



Disaster Resilient Village Program: Manifestation of Community-Based Disaster Risk Management and Reduction Policy

Freddy Johanis Rumambi^{1*}, Dwi Novita Sari², Diana Ari Utami³
Asmi Business and Multimedia Institute, Jakarta, Indonesia

Corresponding Author: Freddy Johanis Rumambi freddyrumambi@ibmasmi.ac.id

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ABSTRACT

The potential and risk of disasters in Indonesia over the last two decades have become a major challenge for this country. Dynamic natural activities, global climate change, and rapid urbanization have increased vulnerability to various types of natural and man-made disasters. Although this risk cannot be completely avoided, mitigation efforts, risk management and community empowerment have been carried out to reduce its impact. The Disaster Resilient Village Program is one of the Indonesian government's important efforts to reduce disaster risk and increase community resilience. Although there are still challenges and obstacles that must be overcome, this program has provided significant benefits in preparing communities to face the threat of disaster.

INTRODUCTION

Indonesia, as the largest archipelagic country in the world, located on the Pacific Ring of Fire, has very high potential and risk of disaster. Dynamic natural and geological behavior, seismic and volcanic activity and global climate change make Indonesia one of the countries most vulnerable to various types of natural and man-made disasters. (Djalante and Garschagen, 2017; Nuryana et al, 2023) One of the main factors that makes Indonesia very vulnerable to disasters is its unique geographical situation. Indonesia is located at the meeting point of three large tectonic plates: the Indo-Australian Plate, the Pacific Plate and the Eurasian Plate. The interaction between these three plates creates a very active subduction zone along the west and north coasts of Sumatra, Java, Bali and most of Nusa Tenggara. As a result, Indonesia frequently experiences strong earthquakes and volcanic eruptions.

As part of the Pacific Ring of Fire, Indonesia has more than 130 volcanoes, some of which are the most active in the world. This volcanic activity can trigger a devastating and widespread eruption of volcanoes. Indonesia also has a very long coastline, which makes it vulnerable to tsunamis. Tsunamis can be triggered by deep sea earthquakes or volcanic eruptions that occur underwater. The most tragic example is the deadly 2004 Indian Ocean tsunami, which took thousands of lives in and around Aceh (Latue et al, 2023).

Global climate change has become an additional factor that increases the risk of disasters in Indonesia. Indonesia experiences rainy and rainy seasons periodically, but this weather pattern is becoming more unstable as a result of climate change. Extreme weather, such as prolonged heavy rains or long rainy seasons, can increase the risk of floods and droughts. Floods are a frequent disaster in many regions of Indonesia, especially in urban areas that have poor drainage. Heavy rains, high seawater, and water-saturated soil can cause floods that flood settlements, damage agricultural crops, and disrupt infrastructure. Drought, on the other hand, is a serious threat to clean water supply and agriculture. Long droughts can dry up rivers and lakes, as well as reduce the availability of water for agricultural consumption and irrigation. It can have a negative impact on the economy and well-being of the people.

Apart from natural disasters, Indonesia also faces the risk of man-made disasters (Reilly, 2022). One of the main challenges is forest and land fires, which are often caused by burning forests to clear agricultural land or illegal logging activities. These forest fires produce ash rain which can pollute the air and threaten people's health. Environmental pollution is also a serious problem in several regions of Indonesia, especially in densely populated urban areas. The growth of industry and motorized vehicles produces a lot of air and water pollution which is detrimental to public health and disrupts the ecosystem. Apart from that, social conflict and political instability in several regions of Indonesia can also trigger man-made disasters. Armed conflicts, land disputes, and tensions between social groups are some examples of conflicts that can cause violence and instability.

The Indonesian government, together with various non-profit and international organizations, has been active in disaster mitigation and

preparedness efforts. The National Disaster Management Agency (BNPB) was established to coordinate disaster management efforts throughout Indonesia. The Disaster Resilient Village (KTB) program aims to build community resilience at the local level. Improving disaster-resistant infrastructure, such as earthquake-resistant buildings, has also become a priority. Public education and awareness about disasters continues to be increased through outreach campaigns, training and evacuation simulations (Ottinger, 2022). Additionally, the development of more sophisticated early warning technology and better access to disaster information has helped reduce risks to communities. Tsunami and earthquake early warning systems are increasingly efficient in providing warnings to threatened communities.

The impact of natural and man-made disasters in Indonesia is very broad. Apart from causing loss of life, disasters can also cause significant economic losses. Damage to infrastructure, loss of agricultural land, and loss of business can negatively impact economic growth. Disasters can also displace refugees, who often have to face difficult conditions in refugee camps, such as a lack of clean water and adequate medical care. The social and psychological impact can also be significant, with people experiencing trauma, loss of family and social isolation. This certainly poses a serious threat to people in various regions of Indonesia. The concept of Disaster Resilient Villages (KTB) has become a national priority to reduce the risks and impacts of these disasters.

LITERATURE REVIEW

Disaster Mitigation

Disaster mitigation is a series of actions and strategies designed to reduce the risks, impacts and vulnerabilities associated with natural or man-made disasters (Rumambi et al, 2022; Suarmika et al, 2022). Mitigation is an important component of disaster risk management which includes preventive measures, risk reduction and preparation. The main goal of mitigation is to protect human lives, physical assets, the environment and the community's economy from the threat of disaster. In this description, we will explain in detail the concept, the importance of disaster mitigation, as well as several mitigation strategies and practices used throughout the world.

Disaster mitigation is a very proactive approach in dealing with disaster risks. It focuses on the steps taken before, during, and after a disaster to reduce its negative impacts. The mitigation concept encompasses a wide range of actions that include planning, regulation, investment in disaster-resistant infrastructure, education, training and community empowerment. It is important to understand that disaster mitigation does not always mean preventing the disaster itself from occurring. Some natural disasters, such as earthquakes and volcanic eruptions, cannot be stopped or avoided. However, mitigation aims to reduce human vulnerability to these threats and minimize their impact. This involves identifying risks, assessing vulnerabilities, and developing strategies to reduce those risks (Daud et al, 2022).

The importance of disaster mitigation cannot be ignored, especially in a world that is increasingly complex and threatened by various natural and man-

made disasters. Disaster mitigation is a proactive effort intended to reduce the risks, vulnerabilities and impacts of disasters. It is a wise investment to protect human lives, physical assets, the environment, and the economy. First, disaster mitigation plays an important role in protecting human lives. Natural and man-made disasters can result in enormous loss of life if there are no appropriate mitigation measures (Houston et al, 2019; Fuady et al, 2021). By identifying risks and taking appropriate steps, we can reduce the number of fatalities that may occur in a disaster situation. For example, by building earthquake-resistant buildings, effective early warning systems, and good evacuation planning, we can increase the chances of community survival amidst the threat of disaster. This is the main reason why disaster mitigation is a priority in efforts to save human lives.

Apart from that, disaster mitigation also plays an important role in reducing economic losses. Natural and man-made disasters often result in significant physical damage to assets and infrastructure, such as buildings, roads and other critical facilities. These economic losses can damage a country's economic growth and impact the lives of society as a whole (Hansson, 2020; Loebach and Korinek, 2019). By implementing appropriate mitigation strategies, such as developing disaster-resistant infrastructure, we can reduce economic losses that may occur in disaster situations. This will help maintain economic stability and provide long-term benefits to society.

Disaster mitigation contributes to environmental maintenance. Natural disasters, such as floods and landslides, often result in significant damage to the natural environment. Polluted water, damaged forests, and disturbed ecosystems are some examples of negative impacts that can occur. By implementing sustainable mitigation practices, such as forest preservation and wise management of natural resources, we can help protect the natural environment from damage caused by disasters. This is important to maintain the sustainability of the ecosystem and ensure that we have a healthy and productive environment for future generations. Disaster mitigation also involves community empowerment. When communities are given the knowledge, training, and tools necessary to deal with disasters, they become more self-sufficient and can play an active role in protecting themselves and their neighbors. Community empowerment is an important aspect of mitigation, because trained and informed communities can respond more effectively in emergency situations. They can be part of rescue efforts, provide first aid, and collaborate in post-disaster recovery.

Disaster mitigation also reduces pressure on emergency resources and disaster management systems. When disaster risk has been reduced through mitigation measures, the pressure on rescue teams, medical equipment and evacuation facilities will be reduced. This allows these resources to be used more efficiently in real emergency situations, such as rescuing victims and post-disaster management. By reducing the impact of disasters, mitigation helps ensure that resources are available when needed which in turn can save more lives.

The importance of disaster mitigation is also visible in the current global context. Climate change has increased the frequency and intensity of natural disasters such as storms, floods and droughts. In this situation, disaster mitigation becomes increasingly important as part of climate change mitigation efforts. Actions to reduce greenhouse gas emissions and adapt to climate change are an integral part of disaster mitigation, as climate change has become an additional cause of many natural disasters. In addition, disaster mitigation requires close international cooperation. Disasters often know no national borders, and cooperation between countries is key to successful mitigation efforts (Ryan et al, 2020; Rumambi and Sari, 2023). Information exchange, joint training, and assistance in emergency situations are some examples of ways countries can work together to face the threat of disaster. By increasing international cooperation on mitigation, we can increase the effectiveness of mitigation efforts and protect more people around the world.

Disaster Resilient Village

Disaster Resilient Village (KTB) is a concept and program developed in Indonesia to increase community resilience and preparedness in facing natural and man-made disasters (Oktari, 2019; Luahambowo, Nasution, & Suharyanto, 2022). This program is an integral part of Indonesia's national strategy in reducing the risks and impacts of disasters and actively involving the community in the process of mitigating and managing disaster risks. The Disaster Resilient Village Program is an Indonesian government initiative which aims to create districts or villages that are resilient to disasters. This concept was first introduced by the Indonesian National Disaster Management Agency (BNPB) as part of a national strategy to increase disaster resilience at the community level. Disaster Resilient Subdistrict aims to increase public awareness about disasters, increase preparedness, and build community capacity in facing disaster threats.

KTB was first introduced by the Indonesian National Disaster Management Agency (BNPB) in 2009. This program aims to create sub-districts or villages that have high capacity in dealing with disasters and good preparedness in responding to disaster threats. In the context of this program, "kelurahan" refers to the smallest unit of government administration in Indonesia, while in rural areas, the term used is "village." The KTB concept does not only focus on the physical or technical aspects of disaster management, but also on the social, economic and cultural aspects of society. One of the important points in understanding KTB is community empowerment. This program emphasizes that communities who are involved and actively involved in the planning, implementation and evaluation processes have a key role in building sustainable disaster resilience. This means that KTB is not a top-down program, but a participatory approach that allows local communities to participate in protecting themselves.

The main objective of the Disaster Resilient Village program is to create sub-districts or villages that have high capacity to face disasters and good preparedness in responding to disaster threats (Salsabila and Alhadi, 2022). In

achieving this goal, there are several main components that must be implemented, namely: 1) increasing public awareness about disaster risks in their area; 2) increasing community preparedness in facing various types of disasters; 3) development of disaster-resistant infrastructure; 4) encourage the formation of policies and regulations at the sub-district or village level that support disaster mitigation efforts; and 5) provide training and knowledge to the community so that they can play an active role in the decision-making process and implementation of mitigation actions

METHODOLOGY

This research is a Systematic Literature Review (SLR) using a qualitative approach. SLR is a literature review method that identifies, assesses, and interprets findings on a research topic to answer previously determined questions (Solorzano et al, 2022; Paul Barari, 2022). SLR is a highly structured and objective approach to collecting and analyzing evidence in the literature, and can be used to answer specific research questions or develop a deeper understanding of an issue. SLR begins by formulating clear and specific research questions about the topic of the Tangguh disaster district. A literature search was carried out systematically using relevant databases, such as PubMed, Scopus, Web of Science, and others. This search includes the use of keywords appropriate to the research topic and often involves selecting studies using predetermined inclusion criteria.

RESEARCH RESULT

Principles of the Disaster Resilient Village Program

The Disaster Resilient Village Program is based on a number of important principles which form the basis for its implementation. These principles help guide the program to achieve its goals of community-based disaster risk management and reduction.

1. **Community Participation:** The main principle of KTB is active community participation in all stages of the program. The community is involved in planning, implementing and evaluating disaster risk reduction and management programs. They have a key role in determining the steps that need to be taken to reduce disaster risks in their area.
2. **Intersectoral Collaboration:** KTB prioritizes collaboration between various government, private and civil society sectors. This collaboration is needed to ensure that disaster risk management and reduction efforts are effective and coordinated.
3. **Local Knowledge:** KTB recognizes the importance of local knowledge in dealing with disasters. Local communities often have valuable knowledge and experience in dealing with disasters specific to their region. This program encourages documentation and use of local knowledge.
4. **Sustainable:** KTB aims to build sustainable community resilience to disasters. This means that the program focuses not only on acute

responses to disasters, but also on long-term efforts to reduce disaster risks.

Stages of Implementation of the Disaster Resilient Village Program

Implementation of the KTB Program involves a number of stages that need to be followed to achieve the goals of disaster risk management and reduction at the community level. These stages may vary depending on the situation and context of each subdistrict, but in general, the following are the stages of implementing the KTB program:

1. Initial Identification

The first stage in this program is identifying disaster risks in the sub-district area. This involves analyzing potential disasters, community vulnerabilities, and existing capacities. Identify human, financial and technical resources that can be used in implementing the program. This includes manpower, funding, equipment, and support from various stakeholders.

2. Mitigation Planning

Once risks are identified, the next step is to plan mitigation actions to reduce disaster risks. This can include developing disaster-resilient infrastructure, outreach, training, and so on. Decide on action priorities based on urgency and risk level. This can include developing disaster-resilient infrastructure, community training, awareness campaigns, and more.

3. Program Implementation

After planning is complete, the program is implemented involving planned activities, both preventive and responsive. If necessary, construction or repair of disaster-resistant infrastructure such as shelters, embankments, evacuation routes and early warning systems is carried out according to plan. Conduct training to increase community knowledge and skills in disaster management. This includes training in evacuation, first aid, and use of disaster management equipment. Conduct awareness campaigns to provide information about disaster risks and mitigation actions that must be taken by the community.

4. Evaluation and Monitoring

Carry out routine monitoring of program implementation to ensure that activities are in accordance with plans. This involves measuring progress, recording successes, and identifying necessary changes. Conduct program impact evaluations, including analyzing whether disaster risk reduction objectives have been achieved and what has or has not been successful in program implementation. Continuous evaluation and monitoring is carried out to ensure that the program runs according to plan. The results of this evaluation can be used to improve the program in the future.

5. Strengthening Community Capacity

During all stages of the program, strengthening community capacity was the main focus. The community is involved in training, counseling and

other activities that can increase their knowledge and skills in dealing with disasters.

These stages reflect a continuous cycle approach to disaster risk management. The Disaster Resilient Village Program is not only about building physical infrastructure, but also about increasing the community's capacity to deal with disasters and reduce their risks. Coordination and active participation of all stakeholders, including local communities, is essential in all these stages.

Success of the Disaster Resilient Village Program

The Disaster Resilient Village Program has achieved a number of significant successes in disaster risk management and reduction efforts. Some examples of such success include:

1. **Increasing Public Awareness:** This program has succeeded in increasing public awareness about disaster risks and the steps that can be taken to reduce these risks. The community becomes better prepared to face disasters.
2. **Improved Disaster-Resistant Infrastructure:** The KTB Program has encouraged the development of disaster-resistant infrastructure, such as embankments, shelters, evacuation routes and early warning systems.
3. **Increased Community Preparedness:** Communities involved in this program have increased their preparedness in facing disasters. They have been trained to deal with emergency situations, including evacuation, first aid, and communication in crisis situations.
4. **Reduction of Losses Due to Disasters:** Through sustainable mitigation efforts, this program has helped reduce losses caused by disasters. This includes loss of life, property loss, and socio-economic impacts.

DISCUSSION

Even though it has achieved a number of successes, the Disaster Resilient Village Program also faces a number of challenges in its implementation. One of the main challenges is limited resources, both funds and human power (Kusumastuti et al, 2021). This program involves various activities such as developing disaster-resistant infrastructure, community training, disaster management equipment, and awareness campaigns. All of this requires significant financial investment. Limited funding can hinder program implementation and reduce its effectiveness. Limited human resources or labor is a serious problem in implementing KTB. The program requires trained and qualified personnel in a variety of fields, including disaster risk management, civil engineering, communications, and health. A limited workforce can hinder the program's ability to achieve its stated goals. The use of appropriate technology is very important in reducing disaster risk. The technology can be used for weather monitoring, risk modeling, early warning, emergency communications, and more. However, many sub-districts, especially those in remote areas, may face limitations in accessing and utilizing modern technology.

Barriers to inter-agency coordination in the implementation of the KTB Disaster Program are one of the challenges that need to be overcome to achieve the success of this program. Poor or ineffective coordination between institutions can hinder program progress, result in overlaps in activities, and potentially disrupt the achievement of KTB goals (Salman, 2023; Rumambi et al, 2022). One of the main obstacles in inter-institutional coordination is the lack of a clear definition of the roles and responsibilities of each relevant institution in the KTB context. This lack of clarity can result in overlap in activities or even uncertainty in decision making. Poor communication between agencies involved in the program can make it difficult to exchange relevant information. This can hinder the ability to coordinate plans and actions.

Even though community participation is the main principle, it is not always easy to involve all residents in this program. There are various factors, such as differences in knowledge, skills, and interests, that influence participation levels. Some people may not be aware of the disaster risks and benefits of the KTB program. Low understanding of disaster threats and mitigation efforts can hinder interest and active participation. People who have limited knowledge and skills in the field of disaster management may not feel confident in participating. They may not know how to properly plan, deal with, or respond to a disaster. Efforts must be made to increase public awareness about disaster risks, the benefits of the KTB program, and ways to participate in disaster management efforts. Awareness and education campaigns need to be held regularly. The problem of community participation in the Disaster Resilient Village Program can be addressed with an approach that focuses on education, active involvement, and recognition of diversity in levels of participation. When the community feels they have an important role in disaster management efforts, the KTB program will become more effective in achieving its goals.

Steps to Improve the Disaster Resilient Village Program

To overcome the challenges faced, there are a number of efforts that can be made to improve the KTB Program

1. **Increased Funds:** The government needs to allocate more funds for this program, especially for infrastructure development and training.
2. **Strengthening Coordination:** The government can strengthen coordination between the various institutions involved in this program, including BNPB, regional governments, and civil society institutions.
3. **Adaptation to Climate Change:** The KTB program needs to adapt to increasingly complex climate changes. This involves more flexible planning and adaptation to new conditions.
4. **Education and Awareness Campaigns:** Greater efforts can be made in terms of education and awareness campaigns to increase public participation in the program.
5. **Regular Evaluation:** Regular evaluation can help identify problems and ensure the program is running according to plan. The evaluation results can be used for improvement.

6. Dissemination of Best Practices: The KTB program can identify best practices in community-based disaster risk management and reduction and disseminate them to other areas.

CONCLUSIONS AND RECOMMENDATIONS

The KTB Program is a form of community-based disaster risk management and reduction policy which has made a positive contribution in increasing community resilience to disasters in Indonesia. With the principles of community participation, intersectoral cooperation, local knowledge, and sustainability, this program has helped reduce disaster risk, increase community preparedness, and reduce losses due to disasters.

Despite a number of challenges, efforts can be made to improve this program, including increasing funding, strengthening coordination, adapting to climate change, and awareness education. By continuing to strive to improve and develop the KTB Program, Indonesia can become more resilient in facing the natural disasters that are always lurking.

FURTHER RESEARCH

Further research on KTB would be invaluable in understanding more about this program and how it can be more effective in reducing disaster risk and increasing community resilience. This research uses a systematic literature review type of research so that for further research it is recommended to conduct impact evaluation research which can explore the extent to which the KTB program has been successful in reducing disaster risk in various sub-districts. This involves concrete measurements of changes in community resilience and reduced vulnerability to disasters

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