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Know the Map, Avoid Danger: Geographic Information System-Based Lembang Fault Disaster Mitigation Education at Langensari 2 Elementary School

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Abstract

The community service team, comprising academics and students from STMIK Mardira Indonesia, has initiated a project focused on disaster mitigation related to the Lembang Fault for elementary school pupils at State Elementary School 2 Langensari Lembang. The Lembang region and its vicinity are susceptible to seismic threats owing to the active geological characteristics of the Lembang Fault. A lack of comprehension within the community, particularly among school-age students, about disaster risks and mitigation may exacerbate vulnerability during a disaster. This community service initiative seeks to enhance students' understanding and awareness of the potential hazards posed by the Lembang Fault through disaster mitigation education using Geographic Information Systems (GIS). The implementation methods include interactive content delivery, the introduction of digital maps of disaster-prone regions, basic earthquake-mitigation simulations, and the assessment of student comprehension before and after the activities. The application of GIS facilitates the geographical visualization of the Lembang Fault, earthquake-prone areas, and the adjacent school environment, thereby enhancing student comprehension. This initiative seeks to foster a disaster-aware culture from a young age and help mitigate catastrophe risk in elementary school environments.

Keywords: *Disaster Mitigation, Lembang Fault, Geographic Information System, Disaster Education*

Introduction

Indonesia is situated in a disaster-prone region, especially vulnerable to earthquakes, owing to its position at the intersection of four significant tectonic plates. West Java, particularly the Bandung Raya region, is characterized by a significant risk of geological disasters. The Lembang Fault is a notable potential calamity, providing explicit geological evidence and geomorphological manifestation of neotectonic activity in the Bandung Basin. The Lembang Fault is located on the Lembang Plateau and was formed by a catastrophic eruption of Mount Sunda roughly 105 years ago. During that period, Mount Sunda's elevation was estimated at approximately 4,000 meters above sea level. The eruption was so intense that two-thirds of the mountain disintegrated, creating the Lembang Fault. The Geotechnical Research Center of LIPI states that the Lembang Fault extends 29 kilometers and crosses with the Cimandiri Fault in the Padalarang district of West Bandung Regency. The Lembang Fault originates in Cimeta, Padalarang, and extends eastward through Cimahi and Lembang, traversing 26 villages before terminating at the western slope of Mount Manglayang. The documented displacement rate of the Lembang Fault is 3 millimeters per year. BMKG indicates that the Lembang Fault has the potential to generate earthquakes with magnitudes ranging from 6.8 to 7, occurring approximately every 170 to 670 years. Seismic activity along the Lembang Fault will result in landslides in the Bandung region.

Elementary school is an educational establishment that offers six years of instruction for children aged 6 years (Ma'sumah et al., 2servesctions as a hub of community engagement, particularly for school-age children who are ldren susceptible to the effects of disasters. Elementary children possess constraints in comprehending disaster risks and suitable mitigation measures. Disaster mitigation

encompasses a range of risk-reduction strategies, including physical infrastructure improvements and awareness-raising campaigns to bolster preparedness against disaster hazards. Mitigation primarily aims to diminish or avert casualties and losses, focusing on proactive measures taken before a disaster, notably through a range of activities referred to as mitigation (Suciati et al., 2022). Nonetheless, in the absence of sufficient education, students may remain ill-prepared. Preliminary assessments indicate that pupils at State Elementary School 2, Langensari, have limited comprehension of the earthquake risks associated with the Lembang Fault and the corresponding mitigation strategies, particularly regarding spatial awareness and practical preparedness.

To date, disaster prevention education in primary schools has predominantly been delivered through traditional methods such as lectures and written materials, rendering it less engaging and challenging for pupils to understand. This method has inadequately incorporated essential spatial elements necessary for catastrophe awareness, including fault sites, disaster-prone areas, and evacuation routes. Early spatial comprehension might help kids recognize their environment and enhance their awareness of disaster threats.

Geographic Information Systems (GIS) are computer-based systems that input, maintain, alter, analyze, and generate descriptions of data. Moreover, GIS serves as an essential tool for collecting, storing, retrieving, and presenting geographic data from real-world settings (Dharmawan, 2023). In crisis scenarios, GIS efficiently maps hazard zones, assesses risks, and formulates location-specific mitigation solutions. Its ability to amalgamate data from diverse sources to produce information facilitates decision-making.

Under these circumstances, there is a need for community service initiatives focused on disaster mitigation education using GIS for students at State Elementary School 2, Langensari. This program aims to improve

students' comprehension, awareness, and readiness concerning seismic disaster risks through a contextual, visual, and participatory instructional methodology. This approach enhances disaster literacy in schools and helps mitigate disaster risk from a young age.

Method

The community service initiative by lecturers and students from STMIK Mardira Indonesia began educating on disaster mitigation related to the Lembang Fault at the state elementary school Negeri 2 Langensari in Lembang District, West Bandung Regency, West Java. The teaching centered on the Lembang Fault, elucidating its characteristics and examining historical seismic activity in the Lembang region, highlighting the potential hazards of earthquakes and landslides. Participants were apprised of the effects, mitigation techniques, rescue operations, and disaster responses, as well as information on hazard maps and at-risk zones related to the Lembang Fault.

The presenting approach sought to educate children on identifying hazards during an earthquake and on the measures required to reduce risks when the Lembang Fault occurs. The process included discussions and a question-and-answer session. Discussion is a pedagogical approach that promotes the exchange of ideas, views, and information among participants and facilitators. This strategy aims to cultivate critical thinking, communication, and teamwork skills and can be used in numerous formats, including small-group discussions, class discussions, or debates. Consequently, the discussion approach serves as an effective tool for fostering interactive and participatory activities (Ruslandi et al., 2025). This method sought to improve comprehension and alleviate uncertainties or misunderstandings concerning the offered material.

Following these discussions, interviews were conducted to evaluate the children's comprehension of the Lembang Fault disaster mitigation education, enabling educators to modify their instructional approach to align with the students' knowledge and understanding at the state elementary school Negeri 2 Langensari. Interviews, a method for collecting

information or data from individuals or groups, may occur verbally or in writing and can be administered by a single interviewer or a panel of interviewers (Merti Paensi et al., 2023). Following the completion of the interviews, simulations were conducted to prepare for probable earthquakes, including the goods to include in a backpack and methods for self-protection during a disaster.

Results and Discussion

On December 3, 2025, we secured authorization. We submitted a notice letter from research and community service institutions, STMIK Mardira Indonesia, to the Principal of SD Negeri 2 Langensari to conduct a community service event for the institution's sixth-grade students. A student body representative submitted the authorization letter to the school, which was favorably accepted by the authorities. This was a preliminary action to initiate operations, as effective administration is anticipated to ensure the seamless execution of this community service event.

On January 14, 2026, faculty and students from STMIK Mardira Indonesia conducted a community service initiative in accordance with their dedication to the Tri Dharma of Higher Education. This program aimed to enhance the community by delivering educational outreach on disaster mitigation related to the Lembang Fault through Geographic Information Systems (GIS) to sixth-grade students at SD Negeri 2 Langensari in Lembang District, West Bandung Regency, West Java.

Figure 1. Location of Community Service Activities

The outcomes of the community service effort, especially for the sixth-grade kids, indicated that they became more prudent and consistently alert to the hazards associated with the Lembang Fault. The sixth graders of State Elementary School 2, Langensari, demonstrated remarkable engagement and participation, ensuring the event proceeded seamlessly from start to finish. This document outlines the implementation of community service for sixth-grade students at State Elementary School 2, Langensari.

Figure 2. Implementation of Joint Activities with Grade 6 Students of Langensari 2 Public Elementary School

Figure 3. Implementation of Material Presentation

After the lecture, we conclude the session with discussions, interviews, and simulations that engage many students. We undertake these actions to ensure the audience comprehensively understands the topic and to address any outstanding questions. These conversations, simulations, and interviews significantly enhance the learning experience. The subsequent photographs depict the ongoing sessions.

Figure 4. Discussion, Simulation and Interview

Conclusion

A community service team, including academics and students from STMIK Mardira Indonesia, instructed sixth-grade pupils at State Elementary School 2 Langensari, Lembang, West Bandung Regency. The team diligently executed each phase of the process, from acquiring school licenses and presenting papers to facilitating conversations, simulations,

and interviews. The team leader and colleagues successfully executed the program, garnering favorable feedback from all participants.

This program enhanced students' understanding of the importance of remaining vigilant about the Lembang Fault disaster, particularly given that their residences are located near the fault line. They also put in place basic preparedness measures to ensure their readiness for any potential natural disasters.

The community service initiative at State Elementary School 2 Langensari, entitled 'Know the Map, Avoid the Danger: GIS-Based Mitigation Education for the Lembang Fault,' yielded several significant conclusions. The project substantially expanded the sixth-graders' understanding of disaster awareness and prevention. Moreover, the pupils demonstrated heightened preparedness for potential disasters and an enhanced ability to share this knowledge with their parents. Ultimately, we all persist in hoping that the Lembang Fault catastrophe never transpires.

References

Dharmawan, E. A. (2023). Perancangan Sistem Informasi Geografis Penyebaran Daerah Zonasi Mangrove Di Pulau Ambon. *Jurnal ELKO (Elektrikal Dan Komputer)*, *4*(1), 283–290. https://doi.org/10.54463/je.v4i1.75

Ma'sumah, Aini, S. N., & Oktaviana, A. W. (2024). Tri Pusat Pendidikan Sebagai Sarana Pendidikan Karakter Anak Sekolah Dasar. *Buletin Pengabdian Multidisiplin*, *2*(1), 09–19. https://doi.org/10.62385/budimul.v2i1.87

Merti Paensi, Mair, Z. R., Indah Permatasari, & Muhammad Ikhwan Jambak. (2023). Analisis Penggunaan Aplikasi E-Sumsel dalam Pembuatan Surat Tugas dan Taksasi SPPD Pada Badan Pengelola Keuangan dan Aset Daerah Provinsi Sumatera Selatan. *Jurnal Software Engineering and Computational Intelligence*, *1*(2), 101–106. https://doi.org/10.36982/jseci.v1i2.3575

Qolbi, A.-Z. A., Deviani, C. N. P., Aditya, D., & Sutisna, V. C. A. P. (2024). Pengaruh Sosialisasi Mitigasi Bencana Sesar Lembang terhadap Pemahaman Risiko dan Mitigasi Bencana pada Remaja di Zona Sesar Lembang. *Jurnal Pendidikan Non Formal*, *1*(4), 8. https://doi.org/10.47134/jpn.v1i4.566

Ruslandi, U., Qomariyah, S., & Sumitra, M. (2025). *Peran Metode Pembelajaran Diskusi dalam Menciptakan Keaktifan Belajar Siswa di MAS Tarbiyatul Islamiyah*. *2*.

Suciati, R., Mahardani, A., & Kristiana, D. (2022). 4811-19351-2-Pb. *JurnalDimensiPendidikandanPembelajaran*, *10*(Mitigasi Bencana untuk Menumbuhkan Karakter Peduli Lingkungan pada Anak Usia Dini).