge in facing earthquake with tsunami potential. The results of this study reveals that people aware their rea is prone from earthquake with tsunami potential, nevertheless they have not had well strategy adaptation in dealing with it. People just rely their previous experiences in facing the disasters which were occurred in Ketaping Village and other areas. In conclusion, the research information would contribute to attempt the disaster risk reduction in Indonesia, mainly in Ketaping Village.

Keywords: Adaptation, Earthquake, Tsunami, Perception, Local Wisdom

1. INTRODUCTION

Ketaping Village is one of the villages locates in Padang Pariaman district, West Sumatera Province. Geographically, it directly borders with the west coast of Sumatera. The west coast of Sumatera area locates on the subduction zone (collision) between the Hindia-Australia Ocean Plate and the very active Eurasia Plate. A Part of the subduction zone can cause earthquake covers about 50-230 km from west coast of Sumatera Island. Earthquake that is occurred can give the high magnitude, shallow depth, and slip mechanism/reverse that potentially triggers the occurrence of Tsunami. This disaster had been occurred in West Sumatera in 1797 and 1833. Based on the geographical position of area and the disasters history that had been occurred, Ketaping Village is categorized as the red zone area, which means it is most prone area affected by earthquake with tsunami Potential disaster hazard.

The study about disaster hazard of West Sumatera states that the number of their occurrence probability and their impact of risk which is come up are four from a scale of five. It means that the occurrence probabilities of tsunami and earthquake disasters are high in West

Sumatera in ten years later, 60%-80% (most likely happen) and the impact of the risk that is raised in a serious category, 60-80% runs into damage. Therefore, the experts set a scenario of earthquake with tsunami potential incident with 8.8 Magnitude in West Sumatera. (West Sumatera Tsunami Contingency Plan Document, 2012).

Earthquake with Tsunami Potential has a different of disaster type with others. The disaster type is Sudden Onset means that the disaster is occurred suddenly without being preceded by signs so that it is difficult to predict when it will occur. Consequently, when the disaster happens, the community is not being ready. The condition potentially causes many victims. The large number of the casualties and the infrastructure damages due to disaster show the lack of community alerting and preparedness, especially due to the lack of community knowledge and adaptation toward the vulnerability of the disaster area. However, the impacts that are caused by earthquake and tsunami disasters not only raise victims and infrastructure damages but also they take effect to economic, socio-cultural, educational, psychosocial community aspects.

Because the high of the probability number and the impacts that are raised by earthquake and tsunami disasters also the sudden onset of disaster type, so that this research is important to do with the aims to gain information about: (1) Community perception and knowledge through earthquake with tsunami potential disaster hazard in Ketaping Village, (2) Community social adaptation strategies through earthquake with tsunami potential disaster hazard, (3) The values of local wisdom that influence community social adaptation.

2. MATERIALS AND METHODS

2.1 Research Methods

This research uses qualitative method. This method is chosen because the suitability of the nature of the problem under the study and the type of the information to be collected. The nature of the problem under the study analyses the subjective meaning of individual as the reason in taking action and the type of information to be collated relates to social reality from actor's point of view.

Phenomenology approach is a type of qualitative method that is used in this research. It is chosen because phenomenology approach explains and reveals the concept meaning and the experience phenomena base on the consciousness that occur in several individual. Phenomenology analyses in the natural situation; hence there is no limitation in interpreting and understanding the phenomena which studied and the researcher is free to analyse the data obtained. According to Husserl "Phenomenology approach searches for essentials, invariant structure (or essence) or the central underlying meaning of the experience and emphasize the intentionality of consciousness where experiences contain both the outward appearance and inward consciousness based on memory, image and meaning (Creswell, 1998)".

2.2 Unit of Analysis and Object of Study

To focus of the study in this research, the researcher determines the unit of analysis and the object of the study. Unit of analysis is individual and community in Ketaping Village. The community social action as the form of adaptation through earthquake with tsunami potential disaster hazard is object of this study.

2.3 Research Informants

Research Informants are chosen by using Purposive Sampling Technique. Base on this technique, the informants' criteria are determined before doing the research. The informant criteria in this research are:

1. Community who stays in Ketaping Village and Tsunami red zone area.
2. Adults (Age over 18 years ago)

3. Having knowledge about area under the study
4. Knowing about local wisdom values in Ketaping Village.

The determinations of community who become informants are chosen randomly. The process of extracting information from the community will stop if the data has been saturated.

Table 1. Research Informants

Name	Sex	Age	Occupation
Jamal	Male	58	Farmer
Joni	Male	38	Rice Stalls
Sudarti	Female	43	House Wife
Said Effendi	Male	56	The leader of Korong Ketaping
Irwanto	Male	52	The leader of Korong Pauh
Harjoni	Male	45	The leader of Korong Talau Mundam
Syamsurizal	Male	41	The Chairman of KSB in Ketaping

2.4 Technique of Data Collection

This data is completed by using three stages, (1) Observation, in this stage, researcher come and observe directly the location and community social life who face earthquake with tsunami potential disaster hazard in Ketaping Village. Researcher observes community social action as the form of adaptation from earthquake with tsunami potential disaster hazard; (2) Depth interview with informants who have been determined based on the criteria by using interview guidance that has been arranged and depend on formulation of research problems; (3) Documentation Study, Researcher gathers information in the form of document relates with research problem from various sources, for examples media news, minutes of meeting, correspondence and research reports.

2.5 Data Analysis

The type of data analysis that is used in this research adopts the ones that is developed by Milles and Huberman that the analysis activity of qualitative data is completed interactively and continuously. Data Analysis is completed by using three stages. (1) Data Reduction, the researcher sorts out the data so the collected data is more systematic. (2) Data Display, Researcher will display the data that has been organized so it will be easy to be understood. (3) Data Verification, Researcher draws the conclusion from the collecting data. Data verification

process is analyzed continuously throughout the research process.

2.6 Data Validity

To ensure the data validity displayed, Researcher uses data triangulation technique. It is used to test the data obtained so it can draw the conclusion and it can be accountable to the validity methodologically. Data triangulation is analysed by asking the same questions to the informants in order to obtain the same conclusions from various informants.

3. RESULTS

3.1 Community knowledge and perception through the disaster

Community knowledge and perception through the disaster is the main indicator of adaption effort against disaster hazard in the area. From the research that had been completed showed that there were two community perceptions about why earthquake and tsunami disasters occurred. First, Earthquake and tsunami could be explained scientifically that is the movement of the plate earth causes the vibration called earthquake. If the hypocentre of vibration locates in the sea so it is potential for tsunami to occur. Second, Earthquake and tsunami are interpreted in the view of Islamic teachings. The occurrence of earthquake and tsunami disasters are form of Allah's punishment to humans due to their negligence in doing Allah commands and many immoral acts happen in the area.

In term of knowledge shows that community understands about earthquake with tsunami potential disaster hazard in Ketaping Village. This condition is signed by community can explain the cause of disasters and what must do when they are occurred. When earthquakes occur in this area, community always does self-rescue effort by following the procedure that have been obtained and they are ready to evacuate if they fell the earthquake is huge enough. Their preparedness shows that their realizations of living in prone area of earthquake with tsunami potential.

There is Village Preparedness Team (KSB) which actively socializes the effort of the disaster risk reduction in Ketaping. It is the organization which is formed by village governance and the members are chosen from community from eight sub-areas. The aim of its formation is to give strengthening to the community in effort to disasters risk reduction and to help handling when the disasters occur. The existence of Village Preparedness Team (VPT) also aims to encourage the presence of policies about the disaster risk reduction effort, mainly earthquake and Tsunami in village level.

Besides the existence of Village Preparedness Team (KSB), evidently the community capacity strengthening

has also been obtained from many Non-governmental Organizations (Local, national and International) that came into Katapiang Village after earthquake disaster in 2009. These Non-governmental Organizations pushed the community awareness through the earthquake and tsunami disaster hazard, including to push the existing village prepared team (KSB) in Ketaping.

3.2 Community Adaption Strategy through Earthquake with Tsunami Potential Disaster Hazard

Adaptation concept can be viewed as the process that places human as the actor who tries to achieve the aims and the needs in facing the change of the environment and social condition for surviving in life. He can mobilizes and utilizes the social, material, technology and liberal arts resources in adaption process or in achieving his aims and needs. The method that is chosen usually builds good social relationships with people inside the community and outside of it.

According to Diposaptono (2021) Adaptation strategy for Earthquake with tsunami potential risk reduction was done by disaster mitigation, for example:

1. Announcing through slogan "Live with Earthquake"
2. Increasing community preparedness knowledge against the disasters through education and training
3. Constructing the quake resistant building
4. Building the shelter in Tsunami red zone area
5. Developing community base disaster mitigation

Community has started to adapt with disaster hazard in their area by increasing their knowledge about earthquake with tsunami potential disaster types or signs. By increasing community knowledge in self-rescues efforts through the disasters, it can create convenience, hence they can live together with disasters.

Community is recommended by Village Preparedness Team (KSB) to provide the earthquake bag to save basic needs and important documents that can be bought anytime in emergency situation. However these earthquake bags are seldom prepared by community because the basic needs, such as foods must be renewed in scale that are consumed at emergency situation or in evacuation location.

Community with adequate financial means try to build houses far away from shoreline for adaptation strategy. Unfortunately, this strategy cannot be applied by community since ancestry lands are mostly found along the Ketapiang beach, especially in Korong Simpang Ketaping, Korong Pauh and Korong Talau Mundam. Therefore, the other strategy adaptation is to prepare area (Korong-korong) that is considered as the safe area for evacuation location against tsunami disaster hazard.

Beside the adaptation strategy above, the existence of

Village Preparedness Team (VPT) also much helps the readiness of the village in facing the disaster by optimizing the potential of the team. Optimizing the potential of the team is also a form of adaptation strategy. They need to get the team strengthening continuously because the characteristic of membership is volunteer. They have main activity outside of the team.

3.3 Local Wisdom Values as the Form of adaptation in the Disaster Prone Area

In the term of language, Kearifan Lokal, means kearifan Setempat (local wisdom) which can be understood as local ideas that are wise, full of wisdom, and valuable which are embedded and followed by community. In anthropology concept, local wisdom is known as indigenous or local knowledge or local genius that becomes the basis of culture identity (Nasruddin, 2011).

Local wisdom value in the disaster prone area is interpreted differently by individuals. The interpretation of the values build individuals adaptation action against the disasters hazards in their area.

The kinds of local wisdom values influence the community social adaptation in Ketapiang Village are:

1. The spirit of togetherness and the sense of the strong tribal (Historically, Ketapiang village community comes from one lineage (one headman)
2. Helping each other if there are members of community are affected by disaster through "Badantam". Badantam is the together dues that pay spontaneously for the affected family organized by others. According to Jamal, "Badantam is one of hereditary tradition to collect money quickly for affected family.

Having religious or recitation activities actively is the way to get closer to the God. These religious activities can increase the sense of togetherness among them.

4. DISCUSSION

This research focuses to analyse the community adaptation through the earthquake with tsunami potential disaster hazard. This research differs with others because the adaptation strategies are formed from the individual perceptions in interpreting disasters and community local wisdom that applied in the location.

In order to explaining the individual perceptions in interpreting the disaster, researcher uses phenomenology approach. According to phenomenology approach community social action in the red zone area is showed into social adaptation forms through earthquake with tsunami potential disaster hazard. This adaptation strategy is created through the comprehension perception and individual knowledge about disasters. Interpretation

and comprehension can be gained by individual social interaction process in community and a knowledge that is gained from disaster experiences that had been occurred in other places which are internalized by individual against the disasters. The individual perceptions through disasters are also influenced by individual interpretations base on the belief system that they follow.

5. CONCLUSION

From this research, it can be concluded that, the community knowledge and perceptions through earthquake and tsunami disaster are:

1. The community perceptions through the occurrences of earthquake and tsunami are: first, the earthquake occurs because of the movement of the earth plate. If the hypocentre of movement starts from the sea so it can causes a tsunami. Second, the occurrence of earthquake and tsunami disasters are form of punishment from Allah to human who is more negligent in doing Allah commands and they are doing more immoral actions
2. Community knowledge through earthquake with tsunami potential disaster hazard is good in Ketapiang Village. This condition is signed by the ability of community to explain the causes of why the disasters occur and what must to do when they occur.
3. Ketapiang has had Village Preparedness Team (KSB) that is active to socialize the effort of disaster risk reduction to community
4. After an earthquake in West Sumatera in 2009, many organization/Non-Governmental Organizations (Local, National, and international) entered the village to give capacity strengthening for community in effort to disaster risk reduction.

Community adaptation strategy through earthquake with tsunami potential disaster hazard:

1. Community starts to adaptation with disaster hazard by increasing their knowledge through the types or signs of the earthquake with tsunami potential disaster.
2. Community has prepared the earthquake bags that fill with basic needs and important documents which can be bought anytime in emergency situation.
3. Community has tried to live and build the houses far away from beach (For those who can do that).
4. Optimizing the existing and the potential of village prepared team.
5. Preparing the area/ korong that is interpreted as the safe area from tsunami disaster for evacuated location.

The existing of local wisdom values that influences

community social adaptation in Ketaping village:

1. The spirit of togetherness and the sense of the strong tribal (Historically, Ketapiang village community comes from one lineage (one headman)
2. Helping each other if there are members of community affected by disaster through "Badantam". Badantam is the together dues that pay spontaneously for the affected family organized by others.
3. Having religious or recitation activities actively is the way to get closer to the God. These religious activities can increase the sense of togetherness among them.

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REFERENCES

- [1] Dokumen Rencana Kontingensi Tsunami Propinsi Sumatera Barat, 2012.
- [2] Undang-undang No. 24 Tahun 2007, Tentang Penanggulangan Bencana.
- [3] Alhadi, Zikri. (2014). "Kesiapsiagaan Masyarakat Kota Padang Dalam Menghadapi Resiko Bencana Gempa dan Tsunami Berbasis Kearifan Lokal (Studi Kesiapsiagaan Terhadap Resiko Bencana)". *Jurnal Humanus*. Volume XIII Nomor 2, 2014.
- [4] Bennett, John W. (1976). *The Ecological Transition: Cultural Anthropology and Human Adaptation*. Cyril S. Belshaw (Ed.). England: Pergamon Press Ltd.
- [5] Diposaptono, Subandono. (2011). *Sebuah Kumpulan Pemikiran, Mitigasi Bencana dan Adaptasi Perubahan Iklim*. Jakarta: Kementerian Kelautan dan Perikanan Direktorat Jenderal Kelautan, Pesisir, dan Pulau-pulau Kecil Direktorat Pesisir dan Lautan.
- [6] Novert, Rahmadian. (2015). "Evaluasi Kebijakan Peningkatan Kesiapsiagaan Masyarakat Kota Padang Dalam Menghadapi Bencana Gempa Bumi dan Tsunami". *Jurnal Natapraja*, Volume 3 Nomor 2, 2015.
- [7] Nasruddin, dkk. (2011). *Kearifan Lokal Ditengah Modernisasi*. Jakarta: Pusat Penelitian dan Pengembangan Kebudayaan Badan Pengembangan Sumber Daya Kebudayaan dan Pariwisata Kementerian Kebudayaan dan Pariwisata Republik Indonesia.
- [8] Wirawan. (2015). *Teori-Teori Sosial Dalam Tiga Paradigma*: Jakarta, Kencana.
- [9] Creswell, J.W. (1998). *Qualitative Inquiry and Research Design: Choosing among Five Tradition*. London: Sage Publications.