



Landslide Danger Socialization in High-Potential Slope Areas to Increase Public Awareness and Preparedness

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Abstract

Landslides are one of the most common natural disasters in mountainous and sloping areas in Indonesia. Communities living in high-risk slope areas often have limited knowledge about landslide hazards and mitigation strategies. This community service program aimed to increase community awareness and preparedness through landslide hazard socialization activities in areas with high landslide potential. The program was implemented using participatory methods consisting of educational lectures, discussions, visual demonstrations, and field observations. Participants included community members living in hillside settlements. The results of the program showed an increase in community understanding of landslide causes, early warning signs, and emergency response strategies. Participants also became more aware of the importance of environmental management, such as maintaining vegetation cover and avoiding excessive land excavation. In addition, the program encouraged community participation in disaster preparedness efforts at the local level. In conclusion, landslide hazard socialization is an effective approach to improving community awareness and strengthening disaster preparedness in slope areas with high landslide potential.

Keywords

landslide hazard, disaster mitigation, community awareness, slope area, socialization

INTRODUCTION

Indonesia is geographically located in a region with high geological and climatic activity, making it vulnerable to various natural disasters, including landslides. Landslides are one of the most frequent disasters occurring in mountainous and hillside regions, particularly during the rainy season when soil saturation increases and slope stability decreases (Froude & Petley, 2018). The occurrence of landslides is influenced by several factors such as soil characteristics, slope angle, rainfall intensity, and human activities including deforestation and land-use change (Arifin et al., 2021).

In many rural areas of Indonesia, communities often inhabit steep slope areas due to limited land availability. While these areas provide agricultural opportunities and residential space, they also increase exposure to landslide hazards. According to the Indonesian Disaster Risk Index, many regions in Indonesia are categorized as high-risk landslide zones (BNPB, 2023). Landslides can result in severe impacts such as infrastructure damage, loss of property, and threats to human life.

Research shows that landslides frequently occur in regions where environmental management practices are inadequate, such as excessive land clearing and poor drainage systems (Van Westen et al., 2017). Environmental degradation significantly reduces slope stability and increases the potential for landslide disasters (Putra & Rahman, 2020). Therefore, environmental conservation efforts such as maintaining vegetation cover and proper land management are essential to reduce landslide risks.



Besides environmental factors, limited community awareness also contributes to the high vulnerability of communities living in landslide-prone areas. Many residents are not familiar with early warning signs of landslides, such as cracks in the soil, tilted trees, and unusual water flow patterns (Sudibyakto, 2018). Without proper knowledge and preparedness, communities may fail to take preventive measures or respond effectively during disaster events.

Disaster risk reduction efforts increasingly emphasize the importance of community participation in disaster preparedness programs. Community-based disaster risk reduction approaches aim to empower communities with knowledge and skills necessary to identify risks and take preventive actions (Rahman & Sakurai, 2019). Educational programs and socialization activities have proven effective in improving community awareness and disaster preparedness in vulnerable areas (Hidayat et al., 2020).

In addition, disaster education plays a crucial role in strengthening community resilience. Studies indicate that communities with better knowledge of disaster risks are more capable of implementing mitigation strategies and responding appropriately during emergency situations (Achour & Price, 2019). Public awareness programs can also encourage behavioral changes related to environmental management and disaster preparedness.

Based on these considerations, socialization programs related to landslide hazards are necessary to increase public awareness, particularly for communities living in slope areas with high landslide potential. Through educational activities and participatory discussions, communities can better understand landslide risks, recognize early warning signs, and adopt preventive measures to minimize disaster impacts.

METHOD

This community service program applied a participatory educational approach aimed at improving community awareness and preparedness regarding landslide hazards. Community participation is considered an important component in disaster risk reduction because local communities are the first actors who respond to disaster situations (Rahman & Sakurai, 2019).

Program Design

The program was designed as a community-based disaster education activity focusing on landslide hazard awareness. The design integrates educational sessions, discussions, and field observations to provide both theoretical understanding and practical knowledge related to landslide risks. Educational interventions such as socialization and training activities are effective strategies for improving community preparedness in disaster-prone areas (Hidayat et al., 2020).

Location and Participants

The activity was conducted in a community located in a slope area with high landslide potential. Participants consisted of local residents, community leaders, and youth groups who live and carry out daily activities in the hillside environment. Communities living in mountainous regions often face higher disaster risks due to geographical conditions and environmental pressures (Van Westen et al., 2017).



Needs Assessment

Prior to program implementation, preliminary observations and informal interviews were conducted to identify community needs and challenges related to landslide hazards. The assessment revealed limited knowledge regarding the causes of landslides and the early warning signs that may indicate slope instability. Such conditions are common in rural communities where disaster education programs are still limited (Sudibyakto, 2018).

Implementation Stages

The implementation of the program consisted of several stages:

1. Preparation Stage

Coordination was conducted with community leaders to determine the activity schedule and location. Educational materials related to landslide hazards and mitigation strategies were also prepared based on relevant disaster risk reduction literature (Achour & Price, 2019).

2. Socialization Stage

Educational sessions were conducted through presentations and discussions explaining the causes of landslides, environmental risk factors, and early warning signs of potential landslides. Knowledge dissemination is considered a key component in improving disaster awareness (Froude & Petley, 2018).

3. Demonstration and Discussion Stage

Facilitators used visual materials to illustrate how landslides occur and how environmental degradation such as deforestation can increase landslide risks (Putra & Rahman, 2020).

4. Field Observation Stage

Participants were invited to observe surrounding slope conditions to identify potential landslide indicators such as soil cracks, steep slopes without vegetation cover, and blocked drainage channels. Environmental assessment at the local level helps communities better understand disaster risks in their own surroundings (Arifin et al., 2021).

Data Collection

Data were collected through participant observation, documentation of activities, and feedback from participants during discussions. These data were used to evaluate changes in community knowledge and awareness regarding landslide hazards and mitigation strategies.

Evaluation

Program evaluation focused on assessing improvements in participants' understanding of landslide risks, early warning signs, and preventive environmental practices. Increased awareness and behavioral changes toward environmental conservation are important indicators of successful disaster education programs (Achour & Price, 2019).



RESULTS

The landslide hazard socialization program was implemented successfully with active participation from community members living in slope areas with high landslide potential. Participants consisted of residents, community leaders, and youth representatives who have direct interaction with the environmental conditions of the hillside area. The majority of participants expressed concern regarding the possibility of landslides, especially during periods of heavy rainfall.

Prior to the implementation of the socialization activity, most participants had limited understanding of landslide hazards. Many community members believed that landslides were caused solely by heavy rainfall. However, during the educational session participants learned that landslides occur due to the interaction of multiple factors such as soil structure, slope steepness, vegetation cover, and human activities such as land clearing and uncontrolled construction. This finding supports previous studies which state that landslide occurrences are influenced by both natural and anthropogenic factors (Arifin et al., 2021)

During the educational session (Picture 1), participants were introduced to the concept of early warning signs of landslides. These signs include cracks on the ground surface, tilting trees, unusual water seepage from slopes, and changes in soil structure. Many participants reported that they had previously observed similar environmental changes but did not recognize them as indicators of potential landslide hazards. This condition shows that limited environmental awareness often increases disaster vulnerability in rural communities (Sudibyakto, 2018).



Picture 1. Landslide hazard socialization activity for community members

The use of visual presentations and interactive discussions helped participants understand landslide mechanisms more clearly. Participants were able to relate the presented information with real environmental conditions in their village. This learning approach proved effective in increasing community awareness because it connected theoretical knowledge with practical observations.



Educational activities that combine explanation and visual demonstration are considered effective in improving disaster risk understanding among communities (Hidayat et al., 2020).

Another important outcome of the program was the increased awareness of environmental conservation. Participants realized that maintaining vegetation on slope areas plays a significant role in preventing landslides. Vegetation roots help strengthen soil structure and reduce erosion caused by rainwater infiltration. Environmental degradation such as deforestation and excessive land excavation significantly increases landslide risks (Putra & Rahman, 2020).

Field observation activities also contributed significantly to participant understanding. During the field session, participants were invited to identify potential landslide risk indicators around their residential area. Several locations were identified as potentially hazardous due to steep slopes, limited vegetation cover, and blocked drainage systems. Through this observation process, participants gained direct experience in recognizing environmental conditions that may trigger landslides.

Community participation during discussions also showed a positive response toward disaster mitigation efforts. Some participants suggested that the community should initiate collective actions such as replanting trees on vulnerable slopes and maintaining drainage channels. This initiative reflects the development of community awareness and responsibility toward environmental safety.



Picture 2. Example of landslide disaster used as educational material

The results of this activity are consistent with the concept of community-based disaster risk reduction which emphasizes the importance of empowering local communities to actively participate in disaster mitigation activities. When communities understand disaster risks and preventive strategies, they are more likely to implement sustainable environmental practices and respond effectively during disaster events (Rahman & Sakurai, 2019).



Furthermore, disaster education programs have been proven to strengthen community resilience by improving knowledge, preparedness, and risk perception. Communities that are well-informed about disaster hazards tend to be more prepared to face emergency situations and can minimize disaster impacts (Achour & Price, 2019).

In the broader context of disaster risk management, socialization activities such as this program play an important role in bridging the gap between scientific knowledge and community practices. While many studies have identified landslide risk factors and mitigation strategies, the dissemination of this knowledge to local communities is often limited. Therefore, educational outreach programs are essential to ensure that scientific knowledge can be applied at the community level.

Despite the positive outcomes of the program, several challenges were identified during implementation. Some participants indicated that environmental conservation efforts require strong community cooperation and support from local authorities. Additionally, continuous educational activities are needed to ensure that disaster awareness remains a priority among community members.

Overall, the results of this program demonstrate that landslide hazard socialization activities can effectively improve community knowledge, awareness, and preparedness in slope areas with high landslide potential. Through participatory education and field observation, communities become more capable of recognizing environmental risks and implementing preventive measures to reduce landslide hazards..

CONCLUSIONS

This community service program successfully increased community awareness and understanding of landslide hazards in slope areas with high landslide potential. The socialization activities provided participants with knowledge about landslide causes, early warning signs, and preventive measures. Through discussions and field observations, residents became more aware of environmental factors that influence slope stability. The program also encouraged community participation in disaster mitigation efforts, including maintaining vegetation cover and improving drainage systems.

Therefore, community-based landslide hazard education can be considered an effective strategy for strengthening disaster preparedness in vulnerable slope areas. Future programs are recommended to include regular training, community disaster simulations, and collaboration with local disaster management agencies to further enhance community resilience.

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