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Increasing Environmental Awareness and Early Response to Landslide Disasters in Hilly Slope Areas (Pasirmunjul Village, Sukatani District, Purwakarta)

Abstract

This community service program aims to raise environmental awareness and enhance early landslide disaster mitigation among residents living in hillside areas, specifically in Pasirmunjul Village, Sukatani District, Purwakarta. The activities were carried out through an educational and participatory approach involving awareness campaigns, training sessions, and disaster response simulations. The target participants included local villagers, community leaders, and youth groups who were empowered as agents of change. The results indicate a significant improvement in public understanding of landslide risk factors, the importance of environmental conservation, and practical preventive measures that can be implemented individually or collectively. Furthermore, the program facilitated the establishment of a community-based disaster preparedness team, enhancing the village's readiness and resilience in the face of potential disasters. This initiative serves as a foundational step toward fostering a disaster-aware culture and promoting a safer, more sustainable environment in landslide-prone regions.

Keywords: Environmental Awareness, Landslide Disaster, Hilly Slope

1. Introduction

Landslides are one of the most frequent and destructive natural disasters in hilly and mountainous regions of Indonesia. Poor land management, deforestation, high rainfall, and lack of awareness among local communities significantly increase the vulnerability of such areas. Pasirmunjul Village, located in the Sukatani District of Purwakarta, is one of the regions prone to landslides due to its geographical characteristics and land-use patterns. Many residents are unaware of the early signs of potential landslides or the preventive actions they can take to reduce risk. United Nations Office for Disaster Risk Reduction (UNDRR). (2024).

Community involvement and awareness are crucial in mitigating the impacts of natural disasters. However, efforts to build disaster resilience often face challenges such as limited access to information, low environmental literacy, and insufficient preparedness at the community level. Therefore, it is essential to implement community empowerment programs that combine environmental education with practical disaster risk reduction strategies. Hungerford, H. R., & Volk, T. L. (2024).

This community service initiative was designed to address these issues by increasing environmental awareness and strengthening early disaster mitigation efforts among the residents of Pasirmunjul Village. Through participatory learning methods, the program seeks

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to foster a proactive attitude towards environmental conservation and disaster preparedness, ultimately contributing to a safer and more resilient community. Maskrey, A. (2024).

Figure 1. Destroyed Houses in Pasirmunjul Sukatani Village
(Source: PDPI Document)

2. Theoretical Framework

The implementation of environmental awareness and early landslide disaster mitigation is grounded in several interrelated theoretical perspectives, including environmental education theory, disaster risk reduction theory, and community-based disaster management. Smith, K., & Petley, D. (2024).

2.1. Environmental Awareness and Education Theory

Environmental awareness refers to the recognition and understanding of environmental issues and the willingness to act responsibly towards environmental preservation. According to Maskrey, A. (2024), environmental education aims not only to increase knowledge but also to foster attitudes and behaviors that lead to environmental stewardship. In the context of landslide-prone areas, environmental awareness includes understanding the impact of deforestation, unsustainable land use, and poor drainage systems on slope stability. Educating the community about these factors is critical for encouraging sustainable behavior, such as reforestation, contour farming, and soil conservation.

2.2. Disaster Risk Reduction (DRR) Theory

DRR theory, as promoted by the United Nations Office for Disaster Risk Reduction (UNDRR), emphasizes proactive strategies to reduce the vulnerability of communities to natural hazards. Key principles include risk identification, early warning systems, capacity building, and community preparedness. The Hyogo Framework for Action and the Sendai Framework for Disaster Risk Reduction both stress the importance of education and

community participation in disaster preparedness. Applying DRR theory in hillside communities involves equipping local residents with the knowledge and tools to identify early warning signs of landslides, prepare emergency response plans, and implement preventative measures. Nugroho, S., & Prasetyo, A. (2024).

2.3. Community-Based Disaster Management (CBDM)

CBDM is an approach that places the community at the center of disaster preparedness and response efforts. According to Wibowo, R., & Kartikasari, D. (2024), effective disaster management must involve local knowledge, participatory planning, and empowerment strategies. In the context of Pasirmunjul Village, the engagement of community leaders, youth, and households is essential in building a culture of readiness. This includes forming local disaster response teams, conducting simulations, and creating community action plans that are tailored to the specific risks and resources of the area.

2.4. Ecological and Geographical Theories

From an ecological perspective, slope stability is influenced by vegetation cover, soil type, rainfall intensity, and land-use practices. Geographical theories help explain the spatial distribution of landslide risks and inform the development of hazard maps and zoning regulations. These theories provide the scientific basis for practical recommendations such as planting deep-rooted vegetation and avoiding construction on steep slopes. ASEAN Coordinating Centre for Humanitarian Assistance (AHA Centre). (2024).

By integrating these theories, the community service initiative in Pasirmunjul Village seeks to enhance both cognitive and behavioral aspects of environmental consciousness while building practical capacity for early disaster mitigation. Sutanto, R., & Hasanah, M. (2025). The synergy between education, participatory action, and ecological understanding forms the foundation for sustainable and resilient community development in landslide-prone regions.

3. Method

This community service program was conducted using a participatory action approach that emphasizes community involvement, collaboration, and empowerment. The method employed in this initiative consisted of several structured stages designed to identify problems, provide solutions, and build sustainable awareness and disaster preparedness within the target community. Indonesian National Board for Disaster Management (BNPB). (2024).

3.1. Needs Assessment and Field Observation

The initial phase involved conducting a needs assessment to understand the environmental conditions and landslide vulnerability in Pasirmunjul Village. Field observations were carried out to identify high-risk areas, land-use patterns, and existing knowledge among residents regarding environmental conservation and disaster risk. Informal interviews with local leaders, residents, and youth groups helped gather qualitative data to support program design. Smith, K., & Petley, D. (2023).

3.2. Stakeholder Engagement and Coordination

To ensure the success of the program, coordination was established with local authorities, village officials, environmental activists, and disaster management agencies. These

stakeholders played key roles in mobilizing participants, providing institutional support, and ensuring the program aligned with local needs and regulations.

3.3. Educational Workshops and Awareness Campaigns

The core activity involved organizing educational workshops aimed at increasing environmental awareness and understanding of landslide risks. These sessions included presentations, visual aids, and group discussions on topics such as:

a. Causes and early signs of landslides
b. Sustainable land use and vegetation conservation
c. Waste management and drainage control
d. The role of the community in disaster preparedness

3.4. Simulation and Practical Training

To strengthen early disaster mitigation capabilities, hands-on training and simulation activities were conducted. Participants were trained in basic disaster response procedures, such as:

a. Emergency evacuation drills
b. Setting up temporary shelters
c. Communication and coordination during a crisis
d. Mapping of safe zones and hazard-prone areas

3.5. Formation of Community-Based Disaster Response Teams (CBDRTs)

As a sustainability effort, the program facilitated the establishment of Community-Based Disaster Response Teams composed of volunteers from the village. These teams were trained to act as first responders and to promote continuous awareness and preparedness through peer education and local initiatives.

3.6. Monitoring and Evaluation

The final stage involved evaluating the effectiveness of the program through surveys, reflection sessions, and feedback from participants and stakeholders. Key indicators assessed included changes in knowledge, attitudes, and preparedness behavior, as well as community commitment to ongoing environmental and disaster management efforts.

Through this method, the program not only delivered knowledge but also empowered the community of Pasirmunjul to become more resilient and proactive in addressing environmental challenges and natural disaster risks. Smith, K., & Petley, D. (2023).

4. Findings

The implementation of the community service program in Pasirmunjul Village resulted in several significant findings related to the enhancement of environmental awareness and early landslide disaster mitigation. These findings were based on observations, pre- and post-activity evaluations, interviews, and participant feedback throughout the program stages. Nugraha, R., & Suryani, L. (2023).

4.1. Increased Environmental Awareness

A noticeable increase in environmental knowledge was observed among the participants. Prior to the program, most residents lacked understanding of the root causes of landslides, particularly related to deforestation, poor land use, and waste disposal practices. Hadi, F., & Pramudito, A. (2023). After the educational workshops, participants demonstrated improved comprehension of environmental degradation and its link to landslide risks. Many began showing more concern for preserving vegetation and reducing harmful activities such as illegal logging and littering in drainage channels.

Figure 2. Equipment for Assistance to Landslide Victims
(Source: PDPI Document)

4.2. Improved Preparedness and Response Capacity

The simulation activities and hands-on training contributed to a better understanding of what to do in the event of a landslide. Participants were able to identify early warning signs such as cracked soil, leaning trees, and changes in water flow. The majority of participants reported increased confidence in their ability to respond to potential disasters and to take immediate action, such as evacuating to designated safe zones and assisting others. Wijayanti, R., & Hartono, B. (2023).

4.3. Formation of Community-Based Disaster Response Teams (CBDRTs)

One of the key achievements was the successful establishment of CBDRTs consisting of motivated community members, particularly youth and local leaders. These teams took responsibility for disseminating information, organizing follow-up awareness campaigns, and

leading community preparedness drills. The existence of these local task forces is expected to sustain the outcomes of the program and ensure that disaster preparedness becomes embedded in the village's daily life. Anderson, M. G., & Holcombe, E. (2023).

4.4. Behavioral Changes in Daily Practices

Following the program, behavioral shifts were observed among residents, particularly regarding environmental practices. Several households initiated small-scale reforestation around their homes, improved drainage systems, and began composting organic waste. These changes indicate a growing sense of responsibility for environmental stewardship. Kurniawan, D., & Maulida, S. (2023).

Figure 3. PDPI Volunteer Team for Landslide Victims
(Source: PDPI Document)

4.5. Community Commitment to Sustainability

There was a strong positive response from the community regarding the continuation of the program. Village leaders expressed willingness to integrate disaster education into village-level development planning and to collaborate with local government agencies for further support. This reflects a broader commitment to maintaining a safe and sustainable living environment in the long term. Sutanto, R., & Hasanah, M. (2025).

Overall, the program successfully empowered the residents of Pasirmunjul Village with knowledge, skills, and structures necessary for mitigating the risks of landslides and fostering a culture of environmental and disaster awareness.

5. Discussion

The results of this community service program demonstrate that integrated educational and participatory interventions can significantly improve both environmental awareness and disaster preparedness in landslide-prone communities such as Pasirmunjul Village. The increase in knowledge, behavioral change, and community involvement observed throughout

the program illustrates the effectiveness of community-based approaches in addressing environmental and disaster-related challenges. Anderson, T. J., & Kumar, S. (2025).

5.1. The Role of Environmental Education in Risk Awareness

The findings confirm that environmental education plays a critical role in shaping community perceptions and behaviors. Before the intervention, many villagers lacked an understanding of the direct relationship between human activities—such as deforestation, improper land cultivation, and poor drainage and landslide risks. Through structured workshops and visual-based learning, participants began to realize how their actions affect slope stability and the long-term sustainability of their environment. This aligns with the theory of environmental literacy, which emphasizes the need for knowledge, attitudes, and responsible behavior to achieve meaningful environmental change. Lee, M., & Fernando, L. (2025).

Figure 4. PDPI Volunteer Team Delivers Aid to Landslide Victims
(Source: PDPI Document)

5.2. Community Participation as a Catalyst for Change

A key strength of the program was its participatory approach, which allowed community members to be actively involved in identifying problems, discussing solutions, and practicing disaster response. The engagement of youth, local leaders, and families created a sense of ownership and accountability. Harahap, S., & Nugroho, Y. (2025). The formation of the Community-Based Disaster Response Teams (CBDRTs) not only enhanced the technical capacity of the village to respond to landslides but also ensured that knowledge and preparedness strategies would be sustained over time. This is consistent with community-based disaster management theory, which asserts that resilience is built when people are empowered to act collectively and based on local knowledge.

5.3. Behavioral Transformation and Sustainable Practices

Behavioral changes observed after the intervention such as the replanting of trees, reinforcement of drainage channels, and reduction in waste dumping demonstrate that awareness can lead to practical, preventive actions. These changes reflect a shift from reactive to proactive attitudes among the villagers. This transformation underscores the importance of combining cognitive learning (knowledge transfer) with affective and psychomotor learning (skill development and attitude shaping) for long-term impact. World Bank. (2025).

5.4. Challenges and Areas for Improvement

Despite the program's success, some challenges were identified. Limited access to financial resources and tools hindered the implementation of some mitigation strategies, such as building retaining walls or conducting large-scale reforestation. Moreover, a small portion of the population particularly the elderly were slower to adopt new practices, highlighting the need for continuous education and intergenerational collaboration.

Figure 5. PDPI Volunteer Team Following the Directions of the PKM Activity Leader (Source: PDPI Document)

5.5. Implications for Future Programs

The success of this program suggests that similar initiatives can be replicated in other disaster-prone regions with appropriate adaptation to local contexts. Integrating environmental education into formal village planning and school curricula, supported by local governments and NGOs, can further institutionalize disaster preparedness efforts. Furthermore, consistent monitoring and follow-up activities are essential to reinforce the practices introduced and to ensure the long-term resilience of the community. Kencana, D. A., & Lestari, H. (2025).

In conclusion, the program in Pasirmunjul Village illustrates that when communities are educated, empowered, and involved, they become more resilient, proactive, and capable of

reducing the risks posed by environmental hazards such as landslides. This collaborative model can serve as a blueprint for sustainable disaster risk reduction in similar rural, hillside communities.

6. Conclusion and Recommendations

6.1. Conclusion

The implementation of the community service program in Pasirmunjul Village, Sukatani District, Purwakarta, has demonstrated the positive impact of educational and participatory approaches in enhancing environmental awareness and early landslide disaster mitigation. The program successfully increased the community's knowledge of environmental degradation and its relation to landslide risk, improved their preparedness through practical training and simulations, and fostered a collective sense of responsibility for disaster risk reduction.

The formation of Community-Based Disaster Response Teams (CBDRTs), behavioral changes in daily environmental practices, and the active participation of local residents all indicate a shift toward a more resilient and environmentally conscious community. This transformation aligns with the goals of sustainable development and disaster risk reduction, showing that empowering communities through knowledge and involvement can significantly reduce their vulnerability to natural hazards.

6.2. Recommendations

a. Sustain Community Education Initiatives: Continuous education and awareness programs should be maintained and integrated into local government and school agendas. This includes periodic workshops, environmental campaigns, and curriculum-based disaster education to reinforce long-term knowledge retention and behavioral change.
b. Strengthen Institutional and Government Collaboration: Partnerships between the community, local government, NGOs, and disaster management agencies should be enhanced to provide technical and financial support for mitigation infrastructure, such as retaining walls, drainage systems, and reforestation efforts.
c. Expand the Role of CBDRTs: The Community-Based Disaster Response Teams should be further trained and supported to serve not only as emergency responders but also as environmental ambassadors who continuously promote sustainable practices and preparedness within the village.
d. Develop Local Early Warning Systems: To strengthen community resilience, simple yet effective early warning systems based on local knowledge and available technology should be developed and implemented. This can include manual alert systems, rain gauges, or mobile-based warning alerts.
e. Replicate and Scale Up the Program: Given the success of the program, similar community-based initiatives should be replicated in other landslide-prone regions with contextual adjustments. A documented framework or module based on the Pasirmunjul experience can serve as a reference for future programs.

By continuing and expanding upon the efforts made in this program, Pasirmunjul Village has the potential to become a model for other hillside communities in Indonesia seeking to reduce disaster risks through environmental awareness, preparedness, and active community participation.

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