ENHANCING COMMUNITIES MITIGATION CAPABILITY AGAINST LANDSLIDE DISASTER

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A. Introduction

Indonesia is a country that is prone to landslides. Every year, Indonesia seems to be a country with many landslides records. This is evidenced by the BNPB (2021) which shows that landslides are the second most common geological natural disaster in Indonesia after floods in 2021.

Gorontalo Province is one of the provinces located in the northern part of the Sulawesi Island, where 43% of the land constituents are generally hills and mountains (Patuti et al., 2017; Suma et al., 2020). By looking at the morphological percentage, it is not uncommon for Gorontalo Province to experience many landslide disaster events (Usman et al., 2018; Manyoe et al., 2020; Usman et al., 2020; Suma et al., 2020).

The many historical landslide disasters that have occurred in Indonesia, especially in the Gorontalo Province, have resulted in large casualties and property losses. To minimize this, a good landslide disaster management and mitigation process is needed. So far, landslide disaster mitigation is often underestimated and considered not a priority by the community. Therefore, an understanding of the management and mitigation of landslides needs to be understood and controlled by all groups, including government, society and the private sector.

B. Discussion

Increasing the ability of landslides mitigation for communities in Gorontalo Province can be carried out in various ways, including by conducting education/socialization, training/workshops, disaster simulations and building LEWS infrastructure (Landslide Early Warning System)

1. Enhancing the Community's Mitigation Capability through Landslide Disaster Socialization

Increasing the knowledge to be aware of landslide disaster precautions can be done by socializing to educate the public. The socialization of landslide disasters has important benefits, such as a reminder as well as a measurement for the society that the importance of mitigation will not rule out the possibility that the impact of a disaster will be lost and at least reduce the risk of a disaster.

In its implementation, the delivery of socialization materials can be done using audio and visual media, with teaching media in the form of infographics, videos, and material reading. In the learning process, the community is encouraged to actively ask and answer oral questions. Another method of delivering socialization is the play-learning approach so that during the learning process, the socialization material can be better absorbed. Then after it finishes, the evaluation stage needs to be carried out to the recipient of the socialization. Evaluation is carried out by comparing the knowledge and understanding of the community, before and after the landslides mitigation socialization.

2. Enhancing the Community's Mitigation Capability through Training and Workshops on Landslide Disasters

Training according to Sumantri (2000) is a short-term educational process that uses systematic and organized methods and procedures. Trainees will learn practical knowledge and skills for specific purposes. Training or workshops on landslide disasters is a debriefing activity that aimed to train the community in the prevention and management of landslide disasters.

Landslide disaster training or workshops can be conducted in various models, including disaster prevention training (pre-disaster) and disaster management training (post-disaster). Pre-disaster training can be carried out with the following activities: 1) Training for the community to plant plantations for preventing the erosion from causing landslides on slopes prone to landslides, 2) Training for the community on reducing the level of steepness of surface slopes and groundwater, 3) Construction training retaining structures, anchors and pilling, 4) Training on making retaining embankments for rock falls. 5) Training on making strong gutters to drain rainwater.

Apart from disaster prevention training (pre-disaster), disaster management training (post-disaster) must also be provided to the community in order to help the recovery process (recovery) from a disaster. The training activities that can be carried out after a disaster include;

a) Relocation Training

Training to relocate community housing is quite important. Relocation is carried out when an area cannot be tolerated because it is prone to disasters or the potential for a very large disaster that can affect people's lives for a long period of time

b) Rehabilitation Training

Rehabilitation training for the community is carried out to increase the capacity of the community during a post-disaster period to rebuild and repair houses, buildings and similar structures that meet technical standards for architectural planning by taking into account the potential for disaster risks that have been determined by the competent authority and in accordance with spatial and regional planning.

c) Reconstruction Training

Reconstruction in question is the development of additional post-disaster infrastructure to minimize impacts and how it will cope with future landslide disasters. Reconstruction training can be said to be the same as the pre-disaster training stage, however, reconstruction training is applied to areas that have not been trained in building anti-landslide infrastructure at all.

3. Enhancing the Community's Mitigation Capabilities through Simulation of a Landslide Disaster

Simulation is an imitation of the actual operation in the real world (Tumbol & Poli, 2014). In other words, simulation activities are activities that are created as if they are real activities with the intention of testing something. Landslide disaster simulation can be in the form of direct introduction in the field of signs of a landslide disaster. This disaster simulation can also use supporting tools in detecting disasters such as LEWS (Landslide Early Warning System). The community will later know the actions to be taken step-by-step when a disaster occurs.

This landslide simulation activity encourages the capacity building of residents and village/sub-district governments to take anticipatory action against disasters. This simulation activity also provides community and village government skills in dealing with disasters. The residential environmental infrastructure components that have been built will also be tested through this activity.

4. Enhancing the Community's Mitigation Capability through the Establishment of a Landslide Early Warning System

Landslide early warning system (LEWS) is a cost-effective way to reduce risks with low environmental and economic impacts (Intrieri et al., 2012). Efforts to minimize casualties and material losses caused by landslides can be done by installing landslide early warning tools. The way the landslide early warning system works in general is to notify the real condition of an area when a landslide disaster will occur by sending information through certain media which will later spread to the community (Fig. 1).

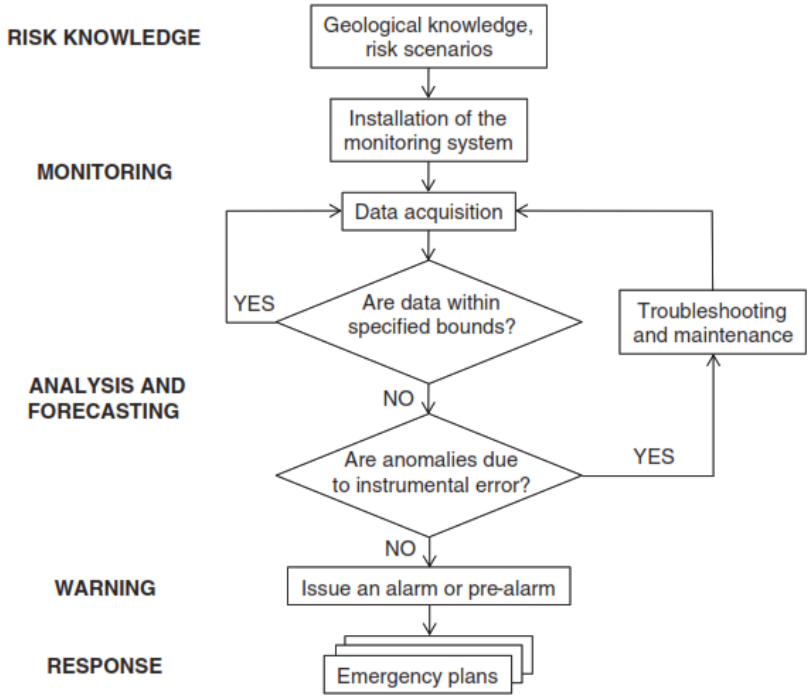

Figure 1 General Flowchart of Disaster Early Warning System (Dibiagio and Kjekstad, 2007).

The implementation of a landslide warning system is urgently needed in areas prone to ground movement processes, such as example in Gorontalo Province. There is a need for LEWS integration at each point of landslides which can have a fatal impact on the community. With the integration of LEWS at several landslide points, economic losses, obstruction of transportation speed for a long time and loss of life due to landslides that occur every year can be avoided.

5. Enhancing the Community's Landslide Disaster Mitigation Capability During the Covid-19 Pandemic

In March 2020, Indonesia became one of the countries affected by the Covid-19 disaster that occurred around the world. Gorontalo Province is also an area exposed to Covid-19. This incident caused the government to also issue an appeal to the public to work from home, urging for all forms of community activities to be carried out from home.

Learning activities, socialization/workshops and simulations regarding face-to-face landslide disaster mitigation inevitably cannot be implemented. This, of course, requires the application of new methods to increase the community's mitigation capacity to deal with landslides during a pandemic. The methods referred to are methods that use the in-network system to convey the issues of landslide disaster mitigation to the community, without any physical contact.

In-Network implementation to increase public awareness of landslides is the right step to take in the current pandemic situation. Examples of in-network applications in improving community mitigation against landslide disasters can be used with interactive media, such as the application of teleconferences in delivering landslide socialization, training/workshops on landslide disaster preparedness through YouTube tutorial vlogs as well as through virtual tours and virtual landslide disaster simulations to encourage community anticipation towards landslide disaster.

The benefits of implementing in-network (online) methods in increasing the community's mitigation capacity against landslides are quite a lot. Avoiding the coronavirus is one of the main benefits of this implementation. Other benefits are in the form of flexible time and place, cost efficiency, varied, active, creative, and independent learning, the learning materials that can be accessed repeatedly and also the public will better at understanding the importance of technology and communication in mitigating landslides hazards.

C. Conclusion

Increasing the community's capability for landslide disaster preparedness in Gorontalo Province is something that needs to be taken seriously, considering that Gorontalo Province is an area prone to landslides. Increasing the capacity for disaster mitigation can be carried out in various ways, starting from socialization, training or workshops, disaster simulations and making infrastructure for early warning of landslides.

It is very necessary to build the same perception for all parties, both government and all elements of society in all landslide disaster mitigation efforts. The implementation of disaster mitigation is carried out in an integrated and coordinated manner that involves all potentials of the government and society. All preventive efforts must be prioritized so that the damage and casualties that occur in the future can be minimized

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Glosarium

Landslide	General term for the mass movement of landforms. The process is characterized by sufficiently rapid downward slope transport to rapid gravitational pressure
Disaster	An event or series of events that threaten and disrupt the life and livelihood of the community that is caused, both by natural factors and/or non-natural factors as well as human factors, resulting in losses.
Mitigation	Efforts to reduce disaster risk, both through physical development as well as awareness and increased capacity to face disaster threats.
Preparedness	Activities to anticipate disasters through organizing, as well as through effective and efficient steps.

Biography

Muhamad Danial Suma

Born on July 9, 2000, and raised in Gorontalo City, Danial is an active 6th-semester student of the Geological Engineering study program, Universitas Negeri Gorontalo. In 2019, Danial, as a member of the team, successfully passed the funding for the Student Creativity Program for Research (PKM-PE) by the Ministry of Research, Technology and Higher Education (Kemenristekdikti) with the program title "4D Geology and Radar Image Analysis for the development of the science-tourism flood village, Ilotidea". In the PKM program, Danial as co-author with the team leader and one of his fellow members published one monograph book with ISBN and two national research journals.

In 2020, Danial as group leader along with 12 other members successfully passed the Village Development and Empowerment Holistic Program (PHP2D) and becoming Top 20 National Best Team. This program is funded directly by the Ministry of Education and Culture (Kemendikbud) and is implemented for 5 months in Botubarani Village, Bone Bolango Regency. PHP2D chaired by Danial was selected as the 20 Best National Team. In the same year, Danial participated in the Indonesian Archipelago Student Exchange Program-Credit Transfer System with Information Technology (PERMATA-SAKTI) at the Institut Teknologi Sepuluh Nopember of Technology and the virtual International Credit Transfer (TKI) program at Ehime University, Japan online for one semester.