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Disaster education as an effort to improve students' flood mitigation preparedness

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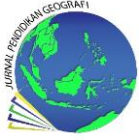
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Disaster education as an effort to improve students' flood mitigation preparedness

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Abstract

Reducing disaster risk is an important thing that needs to be done at all levels of society, including students. This study aims to determine students' level of preparedness for flood disasters and the efforts made by schools in dealing with flood disasters. This study used a descriptive quantitative method conducted at SMA Negeri 1 Jeneponto. The population in this study was 95 students, with a total sample of 49 students determined using the Slovin formula with a ten percent margin of error. The data collection techniques used questionnaires, interviews, and documentation. The research results were analyzed using descriptive statistics. The results of the study showed that knowledge of attitudes, emergency response plans, disaster warning systems, and students' disaster preparedness when a flood disaster occurs are included in the "very prepared" category. This research has implications for school practice in terms of developing a school curriculum that includes material on natural disasters and risk reduction, as well as training teachers and educators to teach and communicate about natural disasters to provide appropriate information to students.

Keywords: disaster mitigation; flood mitigation preparedness; SMAN 1 Jeneponto

1. Introduction

Jeneponto Regency, as one of the regencies located in South Sulawesi Province, has the potential for tornadoes, floods, and droughts to occur (Alamsyah & Handayani, 2020). Indonesian society's disaster preparedness is still weak. It is proven by the large number of victims and victims of property from each disaster (James, 2008; Kusumastuti, Arviansyah, Nurmala, & Wibowo, 2021). Although the impact of disasters varies widely, ranging from damage and loss to causing casualties, these conditions show that preparedness is still weak for disasters that occur in Indonesia (Emosda, 2014; McNeill, Killian, Moon, Way, & Betsy Garrison, 2018; Rijal, Matalapu, Jaya, & Maulana, 2020). As for areas in South Sulawesi, especially Jeneponto Regency, in the last five years, there have been heavy rains which have caused flooding in several areas and one area in Jeneponto Regency (Ahmad, Farida, & Juita, 2022; Syarif, Maddatuang, Hasriyanti, & Saputro, 2022). The flood caused the surrounding environment to be ravaged, including educational facilities.

Children are one of the most vulnerable groups at risk of being affected by disasters (Republic Indonesia, 2008). Children's vulnerability to disasters is sparked by the limited understanding of the risks around them, which results in a lack of preparedness in dealing with disasters. Based on data on disaster events in several areas, many victims due to disasters are

school-age children, both during school hours and outside school hours. This shows the importance of knowledge about disasters and disaster risk reduction from an early age to provide understanding and direction of steps that must be taken when a threat occurs in the vicinity to reduce disaster risk (Sunarto & Marfai, 2012).

Increased knowledge to be aware of disaster preparedness can be done through socialization to educate. It is in line with the activities carried out by BNPB that disaster awareness socialization is very important to reduce the impact when a disaster occurs. Disaster education has important benefits; it does not rule out the possibility that the impact of a disaster will disappear or at least can reduce the risk of a disaster occurring. Children have a higher exposure to disasters compared to adults. This is because children are still not able to control and prepare themselves for disaster situations (Ningsih et al., 2020; Sulistyaningsih, 2011). Thus, children need increased knowledge and understanding of disaster preparedness.

Community knowledge, attitudes, and skills regarding hazards, vulnerabilities, and disaster risks, as well as efforts that must be made to reduce disaster risks, are important things that need to be done at all levels of society, including high school students. Education effectively reduces disaster risk by including subject matter on natural disasters as a compulsory lesson for every student at all levels, especially in schools located in disaster-risk areas. Disaster mitigation socialization efforts will be very effective if implemented through schools (Bahtiar, 2013). Students in high school geography learning are directed, guided, and assisted to become good citizens of Indonesia and citizens of the world in the constellation of a dynamic global society. This subject is designed to build and reflect students' abilities in the life of a society that always develops continuously. Awareness of actions in dealing with disasters is related to human behavior and actions to develop himself, society, nation, and the environment.

One of the schools that are prone to disasters in Jeneponto Regency is SMA Negeri 1 Jeneponto, South Sulawesi Province, Indonesia, which is an area or region that is threatened by natural disasters such as floods and even landslides, which sometimes cause fatalities. This condition must be addressed immediately, considering the large number of losses that have been caused. In addition, it can be seen that there is panic, and students are not alert when facing floods. Floods often cause a feeling of insecurity and make people feel out of control. Therefore, this disaster can trigger fear and panic (Shah et al., 2020).

Knowledge of disasters is vital for students because it can help them understand the risks and dangers that might arise if a disaster occurs, and knowledge of disasters can help students understand the importance of emergency response (Pramita et al., 2022; Sayuti et al., 2022). Furthermore, when students know about disasters, they can better prepare for and deal with emergencies and help reduce the risk of injury and loss. Therefore, it is important for students to learn disaster information to act appropriately and safely in an emergency (Ilyasa, Rahmayanti, Muzani, Ichsan, & Suhono, 2020; Kamil, Utaya, & Utomo, 2020).

A weak understanding of disaster cannot be separated from the weakness of the disaster education system in schools today. Therefore, disaster education should be included in the school curriculum, where students should be educated about various disasters, their causes, and ways to reduce their impact. In addition to teacher support, schools must prepare the necessary learning resources for the school library about disasters and their management. Books, magazines, videos, and online learning materials can help students deepen their knowledge about disasters and their mitigation efforts. In addition, it is necessary to know the

level of student preparedness for floods and the efforts made by schools in facing floods at SMA Negeri 1 Jeneponto using the parameters of student preparedness for flood disasters which are assessed based on attitude knowledge, emergency response plans, disaster warning systems, and disaster preparedness. Therefore, it is hoped that it can become a reference for all authorized parties to always carry out disaster response life in the home and school environment.

2. Method

This type of research is descriptive qualitative research. This research is used to present data in a systematic, factual, and accurate manner regarding facts and the meaning of phenomena in the field. This research was conducted in Senior High School at SMA Negeri 1 Jeneponto located at Jl. Education No. 50, Panaikang, Kec. Binamu, Jeneponto Regency, South Sulawesi. This research was conducted in August-October 2022.

The research variables used are: 1) knowledge of attitudes. Students have a sufficient understanding of the various types of disasters, their causes, and ways of overcoming them. Knowing how well students understand the essential steps in disaster management and how to get the latest information about potential disasters in their area. 2) Student emergency plan. Measures how well students can develop personal emergency plans with family or teachers. This plan contains steps to be taken in the event of a disaster, such as B. Meeting points, emergency contacts, and supplies. Students also know how to approach and execute these plans well. 3) Disaster preparedness system. The study also measures student readiness for disaster warning systems via communication channels such as sirens, loudspeakers, text alerts, mobile phone notifications, and special audio signals. 4) Disaster preparedness. To analyze student preparedness in dealing with disasters.

The population in this study were all XII Social Studies classes at SMA Negeri 1 Jeneponto for the 2022/2023 academic year, which consisted of 3 XII classes with a total of 95 students. The sample in this study was determined using the Slovin formula (Sugiyono, 2017).

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

Information:

n : Sample
N : Population
e : error 10%

So it is obtained:

$$n = \frac{95}{1 + 95 (0,1)^2}$$

$$n = \frac{95}{1,95}$$

$$n = 48,71$$

$$n = 49 \text{ (rounded)}$$

The sample collection technique in this study used proportional random sampling. Based on the sample formula above, the sample in this study numbered 49 students. This number is considered to represent other samples that also experience the same learning process. Data collection was carried out by observation, interviews with students and teachers using a questionnaire containing questions and documentation. Data verification strategy with data reduction, data categorization, data display, and concluding.

This study uses descriptive statistical data analysis. Descriptive statistical analysis is an analysis that describes or gives an overview of the object under study through sample or population data as it is, without conducting analysis and making generally accepted conclusions (Sugiyono, 2019). The criteria for the level of disaster preparedness use the formula proposed by Hidayati et al. (2006) is presented in Table 1.

Table 1. Research Questionnaire Criteria

No	Index Value	Category
1	0-39	Not Prepared yet
2	40-54	Less Prepared
3	55-64	Almost Prepared
4	65-79	Prepared
5	80-100	Very well prepared

Source: Hidayati et al. (2006)

3. Results and Discussion

The results of the research on the parameters of students' preparedness for flood disasters which are assessed based on knowledge of attitudes, emergency response plans, disaster warning systems, and disaster preparedness as follows:

3.1. Knowledge of Attitudes

Attitudes toward disasters refer to individual beliefs, feelings, and evaluations of disasters and their impacts. These attitudes can differ between individuals and society based on experience, knowledge, cultural background, and social factors. The following are the results of the knowledge attitudes of students in dealing with disasters in Figure 1.

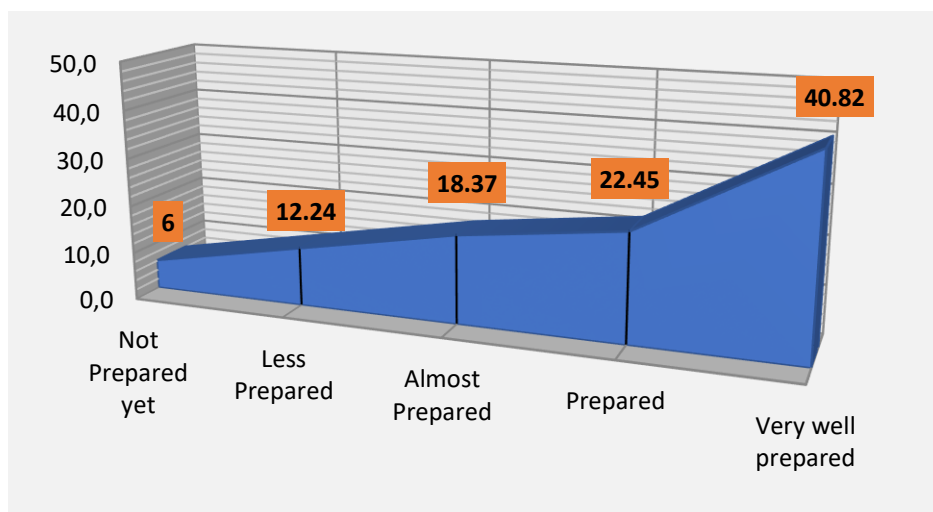


Figure 1. Attitude Knowledge Diagram

Figure 1 above shows that the highest score of 40.8 was found in students who were in the "very well prepared" category of 20 students. While the lowest score for students in the "not prepared yet" category is 6. Floods cannot be prevented, but they can be controlled, and the impact of the resulting losses can be reduced. Since the arrival is relatively fast, to reduce losses due to the disaster, it is necessary to prepare for handling quickly, precisely, and in an integrated manner. Knowledge is the main factor and key to preparedness (Rosyida & Adi, 2017). Figure 1 explains that the parameters of students' knowledge and attitudes are included in the very well-prepared category. Parameters of knowledge and attitudes are the most basic things in shaping student preparedness, so there is a need for improvement efforts so that students are not only ready but very prepared when an earthquake occurs. Deny Hidayati, et al (2006). Students who are unprepared early will become a problem and should not be ignored (Sari & Suciana, 2019).

3.2. Emergency Response Plans

Measuring an emergency plan is very important because it can help a school or student make sure they are prepared for an emergency. The main reason measuring contingency plans is also important is to identify weaknesses in the plan. By measuring preparedness plans, schools or students can identify weaknesses or gaps in their plans and fix them before an emergency occurs. In addition, through measurement and evaluation, schools can improve their preparedness plans, test their ability to handle emergency situations and improve their overall preparedness (Bandecchi, Pazzi, Morelli, Valori, & Casagli, 2019; Shah et al., 2020). Therefore, measuring emergency plans is critical to ensure that schools are prepared for emergencies and can respond effectively and efficiently. It explains in Figure 2.

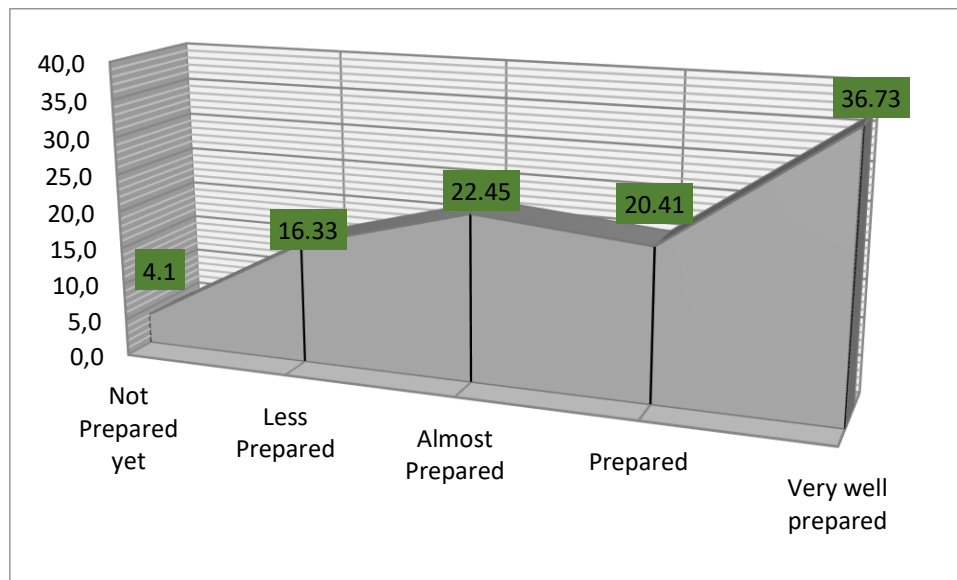


Figure 2. Student Emergency Response Plan Diagram

Figure 2 explains the students' emergency response plans for a flood disaster. The results showed that the score of students in the "very well prepared" category was 18 respondents and two students in the "not prepared yet" category of 4.1. Emergency response plans are part of disaster preparedness (Darwati & Wekke, 2019). Among these are community plans for responding to emergencies, evacuation plans, first aid, and fulfillment of basic needs,

tools, and equipment (BNPB, 2012). The results of the study show that students' emergency response plans when a flood disaster occurs are in the very prepared category. In general, other studies also show similar things where community preparedness in dealing with disasters is included in the good category (Erlia, Kumalawati, & Aristin, 2017).

3.3. Disaster Warning Systems

The next measurement is the student disaster warning system, which is considered very important because it can help them educate themselves about disaster threats by providing information to students about the nature and magnitude of disaster threats that may occur in their environment. This can help students understand the risks and potential harm they may face and take appropriate precautions. In addition, the Disaster Alert System allows students to prepare mentally and physically for emergencies.

Students learn how to prepare equipment, participate in evacuation drills and know safe evacuation routes. Disaster preparedness systems can increase student involvement in disaster risk reduction efforts. For example, students may participate in evacuation simulation and training programs or activities that increase risk awareness and risk reduction. Overall, disaster warning systems are very important for students to understand risks, increase preparedness, minimize risks, maintain security, and increase participation in disaster mitigation efforts (Andespa & Fauzi, 2019; Li et al., 2022; Tyas, 2020). The disaster warning system for students when a flood occurs explains in Figure 3.

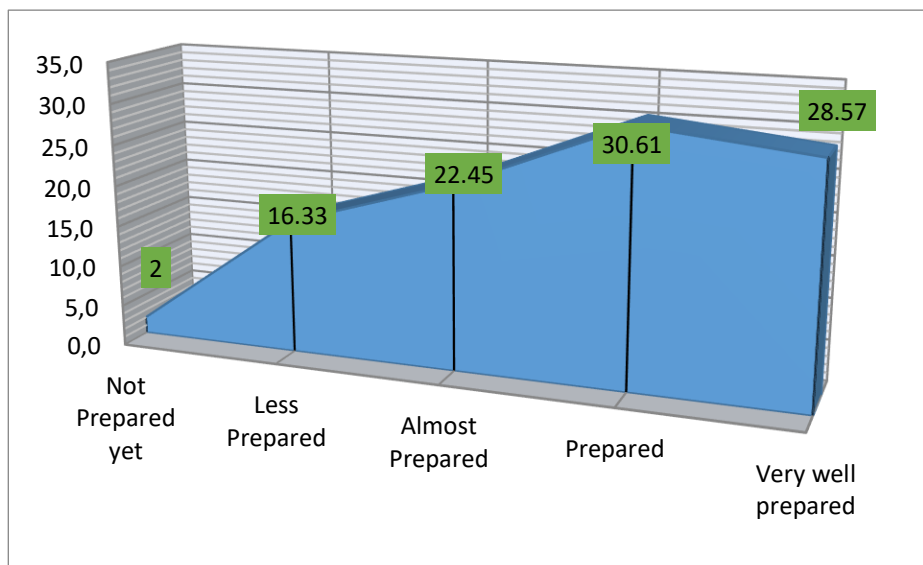


Figure 3. Student Disaster Warning System

The Figure 3 results showed that the score of students in the "very well prepared" category was 14 respondents. The data above can be interpreted that as many as 30.61 students fall into the "prepared" category, with a total of 15 students. Students who get scores between 65 - 79, as many as 11 students or 22.45, fall into the "Almost prepared" category. There were 8 students in the "Less prepared" category that scored 16.33 and 1 student in the "Not prepared yet" category with a score of 2. The results of the study in Figure 3 shows that the student disaster warning system when a flood occurs is in the very prepared category. One of the reasons is that schools hold outreach and introduce online-based applications as a

reminder when a disaster occurs. However, the study of community disaster preparedness in anticipating disasters by mobilizing student resources is still low, which can be seen from the small proportion of students who have participated in various disaster preparedness activities (Badwi, Invanni, & Abbas, 2020).

3.4. Disaster Preparedness

The last measurement is student disaster preparedness when a flood disaster occurs. Students in disaster risk reduction programs are more aware of the risks associated with flooding, including risks of injury, property damage, and other hazards. Therefore, it can help students be better prepared and take appropriate action in a flood. In addition, students who receive disaster training are better prepared and know how to deal with emergencies such as floods.

Students will understand how to avoid hazards such as strong currents, debris, and sharp objects that can be carried away. In addition, students who take part in disaster preparedness programs are also more prepared to provide first aid if a family member, friend, or resident is injured or needs help. And last but not least, students who take part in disaster risk reduction programs are mentally better prepared to face floods. They understand that flooding is a risk that must be faced and know how to manage the potential emotional impact, such as fear and trauma. Student disaster preparedness in flood situations is essential to minimize the risk of accidents and property damage, increase awareness of risks, and reduce emotional impact. That is why schools need to have a good disaster management program for students and keep it updated and strengthened (Mızrak & Aslan, 2020; Nipa, Kermanshachi, Patel, & Tafazzoli, 2020; Tsai, Chang, Shiau, & Wang, 2020). It explains in Figure 4.

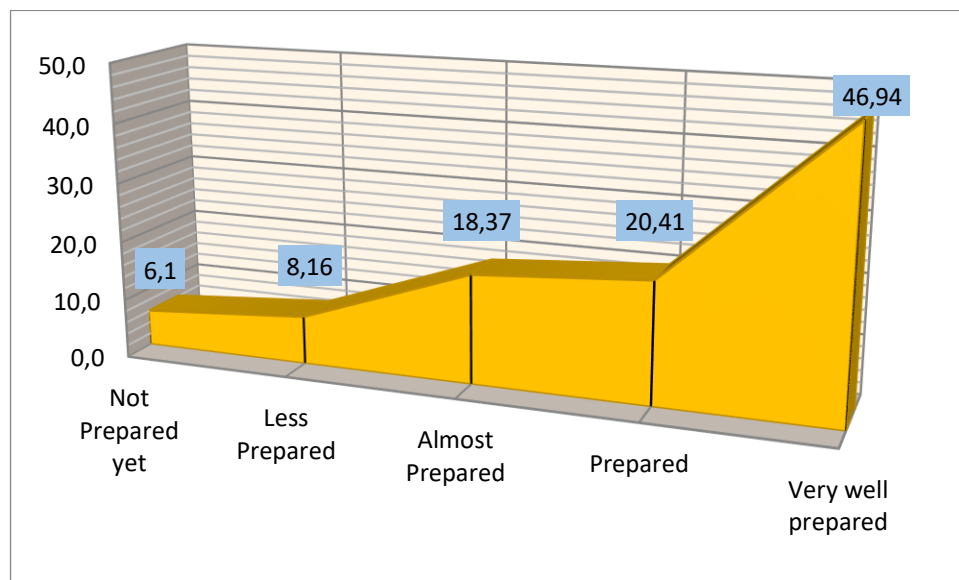


Figure 4. Student Disaster Preparedness Diagram when a Flood Disaster Occurs

Figure 4 explains students' disaster preparedness when a flood disaster occurs. The results showed that the score of students in the "Very well prepared" category was 23 respondents. There were 3 students in the "Not prepared yet" category with a score of 6.1. The school's efforts to increase student preparedness are by implementing disaster programs. The

study results showed that SMA Negeri 1 Jeneponto implements a disaster program that includes disaster preparedness material in the Learning Implementation Plan (RPP), socialization, and disaster simulations held regularly by the District Government. Jeneponto, in this case, the National Disaster Management Agency (BNPB) at schools, completes disaster facilities and infrastructures such as disaster risk maps, evacuation routes, and disaster markers.

Preparedness is seen as a form of dealing with disasters by providing adequate resources and infrastructure (Fajriah, Jati, & Setyaningsih, 2022). Research by Labudasari and Rochmah (2020) shows that school facilities and infrastructure are believed to be responsible for the increasingly severe damage after the disaster. The way for students to survive disasters is to improve disaster-resistant school facilities and infrastructure. In addition to improving infrastructure to withstand disasters, students must also know and understand how to evacuate themselves. Moreover, one of the ways to maintain disaster preparedness for high school students is to use the disaster curriculum as a lesson plan designed to provide the understanding, knowledge, and skills needed to cope with, respond to, and reduce disaster risk. This curriculum aims to increase individual and community awareness and preparedness in dealing with various natural and man-made disasters. In short, it is important to do, considering the school cycle, which brings in new students every year.

4. Conclusion

Based on the description of the research above, it can be concluded that knowledge of attitudes, emergency response plans, disaster warning systems, and students' disaster preparedness in dealing with flood disasters fall into the "very prepared" category at SMA Negeri 1 Jeneponto. This result is due to the integration of school learning with disaster mitigation. Another thing that causes students to be very prepared in dealing with disasters is the experience of experiencing a previous flood disaster, which motivates them to be better prepared in dealing with disasters that come at any time. It is hoped that this activity will continue to be carried out on an ongoing basis so that students' flood response is maintained. It is recommended to all parties (schools, families, government, and society) to always instill a disaster response attitude by participating in socialization and implementing it in everyday life.

References

- Ahmad, A., Farida, M., & Juita, N. (2022). Analisis spasial tekstur tanah terhadap penilaian risiko bencana hidrometeorologi di Kecamatan Rumbia-Kelara, Kabupaten Jeneponto. *Jurnal Wilayah dan Lingkungan*, 10(1), 42-54.
- Alamsyah, A., & Handayani, T. (2020). Pengaruh sumber daya organisasi terhadap kesiapsiagaan petugas BPBD Kabupaten Jeneponto dalam menghadapi bencana. *Healthy Papua-Jurnal Keperawatan dan Kesehatan*, 3(1), 121-126.
- Andespa, D., & Fauzi, A. (2019). Analysis of senior high school student preparedness in dealing with earthquake disaster in the Mentawai island. *Journal of Physics: Conference Series*, 1185(1), 12081. IOP Publishing.
- Badwi, N., Invanni, I., & Abbas, I. (2020). Pemetaan tingkat rawan bencana banjir di Daerah Aliran Sungai Maros Provinsi Sulawesi Selatan. *LaGeografia*, 18(3), 309-322.
- Bahtiar, T. (2013). *Bencana mengintai dari balik keelokan Tatar Sunda*. Bandung: Badan Geologi.
- Bandecchi, A. E., Pazzi, V., Morelli, S., Valori, L., & Casagli, N. (2019). Geo-hydrological and seismic risk awareness at school: Emergency preparedness and risk perception evaluation. *International Journal of Disaster Risk Reduction*, 40, 101280.
- BNPB. (2012). *Regulation No. 2-2012*.

**Jurnal Pendidikan Geografi:
Kajian, Teori, dan Praktik dalam Bidang Pendidikan dan Ilmu Geografi**

28(2), 2023, 158-167

- Darwati, D., & Wekke, I. S. (2019). *Collaborative governance dalam pengelolaan integrated community shelter pasca bencana di Kota Palu*.
- Emosda, L. (2014). Fadzrul. (2014). Mengkonstruksi pemahaman masyarakat peduli bencana alam banjir. *Jurnal Pengabdian Masyarakat*, 29(3), 21-29.
- Erlia, D., Kumalawati, R., & Aristin, N. F. (2017). Analisis kesiapsiagaan masyarakat dan pemerintah menghadapi bencana banjir di Kecamatan Martapura Barat Kabupaten Banjar. *JPG (Jurnal Pendidikan Geografi)*, 4(3), 15-24.
- Fajriah, N., Jati, S. P., & Setyaningsih, Y. (2022). Analisis kebencanaan dan komitmen manajemen rumah sakit di Indonesia: Literature review. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 5(4), 365-373.
- Hidayati, D., Permana, H., Pribadi, K., Ismail, F., Meyers, K., & Widayatun, H. (2006). *Kajian kesiapsiagaan masyarakat dalam mengantisipasi bencana gempa bumi & tsunami*. Jakarta: LIPI-UNESCO.
- Ilyasa, F., Rahmayanti, H., Muzani, M., Ichsan, I. Z., & Suhono, S. (2020). Environmental education for prevent disaster: A survey of students knowledge in beginning new normal of COVID-19. *International Journal on Advanced Science, Education, and Religion*, 3(2), 1-8.
- James, E. (2008). Getting ahead of the next disaster: Recent preparedness efforts in Indonesia. *Development in Practice*, 18(3), 424-429.
- Kamil, P. A., Utaya, S., & Utomo, D. H. (2020). Improving disaster knowledge within high school students through geographic literacy. *International Journal of Disaster Risk Reduction*, 43, 101411.
- Kusumastuti, R. D., Arviansyah, A., Nurmalia, N., & Wibowo, S. S. (2021). Knowledge management and natural disaster preparedness: A systematic literature review and a case study of East Lombok, Indonesia. *International Journal of Disaster Risk Reduction*, 58, 102223.
- Labudasari, E., & Rochmah, E. (2020). Literasi bencana di sekolah: Sebagai edukasi untuk meningkatkan pemahaman kebencanaan. *Metodik Didaktik: Jurnal Pendidikan Ke-SD-An*, 16(1), 41-48.
- Li, J., Xia, H., Qin, Y., Fu, P., Guo, X., Li, R., & Zhao, X. (2022). Web GIS for sustainable education: Towards natural disaster education for high school students. *Sustainability*, 14(5), 2694.
- McNeill, C. C., Killian, T. S., Moon, Z., Way, K. A., & Betsy Garrison, M. E. (2018). The relationship between perceptions of emergency preparedness, disaster experience, health-care provider education, and emergency preparedness levels. *International Quarterly of Community Health Education*, 38(4), 233-243.
- Mızrak, S., & Aslan, R. (2020). Disaster risk perception of university students. *Risk, Hazards & Crisis in Public Policy*, 11(4), 411-433.
- Ningsih, Y. W., Imawati, N. D., A'dawiyah, R., Prihastomi, A., Gunawan, G., & Widyatmoko, W. (2020). Identifikasi kesiapan Sekolah Menengah Muhammadiyah untuk implementasi sekolah siaga bencana di Kecamatan Wedi Kabupaten Klaten. *LaGeografia*, 18(2), 99-108.
- Nipa, T. J., Kermanshachi, S., Patel, R., & Tafazzoli, M. (2020). Disaster preparedness education: Construction curriculum requirements to increase students' preparedness in pre-and post-disaster activities. *EPIC Series in Built Environment*, 1, 142-151.
- Pramita, G., Saniati, S., Assuja, M. A., Kharisma, M. P., Hasbi, F. A., Daiyah, C. F., & Tambunan, S. P. (2022). Pelatihan sekolah tangguh bencana di SMK Negeri 1 Bandar Lampung. *Journal of Social Sciences and Technology for Community Service (JSSTCS)*, 3(2), 264-271.
- Republic Indonesia. (2008). Peraturan Pemerintah No. 21 Tahun 2008 tentang Penyelenggaraan Penanggulangan Bencana. *Lembaran Negara RI Tahun*, (4828).
- Rijal, A. S., Matalapu, I., Jaya, R., & Maulana, K. M. (2020). Analisis mitigasi bencana terhadap kondisi sosial budaya di Gorontalo. *LaGeografia*, 19(2), 155-174.
- Rosyida, F., & Adi, K. R. (2017). Studi eksplorasi pengetahuan dan sikap terhadap kesiapsiagaan bencana banjir di SD Pilanggede Kecamatan Balen Kabupaten Bojonegoro. *Jurnal Teori dan Praksis Pembelajaran Ips*, 2(1), 1-5.
- Sari, D. P., & Suciana, F. (2019). Pengaruh edukasi audio visual dan role play terhadap perilaku siaga bencana pada anak sekolah dasar. *Journal of Holistic Nursing Science*, 6(2), 44-51.
- Sayuti, M., Hasibuan, A., Baidhawi, B., Siregar, W. V., Mariyudi, M., Puspasari, C., ... Al Farizi, R. (2022). Pelatihan simulasi tanggap darurat kebakaran di SMA Lhokseumawe dan Aceh Utara. *Jurnal Solusi Masyarakat Dikara*, 2(3), 172-175.

**Jurnal Pendidikan Geografi:
Kajian, Teori, dan Praktik dalam Bidang Pendidikan dan Ilmu Geografi**

28(2), 2023, 158-167

- 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.
- Sugiyono, P. (2017). *Metode Penelitian Pendidikan*. Bandung: Alfabeta.
- Sugiyono, P. (2019). *Metode penelitian pendidikan (kuantitatif, kualitatif, kombinasi, R&D dan penelitian pendidikan)* (Ke-3; A. Nuryanto, ed.). Bandung: Alfabeta.
- Sulistyaningsih, W. (2011). *Pemulihan anak pasca bencana: Pelibatan komunitas untuk hasil intervensi yang efektif*. Fakultas Psikologi Universitas Sumatera Utara.
- Sunarto, S., & Marfai, M. A. (2012). Potensi bencana tsunami dan kesiapsiagaan masyarakat menghadapi bencana studi kasus Desa Sumberagung Banyuwangi Jawa Timur. *Forum Geografi*, 26(1), 17–28.
- Syarif, E., Maddatuang, M., Hasriyanti, H., & Saputro, A. (2022). Exploration of knowledge and community preparedness in flood disaster mitigation. *Geosfera Indonesia*, 7(3), 277–291.
- Tsai, M.-H., Chang, Y.-L., Shiau, J.-S., & Wang, S.-M. (2020). Exploring the effects of a serious game-based learning package for disaster prevention education: The case of battle of flooding protection. *International Journal of Disaster Risk Reduction*, 43, 101393.
- Tyas, R. A. (2020). Students perception toward their preparedness for volcanic eruption disaster. *Journal of Physics: Conference Series*, 1440(1), 12086. IOP Publishing.