

Reliance towards Temporary Evacuation Shelters (TES) during Tsunami Evacuation Process

Case Study in Meuraksa District, Banda Aceh

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Abstract

When 2012 Banda Aceh earthquake triggered the tsunami warning signal, chaotic citywide evacuation was followed soon after. Unnecessary victims were fallen and damages were experienced due to this very disorganized process. The event raised questions whether the disaster education and evacuation training had successfully relayed essential information about evacuating process along with its safety instruments, including physical facilities such as the Temporary evacuation Shelters or TES. This paper aims to investigate Meuraksa District residents' sense of reliance toward TES in their area during natural disaster, especially tsunami. The result will be analyzed to understand whether the district's resident have embedded the basic survival skills taught in the routine trainings into their daily life, thus also in the decision making process during evacuation. Meuraksa was chosen as research location as it was the ground zero of 2004 Banda Aceh tsunami disaster. The research is carried out using mixed-method approach by data collected through face-to-face, in-depth interview procedure. The analysis shows that Meuraksa District residents' reliance towards TES is very low. TES is intended to be one of the significant safe evacuation instruments. The citizens' decision to opt out TES as shelters and safe destinations during natural disaster events is highly believe will be resulting in the same chaotic evacuation as one in 2012.

Keywords : TES, Meuraksa, tsunami, evacuation, reliance

Ketergantungan terhadap Penampungan Pengungsi Sementara (TES) selama Proses Evakuasi Tsunami - Studi Kasus di Kabupaten Meuraksa, Banda Aceh

Abstrak

Saat gempa Banda Aceh tahun 2012 memicu sinyal peringatan tsunami, evakuasi seluruh kota yang kacau balau segera menyusul. Korban yang tidak perlu jatuh dan kerusakan dialami karena proses yang sangat tidak teratur ini. Acara ini mengangkat pertanyaan apakah pendidikan bencana dan pelatihan evakuasi telah berhasil menyampaikan informasi penting tentang proses evakuasi bersama dengan instrumen keamanannya, termasuk fasilitas fisik seperti tempat penampungan sementara atau TES. Tulisan ini bertujuan untuk menginvestigasi rasa ketergantungan warga Kabupaten Meuraksa terhadap TES di daerah mereka selama bencana alam, khususnya tsunami. Hasilnya akan dianalisis untuk memahami apakah penduduk distrik telah menamakan keterampilan dasar bertahan hidup yang diajarkan dalam pelatihan rutin ke dalam kehidupan sehari-hari mereka, demikian juga dalam proses pengambilan keputusan selama evakuasi. Meuraksa dipilih sebagai lokasi penelitian karena merupakan titik nol dari bencana tsunami Banda Aceh 2004. Penelitian ini dilakukan menggunakan pendekatan mixed-method dengan data yang dikumpulkan melalui tatap muka, prosedur wawancara mendalam. Analisis ini menunjukkan bahwa ketergantungan penduduk Kecamatan terhadap TES sangat rendah. TES dimaksudkan untuk menjadi salah satu instrumen evakuasi aman yang signifikan. Keputusan warga untuk memilih TES sebagai tempat penampungan dan tujuan aman selama peristiwa bencana alam sangat dipercaya akan menghasilkan evakuasi kacau yang sama seperti pada 2012.

Kata kunci: TES, Meuraksa, tsunami, evakuasi, kepercayaan

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Introduction

One of the most catastrophic natural disasters ever recorded in modern day Indonesia was the Banda Aceh's earthquake and tsunami in 2004. The tsunami alone was responsible as the cause of death for 164,891 people and 114,897 other missing (Yulianto et al, 2008). Afterwards, in order to prevent similar loss of life, disaster education programs and survival trainings were continuously and periodically held by the government, especially to Banda Aceh's citizen living on the coastal area. They were taught, most importantly, on how to evacuate themselves during tsunami as it is the foremost important thing to do (Budiharjo, 2006).

However, in the light of Banda Aceh's 11 April 2012 earthquake, the successfulness of these education and training programs was questioned. At the time, the nation was raising the flag as unnecessary victims fell due to a chaotic evacuation process (Nahaba, 2012, Bakri, 2014). National media outlets captured the apocalyptic-like scenes as people fled from the coastline using motorized vehicles (Fajriansyah, 2004). They were reportedly in a state of panic as soon as the tsunami's early warning signal went off. This unfortunate event showed that knowledge and skills taught at the routine trainings were not performed well by Banda Aceh citizens.

The main issues from this evacuation failure might rooted deeper than expected. As Sugimoto, Iemura, and Shaw (2010) pinpoint, due to the fact that tsunami is a low frequency natural disaster in Indonesia, disaster education related to tsunami was not included in public education even after 2004. It is not surprising when the knowledge and skills needed in making fast evacuation decision during actual tsunami are not embedded in citizen's daily life. To make it worse, Iemura et al (2006) reported that awareness of the locals regarding tsunami is already very low even after only two years since the 2004 disaster happening.

WHO stated that due to Banda Aceh and Aceh Besar geographically flat nature and densely populated urban area, the mortality rates during tsunami will be the highest in Aceh Province with 22.9% (Doocy et al, 2007). Therefore, Sugimoto, Iemura, and Shaw (2010) further concluded that escape structure, safe space, or shelters with close proximity are necessary since there was insufficient time for evacuation to safe areas.

After the 2004 disasters, most tsunami-prone coastal areas in Indonesia received grants to build safety facilities such as the Temporary Evacuation Shelters or TES, including Banda Aceh (Nurrady, 2015). TES buildings were placed in all coastal local districts or gampong in every 900 meters apart to accommodate as safe shelters for nearby residents. The distance makes it possible for locals to safely reach TES buildings in 1.5 minutes by speed

walking and running. It was considered enough in giving time to avoid tsunami caused by earthquakes.

Unfortunately, the 2012 evacuation chaos had shed light that when the evacuation training programs were unsuccessful, supporting facilities such as the TES were highly likely become useless or even unknown (Prawira, 2017). Therefore, the authors were conducted a specific research to investigate the knowledge possessed by Banda Aceh's Meuraksa District residents toward the presence and function of TES in their areas. The findings will further be analyzed to show the residents' reliance towards TES in their respective area. The results are expected to give a correlational insight on why the citywide chaos during 2012 earthquake evacuation process occurred.

Meuraksa District is a coastal village in Banda Aceh and one of the most affected areas during 2004 tsunami disaster. It still is one of the most vulnerable and disaster-prone districts in Aceh Province (PVMBG, 2012; Yahya, 2017). Such geographical position was the reason why the research was carried out in Meuraksa District.



Figure 1. Meuraksa District Delineation (red) within Banda Aceh City (Google, 2017)

Research Methods

Data presented in this paper was obtained through field survey or primary data collection, performed for five days on August 2017 at the Meuraksa District. Eight surveyors were dispatched to 13 Gampongs or villages to perform interviews and distribute questionnaires.

The survey was carried out using the mixed-method approach. According to Cresswell (2002), mixed-method approach is practiced through both qualitative and quantitative data collection and analysis. Therefore, the interview questions and questionnaires used both close-ended questions (quantitative approach) and open-ended questions (qualitative approach). As the result, text or image data as well as numerical data could both be generated from this process. Findings were then analyzed in detail using the Sequential Procedure, which is used

when the researchers elaborate the findings using multiple methods (Cresswell, 2002).

In this particular research, the premise was firstly exploring respondents' perception on tsunami evacuation process through open-ended questions. Afterwards, close-ended questions were asked to know their understanding and knowledge of the evacuation process' attributes and facilities. The general direction of this research is fairly similar to qualitative research's Grounded Theory method, which attempting to "derive a general, abstract theory of a process, action, or interaction grounded in the views of participants in a study" (Cresswell, 2002).

Questionnaires were distributed directly using purposive sampling. Purposive sampling is a non-probability sampling which targeted specific group of respondents with similar specific traits (Lund Research, 2012). As many as 70 respondents were participated in the survey in which all live within the Meuraksa District administrative area. Also, all the respondents are currently living near to the TES, disaster assembly points, and/or disaster evacuation routes.

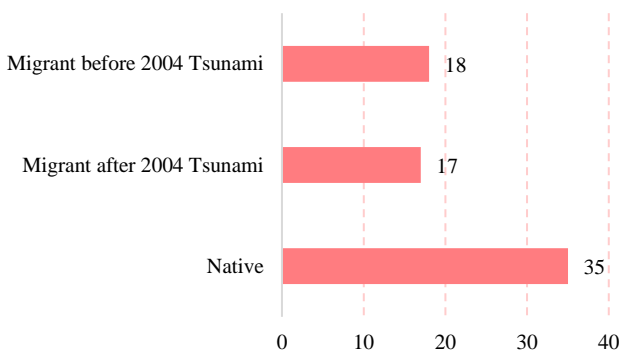


Diagram 1. Respondents Dwelling Status

Out of 70 respondents, 68 people are 17 years old and older, which means these respondents were aware of or had been experiencing the 2004 tsunami. The data is also shown the respondents' dwelling status as well as their dwelling duration. There are 53 respondents who live in the district before the 2004 tsunami occurred in which 35 of them are natives. Meanwhile, 17 respondents were known to move there after the disaster. Both the age group and place of origin explained why as much as 60% or 42 respondents had experienced tsunami in Banda Aceh before while the other 40% respondents had not.

Results and Discussion

In investigating the resident's sense of reliance towards TES, their knowledge and understanding of the evacuation process and instruments/facilities are essentially important to be understood. From the findings, it is found that only 59% or 41 respondents had ever attended the disaster/tsunami evacuation training or briefing held by the local and regional government

agencies (diagram 2). However, a slightly higher number of 55 respondents or 69% admitted to possess the knowledge of disaster evacuation process (diagram 3).

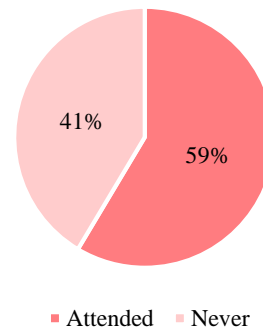


Diagram 2. Respondents Attendance Record on Disaster Evacuation Training

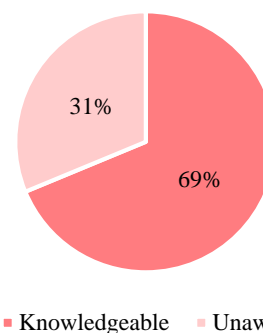


Diagram 3. Respondents Knowledge on Disaster Evacuation Process

Upon observing the inconsistency between the two results, both sets of data were then analyzed using the distribution analysis method. The result presented in table 1 shows that out of 41 respondents ever attended the training/briefing, only 34 people or 49% of the total respondents actually obtained knowledge or understanding of the evacuation process. The other 12 or 17% of total respondents who claimed knowledgeable about the evacuation process admitted to never attended any training or briefing session. Through interviews, it was revealed that the training or briefing content could be shared through words of mouth and social media platforms. However, it is unknown whether both categories of respondents possess similar depth in understanding the disaster evacuation process along with its instruments and facilities.

Table 1. Distribution Analysis Result between Respondents Attendance Record on Disaster Evacuation Training/Briefing and Knowledge on the Evacuation Process

Disaster Evacuation Training/Briefing Record	Evacuation Process Knowledge	Frequency (Person)
Attended	Knowledgeable	34 (49%)
Never	Knowledgeable	12 (17%)
Attended	Unaware	7 (10%)
Never	Unaware	17 (24%)

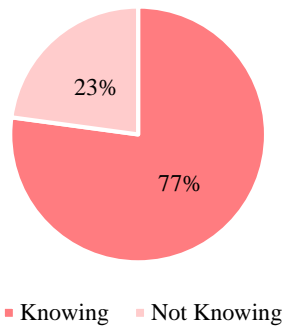


Diagram 4. Respondents Knowledge on Evacuation Place/ Destination Suggested by Government

Higher number of respondents admits they possess knowledge of the evacuation place suggested by the government from the training or briefing (diagram 4). However, out of 54 or 77% respondents possessing the knowledge, only 15 people (19%) specifically mentioning TES. Instead, more respondents (21 people or 27%) mentioned TDMRC or Tsunami and Disaster Mitigation Research Center building as government-recommended shelter during tsunami.

This shows that the respondents assume TDMRC building, along with several public landmarks mentioned during interviews, are the assigned evacuation shelter by the government. This finding shows that the training/briefing successfulness in delivering TES main function is rather questionable, since 80% respondents do not choose it as main and foremost evacuation shelter during tsunami. Haikal et al (2016) has also been pinpointed such belief and assumption further in their paper.

Upon seeing the aforementioned knowledge of the respondents, the respondents' perception of a safe evacuation destination and their actual choice of place during the disaster was then compared. It was found that the respondents considered general four-story buildings as the safest place to be a shelter (diagram 5). Only three people or 4% respondents chose TES, which is included on the option as "other", as the safest place.

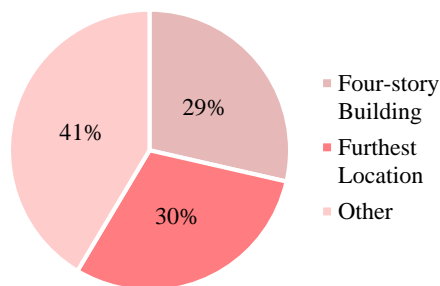


Diagram 5. Respondents Perception on the Safest Evacuation Destination or Shelter

Moreover, as much as 62 people or 89% respondents acknowledged that they have enough or more knowledge

of the presence or whereabouts of TES (diagram 6). However, only four people or 6% of respondents opted to go to TES as their evacuation destination should actual tsunami stroke.

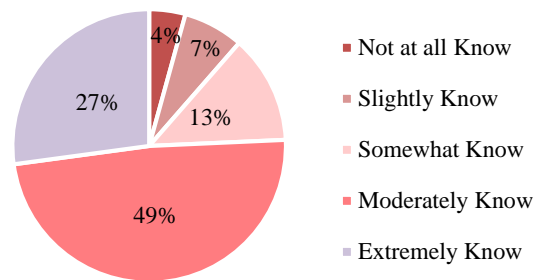


Diagram 6. Respondents Knowledge of TES Whereabouts or Presence

The last comparison shows that knowledge and understanding of the evacuation process gained through the training alone is not enough to ensure a "right" decision-making or "successful" evacuation during disasters. Hearing the decision-making process told by the respondents, it could be rooted from the lack of evacuation information or knowledge ingrained to the respondents' daily life. Should that be the case, overwhelming feeling and panic might take over during evacuation thus ensued chaotic process as seen in the 2012 earthquake.

Meuraksa District owns four (4) TES within the standard 900-meter radius of evacuation assembly points and shelters, yet the number of respondents who choose TES buildings as emergency shelter was extremely low. Several respondents, whose houses are within steps or at the very close proximity to the TES, opted to runaway to other region or main streets rather than utilize the facilities.

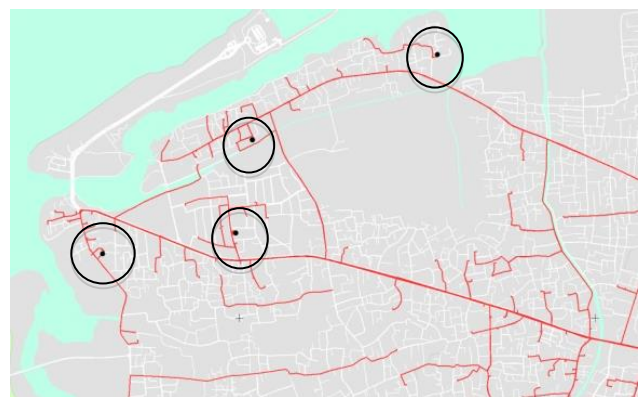


Figure 2. Respondents' Choice of Evacuation Route and 4 TES Around Meuraksa Districts. Most Respondents Preferred to Escape to the Region in the South East Area (Aceh Besar)

Prawira (2018) performed a spatial analysis to map Meuraksa residents' preferred destinations and evacuation routes taken during (hypothetical) evacuation. Figure 2

shows the results of routes taken by the respondents should tsunami or other disasters occurred.

Another note added, the medium or vehicle in evacuating was also come in many variations, starting from running on foot, by bicycles, until motorized vehicular such as motorcycles and cars. Plain to see, using motorized vehicles was easily becoming the main reason for the 2012 chaotic evacuation and highly likely will still be one in the future should the system is not changing.

Conclusion and Recommendation

Overall analysis shows that Meuraksa District resident's sense of reliance towards TES during (hypothetical) disaster or tsunami evacuation process is very low. It is proven by only less than 10% of total respondents chose TES specifically as the safest destination during evacuation as well as choice of evacuation destination during the actual event. This conclusion is supported by the spatial analysis done by tracing the (hypothetical) evacuation route taken by the respondents should tsunami or other disasters occurred. Nearest TES buildings are not the main choice of evacuation shelter for most respondents.

Findings show that the low sense of reliance might be caused by the unsuccessfulness of disaster evacuation training/briefing in embedding such essential information into the residents' daily life. As previously mentioned, the training/briefing successfulness is becoming questionable after 2012 event. It was proven by the lack of information about TES known to the respondents. Thus, it cannot be ensure that respondents will use TES in any circumstances, let alone natural disaster events.

Inconsistent response between numbers of attendants in the training/briefing also did not match with number of respondents who possessed the knowledge about evacuation process, attributes, and facilities. Therefore, it could also be concluded that number of attendants in the training or briefing did not ensure the delivery of information, thus would not ensure the knowledge and understanding they possessed.

To increase the sense of reliance, eventually actual usage of TES, sense of familiarity with evacuation process and its attributes and facilities must be highly maintained. Strengthening the basic understanding is quintessential. Therefore, contents of trainings and briefings must be attended and understood that it would ingrained in their daily life.

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