

Identification of Understanding of Disaster Preparedness in the School Environment

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Abstract

Flores Island is vulnerable towards natural disasters. Therefore, it requires an effective disaster warning management. In this context, schools play an important role in disaster warning system. However, not all schools implement Disaster Risk Reduction (DRR) procedures effectively. Therefore, efforts are needed to improve disaster warning system among schools by integrating the three pillar principles, which include safe facilities, effective disaster management, and resilience education. This study aims to understand the state of school readiness in the Flores region and assess the extent to which these schools apply the three pillar criteria for school disaster warning system. The research method used is a qualitative descriptive approach, with data collection through an open questionnaire distributed using Google Forms. The result showed that the locations of the respondent's schools are spread across the most disaster-prone areas of Flores, especially along the coastal areas. In addition, there are still many schools in the region that have different levels of understanding and awareness regarding to disaster warning system. Based on that issue, the program for activating the disaster warning system in school area is very important to apply and can increase public awareness of disaster warning system. To achieve that idea, a collaboration between school committees, external parties, and the Flores community is essential to strengthen the school infrastructure and to build an effective response towards potential disaster risks and threats.

Keywords: disaster education, education curriculum, education continuity planning, resilience education

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1. Introduction

Eastern Indonesia is a region that has many seismic and non-seismic tsunami sources (Pranantyo et al., 2021). According to the Historical Tsunami Database, the tsunami was a disaster with a serious threat to society

that caused at least 940,000 deaths and unexpected damage (Röbke & Vött, 2017; Sujarwo et al., 2018). Due to the Flores back-arc thrust fault presence, the Flores Island in East Nusa Tenggara exhibits strong tectonic activity (Handayani, 2020; Maneno et al., 2019). Due to this activity, Flores was struck by an

earthquake and tsunami in 1992, which found in 1952 fatalities and 500 unaccounted-for deaths (Julius & Daryono, 2021).

A disaster-prone area requires an effective disaster warning management (Sujarwo et al., 2018). It is because a destructive calamities typically have negative consequences. School is one of the education sectors that are vulnerable to natural disasters (Proulx & Aboud, 2019), as students spend more time in the school activities. School system is believed to have a substantial relationship with disaster awareness. It is due to the fact that school area is a rich source of knowledge (As-tuti et al., 2021).

School has an important role in improving disaster warning system. Conceptually, disaster warning system is defined as interventions designed to effectively equip individuals and communities with the necessary knowledge and skills before a disaster occurs. It is related to Disaster Risk Reduction (DRR). DRR is a series of actions taken to identify, mitigate, and manage factors that can cause or exacerbate the impact of a disaster. However, in reality, not all schools can implement DRR within the school environment (Amri et al., 2017; M. M. Rahman et al., 2020). In general, DRR approaches are often responsive and less integrated in sustainable development planning. It can be caused by a lack of understanding of the concept of DRR.

In the school community, the integration of disaster warning system program is known as the school disaster awareness program. This program is a major issue especially for schools which located at disaster-prone areas. School disaster warning system refers to the ability of communities or institutions to face and cope with disasters. However, it still has a deficiency which is the non-fulfilment of previous preparatory steps in school environment. We can say that the students, the

teaching staffs, and the school staffs may poorly be trained and may not have a sufficient knowledge about what actions to take when the natural disaster occurs. In addition, the non-integration of the disaster approach in developmental planning may mean that the school system do not receive a necessary resources and infrastructures to become more disaster-resilient, such as earthquake-resistant buildings or adequate early warning systems. So, it is necessary to make improvements to the current disaster approach. School readiness can be improved through better education, training for the staffs, infrastructure planning, and coordination between the various parties involved.

At the World Conference on Disaster Risk, it has been proposed that a comprehensive school safety consists of three pillars: 1) safe school facilities; 2) effective school disaster management and disaster risk reduction (DRR); and 3) resilience education (Gentile et al., 2019; Sujarwo et al., 2018). It is hoped that the school has a prominent role as a disaster awareness. According to that goal, it is important to establish disaster warning system at the school which located on disaster-prone areas considering that the program is not only improves individual safety but also helps to break the chain of disasters by reinforce the community knowledge, build a culture of awareness, and reduce long-term impacts. In practical, disaster warning system at school area has the ability to manage the disaster risk. This capability is measured by having a disaster management plan (before, during, and after the disaster); logistics availability; security and comfort in education; emergency infrastructure and systems supported by awareness knowledges and skills; standard operating procedures; and an early warning system. Nevertheless, the fact on the ground shows that the level of school awareness for disaster warning system is still low, and school system

still not ready to face such disaster like earthquakes and tsunamis (Sujarwo et al., 2018). Whereas, disaster warning system in school area should have a higher level of readiness than others. In addition, the results of other studies revealed that schools in the Maumere region had conducted training for disaster warning system. Unfortunately, nowadays the training program is not sustainable.

Considering the significance of the presence of disaster-ready schools in vulnerable regions, this pertains to the Flores region which is prone to disasters. To ensure school safety, this program must align with the principles of the three pillars. Therefore, an analysis of the school situation in the Flores region is necessary to assess whether the schools meet the criteria for being disaster-ready. This research holds the benefit of providing vital information about the level of school preparedness, subsequently offering valuable input into the management of school-based DRR

2. Method

This study examines school-based disaster preparedness for disaster risk reduction.

The research location is the island of Flores, with the geographical area of Flores Island having an area of 13,540 km² while the area of the Flores Sea is 240,000 km². The research method used is a descriptive-qualitative approach that aims to identify the school's disaster preparedness. Research with a qualitative approach can contribute to understanding the effects of disaster awareness and thus add information to create programs related to prevention and social policies in disaster areas (Widiastuti et al., 2022).

The data collection technique used in this study was an open questionnaire through Google Form. The questionnaire was distributed to schools in the Flores Island area randomly due to the fact that geography and seismic faults, particularly along Flores Island's coastline, have a substantial impact on the degree of vulnerability (Khusnani et al., 2022). It is crucial to do an initial community assessment, particularly for the school community, realising that children are more susceptible to physical and psychological harm than adults (Seddighi et al., 2021; Shah et al., 2020, 2022). Figure 1 displays the entire research flow.

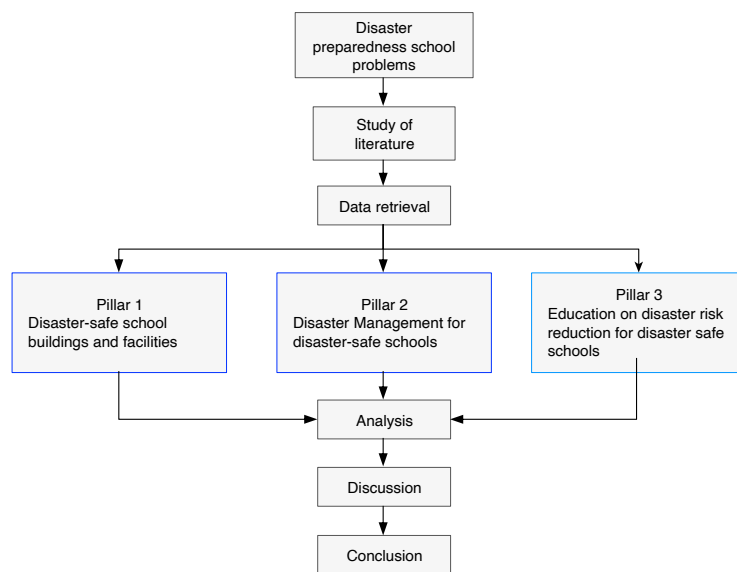


Figure 1. Research Flow

The questionnaire was made based on the three pillars module, which came from the planning and foreign cooperation bureau secretariat-general of the ministry of education and culture (see table 1) (Suharwoto, et al., 2015b, 2015a). The use of this questionnaire is based on scoring 1 and 0. It is important to remember that the use of 1 and 0 in scoring can result in accuracy and clarity in determining criteria and avoiding bias. The implementation of consistency and objective ensures accurate and meaningful evaluation results. It evaluates the extent to which schools have implemented each of the basic principles of DRR by giving a score of 1 for conditions

that are met and a score of 0 for conditions that are not met. The results of this assessment shows the real conditions that exist in the school and provide an overview of the fulfillment of indicators in each pillar. Scoring system of 1 and 0 provides a comprehensive view of the application of DRR principles in schools. It also encourages progress and increases collaboration in the field of disaster risk reduction. Furthermore, based on the discussion, the current strengths and weaknesses identified provide input to external parties about the importance of integrating DRR into schools.

Table 1. Questionnaire Indicator

Pillar	Indicator	Number of questions
Pillar 1 (Disaster-safe school buildings and facilities)	<ul style="list-style-type: none"> ▪ Site selection ▪ Building codes ▪ Performance standards ▪ Disaster-resilient design ▪ Builder training ▪ Construction supervision ▪ Quality control ▪ Retrofit ▪ Re-modeling 	11
Pillar 2 (Disaster Management for disaster-safe schools)	<ul style="list-style-type: none"> ▪ Assessment and planning ▪ Physical and environmental protection ▪ Response skills and provisions ▪ School disaster management committee representative ▪ Education continuity planning ▪ Standard Operating Procedure ▪ Contingency plan 	11
Pillar 3 (Education on disaster risk reduction for disaster safe schools)	<ul style="list-style-type: none"> ▪ Integration into the formal curriculum ▪ Teacher training and staff development ▪ Extracurricular and community-based informal education 	10

3. Result and Discussion

a. Result

1) The Mapping of the Respondent's School Area

School mapping is the process of collecting information about locations. The goal is to identify the geographic location of the school. It was conducted to find out

possible DRR measures based on regional understanding of potential disasters in the region. From the research results, it is known that the number of schools that responded to the questionnaire was 33. Where the total number of respondents who filled in was 79 people. spread from Kindergarten (TK) to High School (SMA) level as presented in

Figure 2. This data provides a broad spectrum of perspectives on understanding disaster preparedness at various levels of education.

The mapping of the respondent's school area was carried out with the aim of visualizing the location of the school in a geographical context. Based on the information provided in Figure 3, it can be analyzed that the location of the majority of

respondents is in the northern coastal area of the Flores Sea, while several other locations are scattered along the southern coast of Flores Island. This information provides insight about the spatial distribution of the participating schools within a certain geographic area.

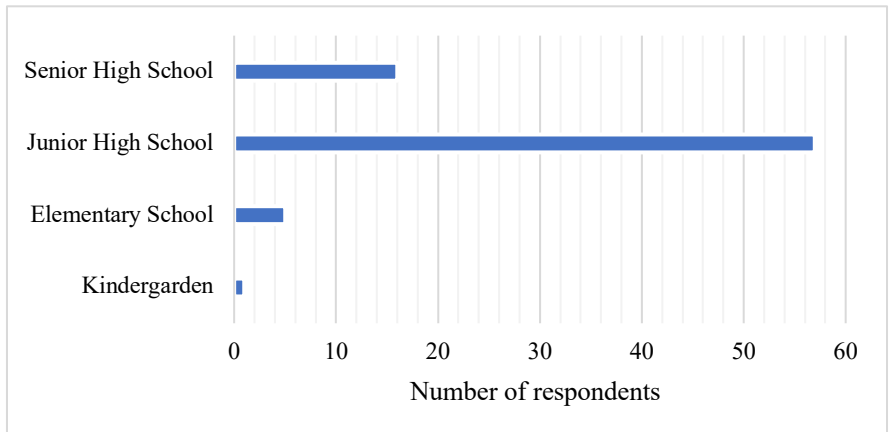


Figure 2. Number of Schools Based on Schooling Level



Figure 3. Mapping the Location of the Respondent's School

2) Identification of Disaster-Safe Schools

The data of questionnaires for each pillar of disaster preparedness is reflected in Figure

4, which shows the results of the various aspects assessed. On the other hand, figure 5 de-

picts the average results of each pillar, presenting more detailed picture of the preparedness of each aspect. Based on the data analysis process, there is a significant variation of respondents the answers. In general, pillar 1 shows the dominance of the answer "Yes," indicating awareness of the importance of preparedness. On the other hand, pillar 2 indi-

cates a predominance of "No" answers, indicating areas that require improvement in terms of preparedness against certain threats. Meanwhile, pillar 3 shows the dominance of the answer "Yes," reflecting efforts that have been made to build disaster response capacity. This analysis provides an in-depth overview towards the perceptions and efforts of disaster preparedness among respondents.

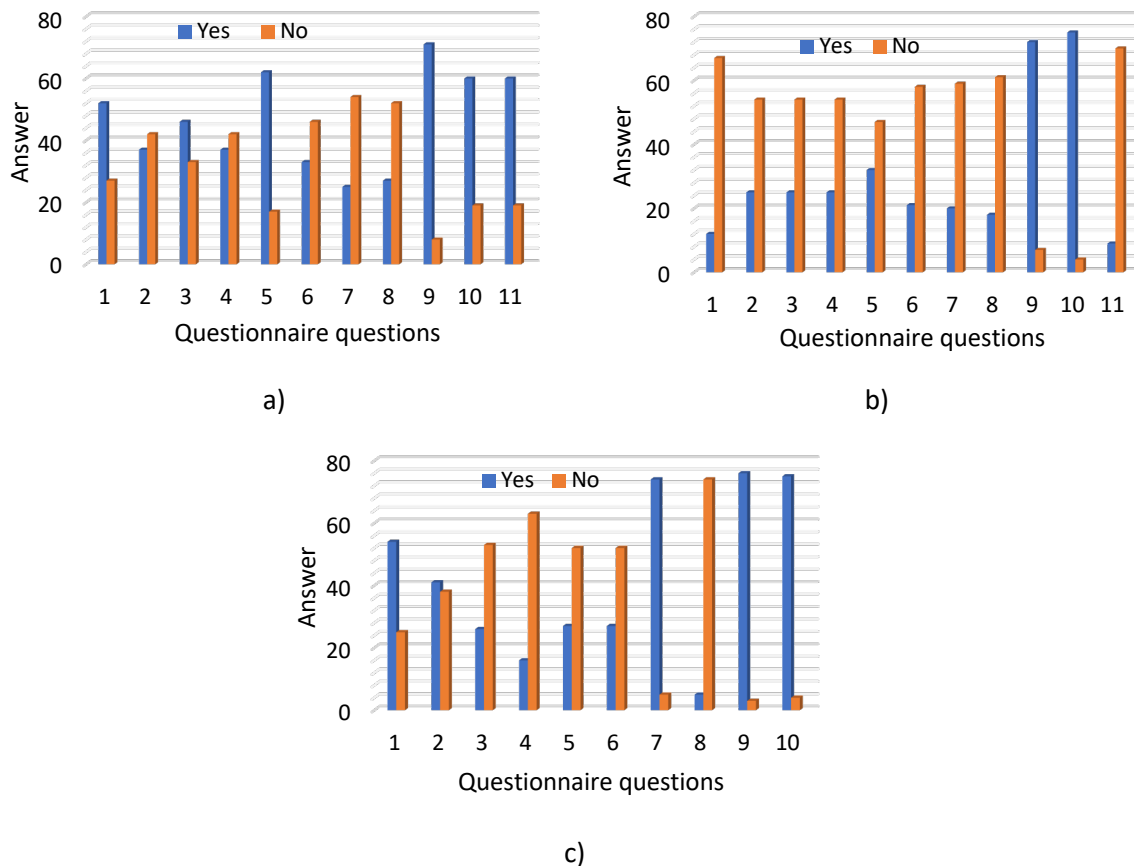


Figure 4. Number of Respondent's Answers on A) Pillar 1, B) Pillar 2, and C) Pillar 3

The findings from this analysis revealed several important issues regarding respondents' perceptions and knowledge of the three disaster preparedness pillars. First, on pillar 1, the results of the questionnaire indicate that most respondents have an understanding of the physical condition of the school location and the sustainability of school buildings. However, it was found that but there is still a lack of knowledge regarding school facilities related to infrastructure and quality protocols for emergency situations that may arise. This case

is crucial due to the needs of the fulfillment of school infrastructure to deal with disasters.

Second, pillar 2 shows interesting findings where more respondents indicated that they did not know about disaster management that had been implemented in schools. This suggests there is a need to increase understanding and awareness regarding disaster response plans and risk management measures in the school environment.

Third, the results in pillar 3 illustrate that almost all the respondents aware of disaster

possibility occurring at school. Furthermore, the respondents claimed that the education of disaster is important. This awareness can be considered as first positive step in building a culture of disaster preparedness and response

within the school community. However, further efforts is needed to ensure that this awareness may turn into concrete actions in efforts to increase disaster preparedness.

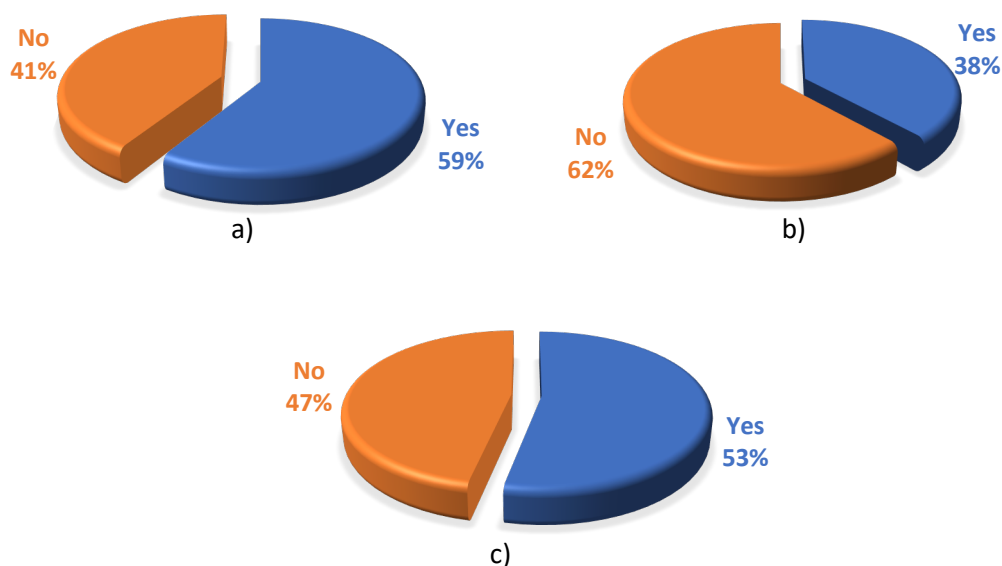


Figure 5. The Average Percentage of Respondent's Answers on A) Pillar 1, B) Pillar 2, and C) Pillar 3

Overall, these findings highlight the importance of a comprehensive approach to build disaster preparedness within school communities. This analysis reveal several crucial aspects regarding perceptions and knowledge of disaster preparedness pillars. First, it is clear that the majority of respondents have an understanding of the school's physical conditions and building sustainability. However, there is a lack of knowledge about school facilities related to emergency situations and relevant quality protocols. This deficiency underscores the need for more attention to the necessary facilities and supporting infrastructure in facing disasters. Furthermore, in the second pillar, it was found that respondents have inadequate knowledge about the implementation of disaster management in the school environment. This indicates the need to enhance their understanding of

existing disaster response plans and the implementation of risk management measures. By involving all members of the school community in training, learning, and simulation exercises, the school can build a stronger foundation in facing potential disaster threats more effectively.

b. Discussion

Schools have a central role in developing disaster preparedness in the school environment, especially on the island of Flores. This is in accordance with research (Handayani, 2020; Jufriansah et al., 2021), which revealed that the geological setting of Flores Island is part of the Pacific Ring of Fire. This finding reinforces the tsunami events disclosed by Pranantyo et al. (2021) and Pranantyo & Cummins (2019). The latest BMKG data states that there are 3,621 earthquakes recorded in 2021. Therefore, further attention is needed

for disaster management preparedness. Cabral (2020) and Coutinho et al. (2009) claim that disaster management measures in coastal areas require an efficient tsunami early warning system, robust infrastructure, strong evacuation strategies, and community understanding of warning signs and precautions needed to reduce the risk and impact of a tsunami. This was confirmed by Sakurai et al. (2018) for the reactivation of disaster preparedness activities in schools.

Schools have a significant impact on community disaster preparedness practices. Schools can achieve this goal through practical ways, including by establishing a school readiness committee, which is an important first step. The member consists of elements from the stakeholders to the students. This group is responsible for organizing, implementing, and managing the school's emergency preparedness plan. This is supported by Zhang et al. (2020), who found that apart from internal parties, it is necessary to involve external parties. Risk assessment must be carried out systematically (Dominelli, 2020). This involves identifying potential disaster risks close to the school. Knowing potential risks can assist schools in developing effective mitigation strategies to address these threats. This relates to the findings in Pillar 1 on the resilience of school buildings. Luetz (2020) states that school buildings that are not disaster-resistant are very vulnerable from a security perspective. So that safer school construction and reinforcement (retrofitting) are needed. Adhikari et al. (2023) strengthen this review by involving the wider community in integrating new knowledge and skills in disaster prevention have a broader impact than the school itself.

Emergency evacuation and response plans are also important to ensure that all school communities are ready to act in the event of an emergency. However, the fact that

is happening in the field is many respondents still don't know about disaster management in schools. So, further action is needed. Such as outlining protocols for first aid, gathering locations, evacuation routes, and emergency communications. Equipping teachers, school personnel, and students with disaster preparedness training meets the requirements for preparedness education. Routine evacuation drills, first aid training, and drills with emergency equipment such as fire extinguishers should also be carried out.

The most important element is the establishment of policy to incorporate disaster education into the curriculum. Integration can be done by providing training or education to integrated teachers, in which pedagogical training and content knowledge can be combined (Çam & Erdamar Koç, 2021; Yusuf, 2022). In various subjects, students should be taught about natural disaster hazards, emergency procedures, and the importance of preparedness. In this way, the entire school community will be protected, and the environment will be safer and better preparation for natural disasters. Especially at this era, the existence of knowledge about disasters in the "Merdeka Belajar" curriculum has an important meaning because it provides students with essential skills and awareness to respond and reduce the impact of disasters effectively (Al Lily et al., 2020; Arung et al., 2023). Through good integration, teachers can design an inclusive learning approach by understanding the unique characteristics of students. So that, it may provide appropriate and effective learning experiences (Lindner & Schwab, 2020; Thambu et al., 2021).

Based on the results of the analysis, it was found that many respondents stated that disaster management training had not been carried out. In this context, it is necessary to understand that the education sector has an important

role in facing various challenges caused by disasters and in preventing hazards from becoming disasters. These findings indicate that many respondents who claimed that there was no disaster management training described the importance of the education sector in overcoming the impacts of disasters and preventing them from becoming bigger disasters. The education sector has a central role in providing knowledge, skills, and awareness to students about disaster preparedness and response (Shah et al., 2020; Sujata, 2010; Zhu & Zhang, 2017). Especially in the context of disaster preparedness, education has a dual role: first, providing an understanding of disaster risks and preventive measures to students through the curriculum (de Mendonca et al., 2019; Pascapurnama et al., 2018); and second, through school extracurricular activities

which related to disaster preparedness. Extracurricular activities have an important role in the professional development of students, assisting students in developing interpersonal skills, career choices, and management of professional life (Rahman & Hundal, 2021; Suleiman et al., 2019). Through extracurricular activities such as disaster management clubs, first aid training, or disaster management teams, students can develop the practical skills and mental readiness needed to deal with emergency situations (Wardana et al., 2021; Wiedyaningsih et al., 2023). Thus, integration between the formal education curriculum and extracurricular activities will provide a holistic approach in shaping students who are ready to face the challenges of disasters and play an active role in keeping the community safe (Garrecht et al., 2018; Keser et al., 2011).

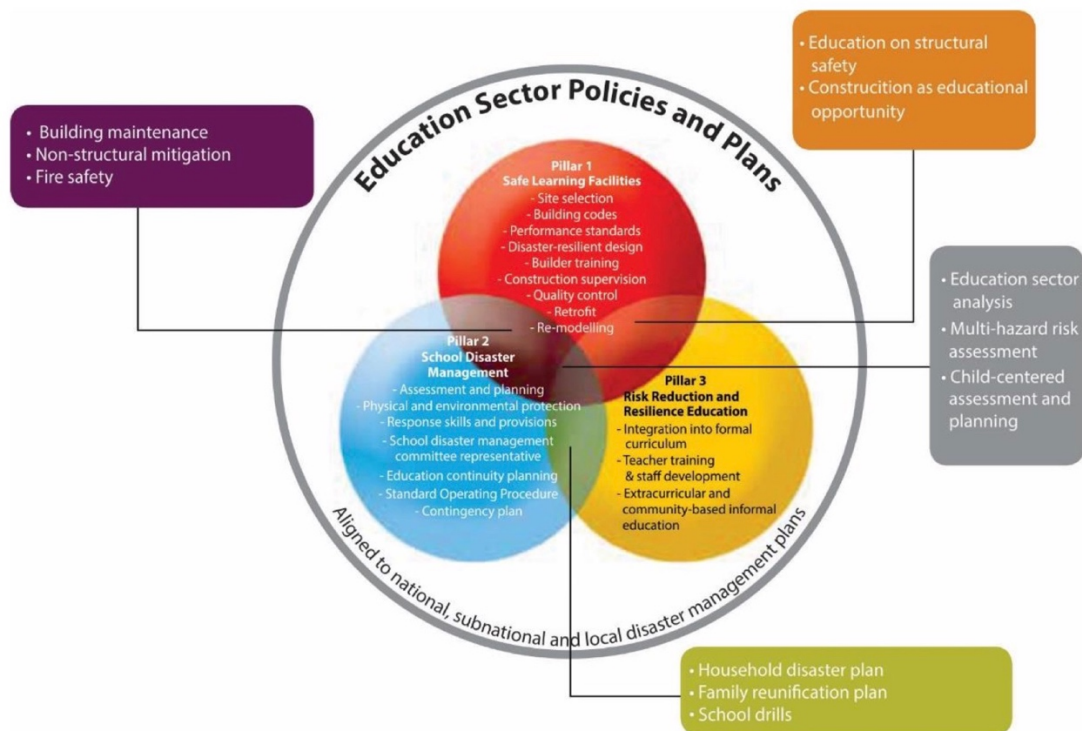


Figure 6. Three Pillars of Comprehensive School Safety (Suharwoto, Nurwin, TD, Supatma, Dirhamsyah, Rudianto, Jayanti, Mahulae, Taufik, Elvera, Kertapati, S, et al., 2015)

The three pillars as a form of DRR are a comprehensive form of safe schools, It can be achieved through policies and planning that are in line with disaster management at the national, provincial, district, and city levels and also at the school level. The intersection of the three pillars can be observed (Figure 6). [Mutasa & Munsaka \(2019\)](#) revealed that important supporting elements in DRR had actually been proposed in the Sendai Framework for Disaster Risk Reduction 2015–2030. So that the linkage between understanding disaster preparedness and the curriculum unit can begin to be integrated. This was revealed by [Tyas et al. \(2021\)](#): it is necessary to provide training through upgrades, training, and seminars on Disaster Risk Reduction (DRR) to school staff before delivering information to students. The training for teachers has a crucial role in shaping the quality of teaching staff and forms the basis for continuous professional development in the future ([Yusuf, 2022](#)). So, it can support the findings in the results of this study. However, it is necessary to reinforce regulations regarding school disaster safety. [Mutasa & Coetzee \(2019\)](#) emphasised that this kind of thing could be avoided if the government took part in implementing DRR policies embedded in the education curriculum. This was claimed by [Desfandi \(2014\)](#), [Amri et al. \(2017\)](#), [Torani et al. \(2019\)](#), [Rahman et al. \(2020\)](#), and [Seddighi et al. \(2022\)](#) that DRR is integrated into the education curriculum in 3 pillars that form the basis of DRR learning, namely: 1) children's knowledge of natural disasters; 2) knowledge of rescue skills; 3) knowledge of disaster risks posed; 4) community's ability to avoid disaster risk; and 5) building disaster risk resilience.

Government efforts in disaster management are regulated in Law Number 24 of 2007 and Government Regulation Number 21 of

2008 concerning the implementation of disaster management. Disaster management is divided into several parts, namely pre-disaster (disaster risk management, mitigation, and preparedness) ([Nurhidayah & McIlgorm, 2019](#)), during a disaster (emergency management), and post-disaster (recovery management). The government also allocates emergency funds through BNPB, a government agency that assists in disaster management. In order to increase the resilience of education units against disasters, the Ministry of Education and Culture has established the Disaster Safe Education Unit (SPAB) program as an effort to prevent and manage the impact of disasters in educational units. The implementation of the SPAB program is regulated through the Regulation of the Minister of Education and Culture Number 33 of 2019 concerning the Implementation of the SPAB Program. In the *Permendikbud*, the implementation of the SPAB program is carried out during normal or pre-disaster situations, emergency situations, and post-disaster situations. In an effort to implement the SPAB program, NTT Regional Disaster Management Agency has integrated DRR into the East Nusa Tenggara Province Medium Term Development Plan (RPJMD) for 2018–2023. The government's move is in accordance with the conditions of NTT as an archipelago province that has multi-threat disaster risk index. However, based on the results of this research, this step has not been fully conveyed to the implementing elements of education, namely schools. This case has been found in the research ([Tong et al., 2012](#); [Pascapurnama et al., 2018](#); [Yao et al., 2021](#)). So, to achieve the disaster resilience school indicators several aspects should be taken into account. It includes establishing relations among schools, providing cooperative and consistent support to increase school resilience to disasters, teaching life skills, creating a caring attitude towards

disasters, creating a supportive environmental climate, and always coordinating and communicating with other agencies, as well as opening opportunities for all school members to develop themselves, of course with the same direction and goal, namely the creation of disaster-resilient schools and school members. This will fully support the indicators of each pillar regarding the understanding and importance of disaster preparedness awareness.

4. Conclusion

Based on the spatial analysis of respondent locations, it was found that insights are provided regarding the distribution of schools in the disaster-prone Flores region. Meanwhile, the questionnaire responses reveal various levels of understanding and awareness concerning the pillars of disaster preparedness. Although respondents display a reasonable understanding of the physical condition of schools and the sustainability of buildings, there is a lack of knowledge regarding school facilities related to infrastructure and quality protocols for emergency situations. The importance of disaster-ready schools becomes increasingly clear in this context, as disaster-ready schools play a crucial role in filling knowledge gaps and enhancing awareness related to preparedness and response in encountering disasters. Recognition of the potential occurrence of disasters and the significance of disaster education among respondents underscores positive steps in building a culture of preparedness. However, addressing the knowledge deficiencies in disaster management and transforming awareness into concrete actions requires collaborative efforts involving school committees, external parties, and the wider community to enhance infrastructure resilience, risk reduction strategies, and effective disaster response planning. This study reaffirms the central role

of disaster-ready schools in disaster resilience in vulnerable areas as well as Flores Island. In addition, this research emphasizes the need for comprehensive disaster education to promote actions in encountering potential threats.

5. References

- Adhikari, R. K., D'Ayala, D., Fernandez, R., Yamin, L., Nassirpour, A., P Vatteri, A., Ferreira, C., & Cortes, F. (2023). GLOSI Taxonomy: A Tool for 'Seismic Risk Assessment' Oriented Classification of School Buildings. *International Journal of Disaster Risk Reduction*, 87, 103594. <https://doi.org/10.1016/j.ijdr.2023.103594>
- Al Lily, A. E., Ismail, A. F., Abunasser, F. M., & Alhajhoj Alqahtani, R. H. (2020). Distance Education as a Response to Pandemics: Coronavirus and Arab Culture. *Technology in Society*, 63, 101317. <https://doi.org/10.1016/j.techsoc.2020.101317>
- Amri, A., Bird, D. K., Ronan, K., Haynes, K., & Towers, B. (2017). Disaster Risk Reduction Education in Indonesia: Challenges and Recommendations for Scaling Up. *Natural Hazards and Earth System Sciences*, 17(4), 595–612. <https://doi.org/10.5194/nhess-17-595-2017>
- Arung, F., Murthado, F., & Boeriswati, E. (2023). Merdeka Belajar: the Real Learning Needs of Students, Teachers, and Institutions Related to Demands for Independent Learning Innovation. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, 5(2), 120–135. <https://doi.org/10.23917/ijolae.v5i2.20370>
- Astuti, N. M. W., Werdhiana, I. K., & Wahyono, U. (2021). Impacts of Direct Disaster Experience on Teacher's Knowledge, Attitudes And Perceptions of Disaster Risk Reduction Curriculum Implementation in Central Sulawesi, Indonesia. *International Journal of Disaster Risk Reduction*, 53, 101992.

- <https://doi.org/10.1016/j.ijdr.2020.101992>
- Cabral, N. (2020). *Revision of the Azorean Catalogue of Tsunamis* (Vol. 501). Geological Society, London, Special Publications,.
- Çam, Ş. S., & Erdamar Koç, G. (2021). Technological Pedagogical Content Knowledge Practices in Higher Education: First Impressions of Preservice Teachers. *Technology, Knowledge and Learning*, 26(1), 123–153. <https://doi.org/10.1007/s10758-019-09430-9>
- Coutinho, R., Pacheco, J., Wallenstein, N., Pimentel, A., Marques, R., & Silva, R. (2009). Integrating Geological Knowledge in Planning Methods for Small Islands Coastal Plans. *Journal of Coastal Research, II*(2009), 1199-1203.
- de Mendonca, M. B., da Silva Rosa, T., & Bello, A. R. (2019). Transversal Integration of Geohydrological Risks in an Elementary School in Brazil: A Disaster Education Experiment. *International Journal of Disaster Risk Reduction*, 39, 101213. <https://doi.org/10.1016/j.ijdr.2019.101213>
- Dominelli, L. (2020). Rethinking Masculinity in Disaster Situations: Men's Reflections of the 2004 Tsunami in Southern Sri Lanka. *International Journal of Disaster Risk Reduction*, 48, 101594. <https://doi.org/10.1016/j.ijdr.2020.101594>
- Garrecht, C., Bruckermann, T., & Harms, U. (2018). Student's Decision-Making in Education for Sustainability-Related Extracurricular Activities—A Systematic Review of Empirical Studies. *Sustainability*, 10(11), 3876. <https://doi.org/10.3390/su10113876>
- Gentile, R., Galasso, C., Idris, Y., Rusydy, I., & Meilianda, E. (2019). From Rapid Visual Survey to Multi-Hazard Risk Prioritisation and Numerical Fragility of School Buildings. *Natural Hazards and Earth System Sciences*, 19(7), 1365–1386. <https://doi.org/10.5194/nhess-19-1365-2019>
- Handayani, L. (2020). Seismic Hazard Analysis of Maumere, Flores: a Review of the Earthquake Sources. *Proceedings of the Proceedings of the 7th Mathematics, Science, and Computer Science Education International Seminar, MSCEIS 2019, 12 October 2019, Bandung, West Java, Indonesia*. <https://doi.org/10.4108/eai.12-10-2019.2296247>
- Jufriansah, A., Pramudya, Y., Khusnani, A., & Saputra, S. (2021). Analysis of Earthquake Activity in Indonesia by Clustering Method. *Journal of Physics: Theories and Applications*, 5(2), 92. <https://doi.org/10.20961/jphystheor-appl.v5i2.59133>
- Julius, A. M., & Daryono. (2021). Overview of 1990s Deadly Tsunamis in Indonesia. *E3S Web of Conferences*, 331, 07001. <https://doi.org/10.1051/e3sconf/202133107001>
- Keser, F., Akar, H., & Yildirim, A. (2011). The Role of Extracurricular Activities in Active Citizenship Education. *Journal of Curriculum Studies*, 43(6), 809–837. <https://doi.org/10.1080/00220272.2011.591433>
- Khusnani, A., Jufriansah, A., & Afriyanto, M. (2022). Utilization of Seismic Data as a Tsunami Vulnerability Review. *Indonesian Review of Physics*, 5(2), 66–72.
- Lindner, K.-T., & Schwab, S. (2020). Differentiation and Individualisation in Inclusive Education: A Systematic Review and Narrative Synthesis. *International Journal of Inclusive Education*, 1–21. <https://doi.org/10.1080/13603116.2020.1813450>
- Luetz, J. M. (2020). *Disaster-Resistant Schools for Disaster-Resilient Education* (pp. 158–174). https://doi.org/10.1007/978-3-319-95870-5_15
- Maneno, R., Sentosa, B. J., & Rachman, G. (2019). Relocation Of Earthquake Hypocenter in the Flores Region Using Hypo71. *IPTEK The Journal of Engineering*, 5(2).

- <https://doi.org/10.12962/j23378557.v5i2.a5024>
- Mutasa, S., & Coetzee, C. (2019). Exploring the Use of Experiential Learning in Promoting the Integration of Disaster Risk Reduction into Primary School Curriculum: A Case Of Botswana. *Jàmá Journal of Disaster Risk Studies*, 11(1). <https://doi.org/10.4102/jamba.v11i1.416>
- Mutasa, S., & Munsaka, E. (2019). Botswana and International Policies on the Inclusion of Disaster Risk Reduction in the School Curriculum: Exploring the Missing Link. *International Journal of Disaster Risk Reduction*, 40, 101271. <https://doi.org/10.1016/j.ijdr.2019.101271>
- Nurhidayah, L., & McIlgorm, A. (2019). Coastal Adaptation Laws and the Social Justice of Policies to Address Sea Level Rise: An Indonesian Insight. *Ocean & Coastal Management*, 171, 11–18. <https://doi.org/10.1016/j.ocecoaman.2019.01.011>
- Pascapurnama, D. N., Murakami, A., Chagan-Yasutan, H., Hattori, T., Sasaki, H., & Egawa, S. (2018). Integrated Health Education in Disaster Risk Reduction: Lesson Learned from Disease Outbreak Following Natural Disasters in Indonesia. *International Journal of Disaster Risk Reduction*, 29, 94–102. <https://doi.org/10.1016/j.ijdr.2017.07.013>
- Pranantyo, I. R., & Cummins, P. R. (2019). Multi-Data-Type Source Estimation for the 1992 Flores Earthquake and Tsunami. *Pure and Applied Geophysics*, 176(7), 2969–2983. <https://doi.org/10.1007/s00024-018-2078-4>
- Pranantyo, I. R., Heidarzadeh, M., & Cummins, P. R. (2021). Complex Tsunami Hazards in Eastern Indonesia From Seismic and Non-Seismic Sources: Deterministic Modelling Based on Historical and Modern Data. *Geoscience Letters*, 8(1), 20. <https://doi.org/10.1186/s40562-021-00190-y>
- Proulx, K., & Aboud, F. (2019). Disaster Risk Reduction in Early Childhood Education: Effects on Preschool Quality and Child Outcomes. *International Journal of Educational Development*, 66, 1–7. <https://doi.org/10.1016/j.ijeduc.2019.01.007>
- Rahman, A., & Hundal, R. A. (2021). Inclination of Students towards Active Participation in Extracurricular Activities as an Effective Tool for Professional Development during Education in Pakistan. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, 3(2), 76–85. <https://doi.org/10.23917/ijolae.v3i2.12026>
- Rahman, M. M., Alam Nabila, I., Islam, F., Tasnim, F., Tabassum, S., Nahar Tanni, K., & Roy, T. (2020). Challenges to Implement Disaster Risk Reduction in Schools of Developing Country: Study on Dhaka City, Bangladesh. *International Journal of Sustainable Development Research*, 6(2), 37. <https://doi.org/10.11648/j.ijdsr.20200602.13>
- Röbke, B. R., & Vött, A. (2017). The Tsunami Phenomenon. *Progress in Oceanography*, 159, 296–322. <https://doi.org/10.1016/j.poc.2017.09.003>
- Sakurai, A., Bisri, M. B. F., Oda, T., Oktari, R. S., Murayama, Y., Nizammudin, & Affan, M. (2018). Exploring Minimum Essentials for Sustainable School Disaster Preparedness: A Case of Elementary Schools in Banda Aceh City, Indonesia. *International Journal of Disaster Risk Reduction*, 29, 73–83. <https://doi.org/10.1016/j.ijdr.2017.08.005>
- Seddighi, H., Salmani, I., Javadi, M. H., & Seddighi, S. (2021). Child Abuse in Natural Disasters and Conflicts: A Systematic Review. *Trauma, Violence, & Abuse*, 22(1), 176–185. <https://doi.org/10.1177/1524838019835973>
- Shah, A. A., Ajiang, C., Gong, Z., Khan, N. A., Ali, M., Ahmad, M., Abbas, A., &

- Shahid, A. (2022). Reconnoitering School Children Vulnerability and Its Determinants: Evidence from Flood Disaster-Hit Rural Communities of Pakistan. *International Journal of Disaster Risk Reduction*, *70*, 102735. <https://doi.org/10.1016/j.ijdr.2021.102735>
- Shah, A. A., Gong, Z., Pal, I., Sun, R., Ullah, W., & Wani, G. F. (2020). Disaster Risk Management Insight on School Emergency Preparedness – A Case Study of Khyber Pakhtunkhwa, Pakistan. *International Journal of Disaster Risk Reduction*, *51*, 101805. <https://doi.org/10.1016/j.ijdr.2020.101805>
- Suharwoto, G., Nurwin, N., TD, N., Supatma, R., Dirhamsyah, D., Rudianto, R., Jayanti, E. D., Mahulae, A., Taufik, A., Elvera, D., Kertapati, I., S., K. P., Bhaswara, N., Sari, D., Hidayati, N., Meiwanty, I., Nurhalim, E., Ngurah, I., Muzaki, J., ... Tebe, Y. (2015a). *Module 2 Pillar 2-School Disaster Management*.
- Suharwoto, G., Nurwin, N., TD, N., Supatma, R., Dirhamsyah, D., Rudianto, R., Jayanti, E. D., Mahulae, A., Taufik, A., Elvera, D., Kertapati, I., S., K. P., Bhaswara, N., Sari, D., Hidayati, N., Meiwanty, I., Nurhalim, E., Ngurah, I., Muzaki, J., ... Tebe, Y. (2015b). *Module 3 Pillar 3-Risk Reduction and Resilience Education*.
- Suharwoto, G., Nurwin, TD, N., Supatma, R., Dirhamsyah, Rudianto, Jayanti, E. D., Mahulae, A., Taufik, A., Elvera, D., Kertapati, I., S, K. P., Bhaswara, N., Sari, D., Hidayati, N., Meiwanty, I., Nurhalim, E., Ngurah, I., Muzaki, J., ... Tebe, Y. (2015). *Module 1 Pillar 1- Safe Learning Facilities*. Planning and Foreign Cooperation Bureau Secretariat-General of the Ministry of Education and Culture .
- Sujarwo, Noorhamdani, & Fathoni, M. (2018). Disaster Risk Reduction in Schools: The Relationship of Knowledge and Attitudes towards Preparedness from Elementary School Students in School-Based Disaster Preparedness in the Mentawai Islands, Indonesia. *Prehospital and Disaster Medicine*, *33*(6), 581–586. <https://doi.org/10.1017/S1049023X1800778>
- Sujata, S. (2010). Disaster Management Education in Indian Schools: Gaps, Challenges and a Human Resource Plan Model for School Education Sector. *Indian Journal of Public Administration*, *56*(4), 979–995. <https://doi.org/10.1177/0019556120100410>
- Suleiman, Y., Hanafi, Z., & Muhajir, T. (2019). Influence of Extracurricular Services on Student's Academic Achievement in Secondary Schools in Kwara State: A Qualitative Approach. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, *1*(2), 1–19. <https://doi.org/10.23917/ijolae.v1i2.7766>
- Thambu, N., Prayitno, H. J., & Zakaria, G. A. N. (2021). Incorporating Active Learning into Moral Education to Develop Multiple Intelligences: A Qualitative Approach. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, *3*(1), 17–29. <https://doi.org/10.23917/ijolae.v3i1.10064>
- Tong, T. M. T., Shaw, R., & Takeuchi, Y. (2012). Climate Disaster Resilience of the Education Sector in Thua Thien Hue Province, Central Vietnam. *Natural Hazards*, *63*(2), 685–709. <https://doi.org/10.1007/s11069-012-0178-5>
- Tyas, R. A., Pujiyanto, & Suyanta. (2021). *Volcanoes Disaster Risk Reduction in Science Education Curriculum*. <https://doi.org/10.2991/as-sehr.k.210305.098>
- Wardana, S., Herdiansyah, H., & Wicaksono, A. (2021). The Actualization of Student's Disaster Preparedness at the Elementary and Secondary Education Level of Disaster-Aware School. *IOP Conference Series: Earth and Environmental Science*, *683*(1), 012034.

- <https://doi.org/10.1088/1755-1315/683/1/012034>
- Widiastuti, R., Mayasari, S., & Utaminingsih, D. (2022). Analysis of Disaster Preparedness Knowledge and Skill among Teachers at Middle School and High School. *Indonesian Journal of Creative Counseling*, 2(1), 9–17. <https://doi.org/10.47679/ijcc.v2i1.170>
- Wiedyaningsih, C., Nugroho, A. K., Widyakusuma, N. N., & Prasetyo, S. D. (2023). How to Best Prepare Pharmacy Students for Disaster Management: A Qualitative Study. *Disaster Medicine and Public Health Preparedness*, 17, e319. <https://doi.org/10.1017/dmp.2022.289>
- Yusuf, H. T. (2022). Teachers Evaluation of Concurrent and Consecutive Teacher Education Models in South-west, Nigeria. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*, 4(2), 107–117. <https://doi.org/10.23917/ijolae.v4i2.17599>
- Zhang, W., Wang, Y., Yang, L., & Wang, C. (2020). Suspending Classes without Stopping Learning: China's Education Emergency Management Policy in the COVID-19 Outbreak. *Journal of Risk and Financial Management*, 13(3), 55. <https://doi.org/10.3390/jrfm13030055>
- Zhu, T.-T., & Zhang, Y.-J. (2017). An Investigation of Disaster Education in Elementary and Secondary Schools: Evidence from China. *Natural Hazards*, 89(3), 1009–1029. <https://doi.org/10.1007/s11069-017-3004-2>