



TECHNIUM
SOCIAL SCIENCES JOURNAL

Vol. 20, 2021

A new decade for social changes

www.techniumscience.com

ISSN 2668-7798



9 772668 779000

Analysis of Disaster Safe School Level in West Coast of Pandeglang Regency, Indonesia

I Dewa Ketut Kerta Widana

Department of Disaster Management, Indonesia Defense University, Indonesia
dkwidana@gmail.com

Fetty Asmaniati

Sekolah Tinggi Pariwisata Trisakti, Indonesia
fettyasmaniati@stptrisakti.ac.id

Sundring Pantja Djati

Sekolah Tinggi Pariwisata Trisakti, Indonesia
spantjadjati@stptrisakti.ac.id

Rahmat Ingkadijaya

Sekolah Tinggi Pariwisata Trisakti, Indonesia
rachmatingkadijaya@stptrisakti.ac.id

Abstract. Natural disasters are detrimental to many sectors, including the education sector. Schools located in disaster-prone areas are vulnerable to building damages, causing fatalities and psychological problems for students. Pandeglang Regency, especially on its west coast, is a tsunami-prone area and is home to hundreds of elementary to high schools in the area. The purpose of this study is to analyze the implementation of disaster safe schools in three schools with high vulnerability to tsunami: MTs Masyariqul Anwar, SDN Tamanjaya 2, and SD Mekarjaya 3. This research used disaster school survey form issued by National Disaster Management Agency (BNPB) which regulated in Head of BNPB Regulation No. 4 of 2012 on Implementation Guidelines of Disaster Safe Schools. The research findings are MTs Masyariqul Anwar and SDN Tamanjaya 2 have a sufficient safe school level but needs improvement in integrating disaster risk reduction curriculum and strengthening SOPs for safe schools, while SDN Mekarjaya 3 has a poor safe school level which lacking in both structural and non-structural frameworks. This study suggests that efforts to implement disaster safe schools are hampered due to the absence of a curriculum based on disaster risk reduction and poor infrastructure conditions. Thus, cooperation between local government, private sector, civic organizations, and the community is strongly needed in realizing a disaster safe school in Pandeglang Regency.

Keywords. Disaster management, disaster safe schools, disaster risk reduction, tsunami

1. Introduction

Indonesia as a country has obligation to protect its citizens from existing threats, as written in the 1945 Constitution. According to Article 7 of Law No. 3 of 2002 on State Defense, the

Indonesian defense system is facing two types of threats, namely military and non-military threats[1]. Along with the development of strategic environment, non-military threats are considered to be a potential danger in the midst of society that can harm the country's sovereignty, territorial integrity and the safety of the whole nation. One form of non-military threat is the rising occurrence natural disasters.

There are several reasons why natural disasters are a priority in the context of Indonesia's defense. Geographically, Indonesia stands on three large plates, namely the Eurasian, Indo-Australian and Pacific plates. Friction of the plates with one another makes Indonesia vulnerable to geological disasters such as earthquakes and tsunamis[2]. Indonesia is also on the Ring of Fire line that extends from Sumatra Island - Java - Nusa Tenggara - Sulawesi where there are 127 volcanoes and makes more than five million Indonesians vulnerable to the danger of volcanic eruptions. In addition, Indonesia's location on the equator also affects the number of hydrometeorological disasters, such as floods, flash floods, whirlwinds, landslides, droughts, and forest and land fires[2].

Data provided by National Disaster Management Agency (BNPB) shows that disaster events in the past decade have tended to increase. The highest number of disasters occurred in 2019, with 3,791 incidents. In the previous year there were 2,572 incidents, but the number of victims killed and missing reached the highest number in the last 10 years with 4,231 people dead and missing[3]. More detail can be seen on Figure 1.

There has also been an increase in the amount of damage in the physical sector, including educational facilities. The number of education facilities damaged by the disaster in 2017 was 1,272 units. Then in 2018 an increase of 36 percent to 1,736 units[3]. This number is still relatively small compared to the number of disaster-prone educational facilities. The number of schools exposed to moderate and high disaster risks is around 250,000 or 75 percent of the total educational facilities in Indonesia; 2,892 of them are 500 meters away from the active earthquake fault[4]. Based on the number of schools, the number of students exposed to disaster risk reaches millions of people.

Disasters can also have tremendous physical and mental effects on children. Physically, children can be exposed to health problems such as malnutrition due to difficult access to healthy food and prone to disease due to environmental conditions that are not hygienic and lack of clean drinking water[5]. This is certainly very dangerous considering that children are more vulnerable to diseases compared to adults[6].

Children are at high risk of developing posttraumatic stress disorders (PTSD) which can make them stressed, traumatized, and depressed[5][6]. The impact on children's mental health can worsen when they face situations where their daily lives are threatened, such as the loss of family members and friends. One way to improve their mental health, besides meeting their basic needs, is to give them the opportunity to return to school as schools can provide mental health support for children[7].

Related to disaster management efforts in the education sector, the international community has reached an agreement in Sendai, Japan regarding the Worldwide Initiative for Safe Schools (WISS) program in 2015[8]. The WISS program was later realized in Indonesia as a Disaster Safe School program supported by BNPB, Ministry of Education and Culture (Kemendikbud), and other NGOs engaged in the education and child protection sector. The aim of the SMAB program is to build resilience of school residents in dealing with disasters in a planned, integrated and coordinated manner by utilizing available resources in order to provide protection to students, teachers, education personnel and the community around the school from the threat and impact of disasters[4][9][10].

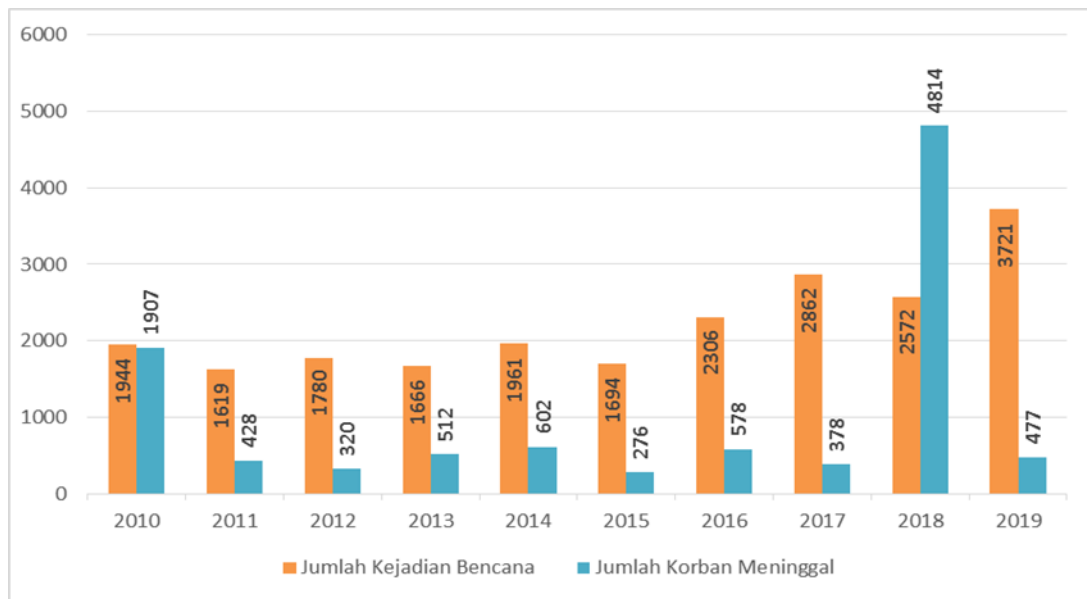


Fig.1 Number of Disasters (Orange) and Casualties and Missing Persons (Blue) 2010 – 2019

One of the deadliest disasters in 2018 is the Sunda Strait Tsunami. Data from BNPB shows that there were 437 casualties, 14.059 people injured, 16 people missing, and 33.179 people displaced[11]. From 5 different municipals or regencies affected by the Tsunami, Pandeglang regency suffered the most losses with 296 people dead, 7.656 people injured, 8 people missing, and 20.726 people displaced[11].

Education sector also suffered losses during the Tsunami. In Banten Province, there were 98 students and 106 teachers affected by the Tsunami, whether dead, injured, or lost their homes and families. In Pandeglang Regency, there were 75 students and 95 teachers affected as well as 3 school buildings that suffered from moderate to high physical damage. More details can be seen in Table 1.

Table 1. Tsunami-affected Educational Sector in Pandeglang Regency[12]

Sub-District	Students	Teachers	School Buildings
Sumur	9	16	2
Cigeulis	2	2	0
Cimanggu	0	3	0
Labuan	48	64	0
Panimbang	10	9	0
Carita	6	1	1

The number in Table 1 shows that children as students possess high vulnerability to disasters which makes it imperative to protect them with systematic, targeted and comprehensive disaster management efforts[4]. Disaster safe school program can provide just that by reducing vulnerability and raising capacity of students, teachers, and school managements. Thus, this research aims to analyse the implementation of disaster safe schools in Pandeglang.

2. Research Method

This research selected three sub-districts in Pandeglang that have their educational sectors affected the most by the Tsunami: Labuan, Panimbang, and Sumur. One school was chosen in

each district as research locus: MTs Masyariqul Anwar in Labuan, SDN Mekarjaya 3 in Panimbang, SDN Tamanjaya 2 in Sumur. All of these schools are located in high tsunami risk areas[13][14]. This research uses the disaster safe school survey form that included in the Head of BNPB Regulation No. 4 of 2012 on Implementation Guidelines of Disaster Safe Schools, henceforth called the Safe School Guidelines[15]. The survey form is divided into two parts: structural framework which covers locations, school designs and infrastructures; and non-structural framework which covers school policies, emergency preparedness planning, and resources mobilization.

Survey data collected through interviews with students, teachers, school management staffs, documentations and observations on school policies and infrastructures, as well as literature and geospatial data. Collected survey data is analyzed through a scoring method against the indicators in the survey form

3. Result

3.1. MTs Masyariqul Anwar

In structural framework assessment, MTs Masyariqul Anwar is in an unsafe location because it is in the red zone with a high level of tsunami risk with the school distance from the coastline only about 260 meters[14]. In the 2004 Aceh tsunami, tsunami inundation distances could reach up to 5 kilometers[13], so that the location of the school which was only 260 meters from the coastline made MTs Masyariqul Anwar vulnerable to Tsunami impact.

MTs Masyariqul Anwar also still needs to pay special attention to improve the resilience of school facilities. The results showed that MTs Masyariqul Anwar had not done a complete renovation of the building in the last 50 years. Observation results showed that the school roofs and ceilings were damaged and the walls were cracked. In classrooms design and arrangement, MTs Masyariqul Anwar has not yet implemented the design of the door that opens to outside. This will certainly complicate the evacuation process because victims of disasters including children will tend to feel panicked when a disaster occurs. This is also not in accordance with the Safe School Guidelines which recommends that the door must be open to outside. Besides that, there are also many windows that do not use trellises, and unfastened bookshelves and furnishings that easily fall during an earthquake. All of this makes the risk of casualties and losses due to disasters even higher.

The good side is MTs Masyariqul Anwar provided fire extinguisher units in several spots throughout the complex, even though it is not placed in each room. MTs Masyariqul Anwar also has tsunami evacuation signs established by the local government. These signs help the school management to direct students MTs Masyariqul Anwar to a gathering point which is about 2 km from the school building.



Fig. 2 Building condition of MTs Masyariqul Anwar: broken ceilings (top) and windows without trellises (bottom)

In non-structural framework assessment, MTs Masyariqul Anwar has not implemented a disaster-based curriculum. This deficiency can be found in all schools in Pandeglang Regency, as revealed during the interview with Head of Pandeglang District Education Office in 9 August 2019. The Office has not yet initiated any discussion on two to integrate disaster risk reduction in schools curriculum at the elementary, middle and high schools. However, MTs Masyariqul Anwar has the conducted routine disaster and self-evacuation simulations every year for new students with the help of local chiefs and local disaster management agency.

3.2. SDN Mekarjaya 3

The second research locus is SDN Mekarjaya 3 located in Panimbang subdistrict. One school management staff said that the inundation caused minor damage to school building and facilities. Although it is not severe, the damage is enough to cease the school's activities for a week.

In terms of location, SDN Mekarjaya 3 is also located in a red zone with a high level of tsunami risk with a distance from the coastline is 229 meters. The distance between SDN Mekarjaya 3 and the coastline is 20 meters more than the distance owned by MTs Masyariqul Anwar. However, with its position facing the sea the school will receive greater impact from the Tsunami as the school building has a larger surface area in its front side[16]. It also has limited communal space compared to the other two schools, which makes it difficult to conduct self-evacuation or simulation activities.



Fig 3. Building condition of SDN Mekarjaya 3: cracked column (top) and doors are still open inside (bottom)

Regarding the structure of the building, SDN Mekarjaya 3 received renovation assistance from a post-tsunami NGO in the form of repairing damaged buildings and facilities and constructing a new building consisting of three classes. However, the assistance provided has not yet refer to the Safe School Guidelines. This is found in the design of classroom doors and teacher rooms that are still open inside. So that renovation and construction of new school buildings does not necessarily reduce the existing risks. In terms of infrastructure, SDN Mekarjaya 3 still needs a lot of improvement, such as the need for fire estinguisher procurement and evacuation signs to the gathering point.

In term of non-structureal framework, SDN Mekarjaya 3 is far from the standard. This school does not have a disaster-based curriculum, has never conducted a disaster simulation and self-evacuation exercise, does not have a sufficient planning or an SOP needed to anticipate disasters. However, this school has sent its teacher to participate in a disaster safe school training in Jakarta in August 2019 which establish a strong committment to comply to standards in the Sadfe School Guidelines.

3.3. SDN Tamanjaya 2

The last is SDN Tamanjaya 2 in Sumur subdistrict. This school is the only school that suffered major damages during the Tsunami. It is mainly because its distance from the shoreline is only 20 meters away. During the Tsunami, the school library was fully destroyed and most of its classrooms were damaged and impossible to use.



Fig. 4. Building condition of SDN Tamanjaya 2: broken ceiling (top) and use of duct tapes to replace picture frames to minimize hazard during earthquakes.

SDN Tamanjaya 2 received renovation assistance and the construction of new library buildings from various private companies and humanitarian organizations. But the results of school renovations and the construction of new library buildings failed to refer to the Safe School Guidelines. This is evident from the class doors and library buildings that are still open inside and the absence of fire extinguishers in each room. Several damage in the ceiling also have not been repaired. However, several classes have minimized the use of heavy wall hangings and replaced with with duct tapes thereby reducing the threat of heavy objects when disaster strikes.

During an interview with school management, it was found that there was one teacher who participated in the Disaster Safe School training. The teacher received learning materials include hazard analysis for the tsunami disaster. But this has not yet been carried out to the fullest due to some resistance from the top management which hinder the implementation of safe school in SDN Tamanjaya 2.

SDN Tamanjaya 2 is working on mitigation-related activities that are integrated in the extracurricular activities of boycouts. In boy scout activities, SDN Tamanjaya 2 taught about first aid and conducted earthquake and tsunami disaster simulations and self-evacuation training which instruct students to evacuate to the hill 1 kilometers away behind the school, although the activities itself are not done routinely. In Figure 5, you can see the self-made SOP concept implemented by the school during on of its simulations been implemented during a disaster simulation at SDN Tamanjaya 2.

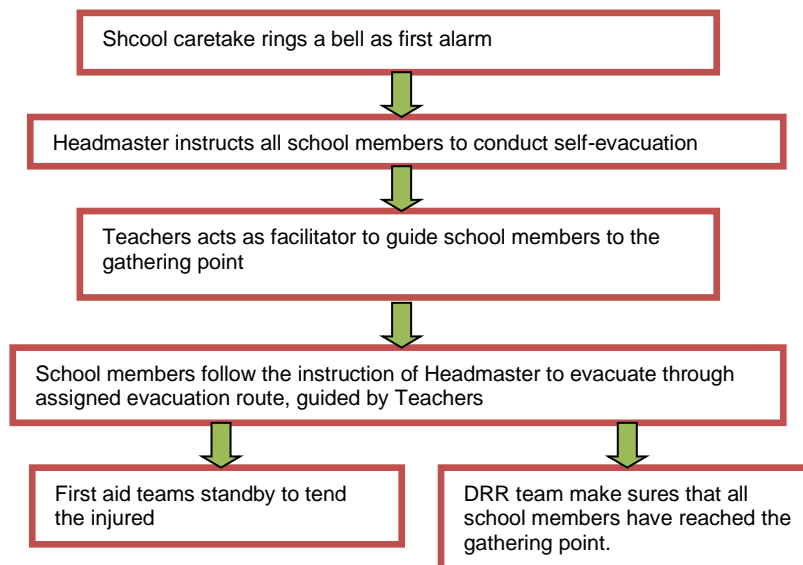


Fig. 5 SOP Concept for Evacuation during Tsunami

3.4. Disaster Safe School assessment

Based on the collected data from interviews, documentations, observations, literature review and geospatial data, an assessment is constructed using indicators of survey forms in the Safe School Guidelines. Assessment result is shown in percentage and classified in following criteria: Very Good (81 to 100%), Good (61 to 80%), Adequate (41 to 60%), Bad (21 to 40%), and Very Bad (0 to 20%).

There are two frameworks examined in this research: structural framework and non-structural framework. The structural framework has 4 criteria and consists of 45 indicators. Each indicator has a different weight value. The results of the structural framework assessment can be seen in Table 2. While the non-structural framework has 4 criteria and consists of 20 indicators, the percentage of weighting is evenly distributed. The results of the assessment of the non-structural framework can be seen in Table 3.

Then after the final value of each frame the value is known, then the final value is accumulated and given an equivalent weight of 50%. The results are then matched with the classification criteria that have been set previously. So that the final results of the assessment of structural and non-structural frameworks and the classification of safe levels of each school that is the focus of the study can be seen in Table 4.

Table 2. Structural Framework Assessment

No	Criteria (Weight)	MTs Masyariku Anwar	SDN Mekarjaya 3	SDN Tamanjaya 2
1	Location (30%)	18%	12%	18%
2	Building Structure (40%)	20%	16%	36%
3	Room Design (15%)	8%	10%	9%
4	Facilities and Infrastructures (15%)	15%	9%	9%
Total		61%	47%	72%

Table 3. Non-Structural Framework Assessment

No	Criteria (Weight)	MTs Masyariqul Anwar	SDN Mekarjaya 3	SDN Tamanjaya 2
1	Knowledge, Attitude, and Action (25%)	12,5%	0%	8%
2	School Policy (25%)	8%	8%	16%
3	Emergency and Preparedness Planning (25%)	8%	4%	8%
4	Resources Mobilization (25%)	10%	0%	0%
	Total	38,5%	12%	32%

Table 4. Disaster Safe School Level

No	School	Structural (50%)	Non-Structural (50%)	Total Value	Safe School Level
1	MTs Masyariqul Anwar	30,5%	19,25%	49,75%	Adequate
2	SDN Mekarjaya 3	23,5%	6%	29,5%	Bad
3	SDN Tamanjaya 2	36%	16%	52%	Adequate

Based on the results above, MTs Masyariqul Anwar scores 61% for structural framework and 38,5% for non-structural framework; SDN Mekarjaya 3 scores 47% and 12% for structural and non-structural framework respectively; and SDN Tamanjaya 2 scores 72% and 32% of structural and non-structural framework respectively. Then after weighing as much as 50% and accumulated with each framework, the results were obtained that MTs Masyariqul Anwar and SDN Tamanjaya 2 scores Adequate for its safe school level, and SDN Mekarjaya 3 score Bad for its safe school level.

This study suggests that in terms of structural framework, all three schools are not differ much. Most notable differences are in the facilities and infrastructure and building structures criteria which SDN Mekarjaya 3 scores lowers than others. This study also considers that MTs Masyariqul Anwar is more prepared to face tsunami compared to MTs Masyariqul Anwar lacks the initiative to create its own written procedures so that it can be easily implemented and makes the school member more prepared. There was still a need for establish a strong commitment among the school management for all three schools to fully provide safe and prepared environment against disasters. It is also necessary to involve the village and / or sub-district apparatus, local disaster management agency and other humanitarian organizations in an effort to improve school safety from disasters by utilizing the school safety indicators contained in the Safe School Guidelines. This is crucial to prevent damage to school structures and facilities and even prevent fatalities[4][15][9].

4. Conclusion

The application disaster safe school through structural frameworks and non-structural frameworks in Pandeglang Regency, it can be concluded that MTs Masyariqul Anwar and SDN Tamanjaya 2 scores Adequate in the safe school level with a few things to note include the absence of disaster-based curriculum and robust disaster SOPs in each school. While in SDN Mekarjaya 3 it has a Bad safe school level with a lot of crucial improvement in both structural and non-structural frameworks. This is inseparable from the fact that there has been no initiative from the local government to integrate disaster science and disaster risk reduction into the school curriculum, so this is considered to be an obstacle in the effort to implement the Safe School Guidelines.

References

- [1] Kemhan RI, ed. 2008. *Buku Putih Pertahanan Indonesia*. Cet. 1. Jakarta: Kementerian Pertahanan Republik Indonesia.
- [2] BNPB. 2016. *Risiko Bencana Indonesia*. Retrieved January 8, 2020 (http://inarisk.bnpb.go.id/pdf/Buku%20RBI_Final_low.pdf).
- [3] Mudassir, Rayful. 2020. 3.721 Bencana Alam Terjadi Sepanjang 2019. *Bisnis.Com*. Retrieved January 8, 2020 (<https://kabar24.bisnis.com/read/20191223/15/1183989/3.721-bencana-alam-terjadi-sepanjang-2019>).
- [4] Amri, Avianto. 2017. *Disaster Resilient Education*. Retrieved December 27, 2019 (http://spab.kemdikbud.go.id/smab-content/uploads/WEB_BukuNotesBencana2017_225x225mm_EnglishVersion.pdf).
- [5] Kousky, Carolyn. 2016. Impacts of Natural Disasters on Children. *The Future of Children* 26:73–92.
- [6] Stanberry, Lawrence R., Madeleine C. Thomson, and Wilmot James. 2018. Prioritizing the Needs of Children in a Changing Climate. *PLOS Medicine* 15(7):e1002627.
- [7] Jaycox, Lisa H., ed. 2006. *How Schools Can Help Students Recover from Traumatic Experiences: A Tool-Kit for Supporting Long-Term Recovery*. Santa Monica, CA: Rand Gulf States Policy Institute.
- [8] UNISDR. 2014. *Worldwide Initiative for Safe Schools*.
- [9] Kemendikbud. 2016. *Petunjuk Teknis Penerapan SMAB Bagi Anak Berkebutuhan Khusus*.
- [10] Kemendikbud. 2015. *Roadmap Sekolah / Madrasah Aman*.
- [11] BNPB. 2018. *Paparan Penanggulangan Bencana Tsunami Selat Sunda*.
- [12] LPMP Provinsi Banten. 2019. *Laporan Dampak Bencana Tsunami Selat Sunda Pada Sektor Pendidikan Di Provinsi Banten*.
- [13] Prasetya, Gagar, Jose Borrero, Willem de Lange, Kerry Black, and Terry Healy. 2011. Modeling of Inundation Dynamics on Banda Aceh, Indonesia during the Great Sumatra Tsunamis December 26, 2004. *Natural Hazards* 58(3):1029–55.
- [14] BNPB & Pemerintah Kabupaten Pandeglang. 2014. *Dokumen Kajian Risiko Bencana Kabupaten Pandeglang 2014 - 2018*.
- [15] BNPB. 2012. *Implementation Guidelines on Disaster Safe Schools*.
- [16] Garcia, Renato, Stephen Siu-Yu Lau, K. W. Chau, Rachadaporn Kanitpun, Yoichi Shimatsu, Peter Grunder, Rosena Koo, and Baharuddin. 2006. Sustainable Resorts: Learning from the 2004 Tsunami. *Disaster Prevention and Management: An International Journal* 15(3):429–47.