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Formation of Disaster Resilient Villages (Destana) for Improvement Community Resilience to Disaster in Timpik Village, Semarang Regency

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Abstract
This community service activity aims to strengthen the capacity of rural communities in disaster preparedness through the establishment of a Disaster Resilient Village (Destana) in Timpik Village, Semarang Regency. The program was implemented using a participatory and collaborative approach based on BNPB Regulation No. 1 of 2012, involving village officials, the Regional Disaster Management Agency (BPBD), community leaders, and vulnerable groups. The implementation stages consisted of the Village Resilience Assessment (PKD), disaster risk assessment, development of disaster mitigation and preparedness plans, establishment of the Village Disaster Risk Reduction Forum (PRB), and the formation of a Community Disaster Volunteer Team. The results show an improvement in the Village Resilience Index from 36.27 (pratama level) to 51.73 (moderately resilient). The village's main strength lies in basic services and the existence of disaster management policies, while weaknesses remain in transportation, services for vulnerable groups, early warning systems, and post-disaster recovery mechanisms. Overall, the establishment of Destana in Timpik Village has successfully enhanced community preparedness and institutional resilience, although continuous capacity building, regular training, and the development of formal disaster management documents are still required.

Keywords: Disaster Resilient Village, village resilience assessment, disaster risk reduction, community preparedness

INTRODUCTION

Indonesia is located in the Pacific Ring of Fire and has great potential for natural resources. Indonesia is located in a volcanic chain and is the meeting point of several tectonic plates, making Indonesia prone to natural disasters. Almost all types of natural disasters occur in Indonesia. Disasters can occur at any time without warning. This means that our society must always be prepared to respond to disasters. Indonesia (Rismawati, 2021). Indonesia is a country that is highly vulnerable to various types of natural disasters, including hydrometeorological disasters. Hydrometeorological disasters are natural disaster phenomena or destructive processes that occur in the atmosphere (meteorology), water (hydrology), or oceans (oceanography) that can cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. Some examples of meteorological disasters are extreme rainfall, drought, landslides, floods, tornadoes, and strong winds (Muliddin et al., 2024).

Disasters related to strong winds account for around 70% of the total number of disasters, with the remaining 30% related to landslides, forest fires, heat waves, storms, tidal waves, and others. In the 2003-2005 period alone, there were around 1,429 disaster events in Indonesia. Around 53.3 percent of these were related to hydro-meteorological disasters (Bappenas and Bakornas PB, 2006 in Tresnanti et al., 2024). One of the areas that has experienced such disasters is Timpik Village, Semarang Regency. Based on local community records, this village has experienced strong winds, but the intensity was not severe and did not cause significant damage. Nevertheless, the geographical

conditions of the village still require the community to be vigilant against the potential for similar disasters in the future.

Given the history of strong winds in Timpik Village, although not severe, efforts to improve preparedness remain an important step. Disasters, whether large or small in intensity, can still disrupt community activities and potentially cause losses if not properly anticipated. Therefore, the government and the community need to take strategic steps to increase the village's capacity to deal with disaster threats, one of which is through the establishment of a Disaster Resilient Village (Destana). In accordance with BNPB Regulation No. 1 of 2012, Destana is designed so that villages can independently identify threats in their area, organize local resources, and recover quickly after a disaster. Dewabrata's (2023) research (FILE 1) also shows that Destana prioritizes a community-based approach to risk reduction and increasing community preparedness. Its implementation in Magelang (FILE 2) confirms that the effectiveness of Destana is highly dependent on the availability of human resources, funds, infrastructure, and multi-stakeholder support. Thus, the establishment of Destana in Timpik Village is expected to be not only a form of formal preparedness, but also a concrete effort to empower the community and improve capacity in sustainable disaster mitigation.

METHOD

Community service activities related to the establishment of Disaster Resilient Villages (Destana) are carried out using a participatory and collaborative approach, in accordance with BNPB Regulation No. 1 of 2012 concerning General Guidelines for Disaster Resilient Villages/Subdistricts. The implementation method was carried out in several stages involving the village government, the Regional Disaster Management Agency (BPBD), community leaders, and the entire village community.

The establishment of Destana was carried out in coordination with the village government, village officials, religious leaders, community groups, and the Regional Disaster Management Agency (BPBD) to align perceptions regarding the urgency of establishing Destana. At this stage, an initial identification of potential disaster threats that may occur in the village area was also carried out , as well as the dissemination of information about the program so that the community understood the objectives and benefits of establishing Destana (Setyowati et al., 2020).

The first stage is the Initial Village Resilience Assessment (PKD). This process is carried out as a self-assessment by the community, guided by the resilience indicators set out in SNI 8357:2017. This activity involves the village secretary as a member of the village administration. The results of the PKD are used as a basis for the preparation of more targeted follow-up activity plans (Wardhana & Amri, 2019).

After that, a Disaster Risk Assessment (DRA) was conducted to identify potential disaster threats covering geological, hydrometeorological, biological, technological, environmental, and social aspects. This assessment included threat ranking, hazard characterization, risk assessment of aspects of life, and the preparation of threat maps. The resulting risk maps contained information on settlements, public facilities, transportation routes, as well as vulnerable points and safe locations that could be used as evacuation sites (Sopaheluwakan, 2018).

The next step is to develop a disaster mitigation and preparedness system. This activity includes formulating an evacuation plan (Revak) by determining safe locations, evacuation routes, and assembly points; developing an effective early warning system (SPD) that is accessible to the community; the preparation of a comprehensive Disaster Management Plan (RPB) covering pre-disaster, emergency response, and post-disaster phases; and the preparation of a Contingency Plan (Renkon) based on agreed priority threat scenarios (Lassa, 2018).

To support the sustainability of the program, a Village DRR Forum was also established as a forum for coordination between institutions and community organizations, as well as a Disaster Preparedness Volunteer Team consisting of individuals who are concerned and prepared to implement disaster risk reduction. These volunteers are trained to be able to act in pre-disaster, emergency, and post-disaster situations (Susanti et al., 2021).

RESULTS AND DISCUSSION

Based on the stages of activities that have been carried out to establish a Disaster Resilient Village (Destana) in Timpik Village, there are several results that describe the initial level of

community resilience to potential disaster threats. These results include the implementation of Village Resilience Assessment (PKD), disaster risk assessment, development of mitigation and preparedness systems, and the establishment of a disaster management forum. The following is a description of the achievements, potential, challenges, and strengthening measures to improve the resilience of Timpik Village in facing disasters.

Disaster Resilience Assessment (PKD)

The Village Resilience Assessment (PKD) is an instrument for measuring the extent of a village's capacity to deal with potential disasters. Through the PKD, the real conditions of a village can be ascertained from various aspects, ranging from basic services, regulations and policies, prevention and mitigation, early warning systems, to preparedness and post-disaster recovery.

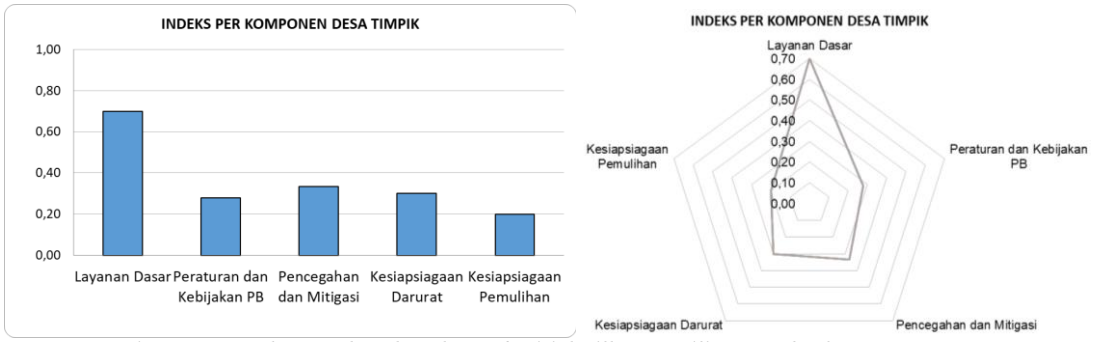

Figure 1. Bar Chart and Radar Chart of Initial Village Resilience Index by Component

The initial implementation of PKD in Timpik Village shows that the community is already aware of the threat of strong winds, but their level of awareness is still low to moderate (primary resilience) with a Village Resilience Index score of 36.27. At this stage, basic services are the main strength with an index value of 0.70, indicating that the village is quite capable of providing education, health, clean water, as well as communication and population administration facilities. However, there are still weaknesses in transportation, services for people with disabilities, and cultural and religious aspects.

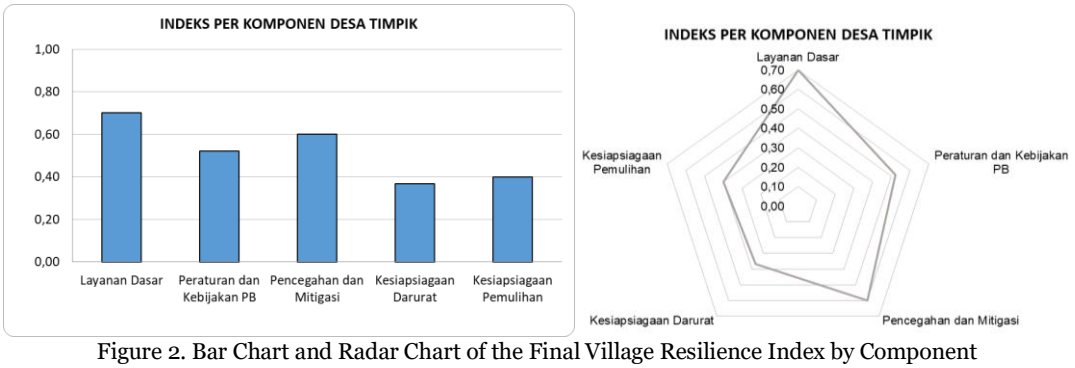

Figure 2. Bar Chart and Radar Chart of the Final Village Resilience Index by Component

As progress is made towards the final PKD, the results of the village's resilience to strong winds have improved significantly. The Village Resilience Index score reached 51.73, placing the village in the moderate/fairly resilient category. This shows that the village already has some basic services and disaster management mechanisms in place, although there are still many aspects that need to be strengthened. Basic services remain the main strength with a score of 0.70 (high category), particularly in education, health, clean water, food and nutrition, and economic empowerment through MSMEs and BUMDes. However, transportation and services for vulnerable groups are still not adequately addressed.

The regulatory and policy components of disaster management also showed progress with a score of 0.52 (moderate category). Villages already have basic documents such as risk assessments, disaster management plans, institutions, and cooperation activities. However, implementation in the field is still limited, especially in terms of training and simulations, which are not yet carried out regularly.

In terms of prevention and mitigation, the initial score of 0.33 increased to 0.60, indicating

improvements in disaster prevention, mitigation, and awareness efforts. Nevertheless, the measures taken are still at a basic level and need to be strengthened to be more systematic and sustainable.

Conversely, early warning and evacuation components remain the weakest points, with a score of 0.37. Villages do not yet have effective hazard warning systems, evacuation routes are unclear, evacuation shelters are inadequate, and there is a lack of preparedness drills. This poses a significant risk if a disaster occurs suddenly.

The preparedness and recovery components also remain low, despite increasing from an initial value of 0.20 to 0.40. Post-disaster assessment mechanisms, early recovery, aid management, and efforts to build back better remain very limited. This situation means that the village recovery process is likely to be slow in the event of a large-scale disaster. The recovery process is often still dominated by a physical and top-down approach, for example through the provision of temporary shelters. In addition, delays in data, weak coordination between key stakeholders, and low community involvement have resulted in uneven distribution of aid, causing the recovery process to be slow (Surtiari, 2019).

Overall, Timpik Village has strengths in relatively good basic services, a disaster management policy framework, and ongoing prevention and mitigation awareness activities. However, weaknesses are still evident in transportation and services for people with disabilities, training and simulation capacity, early warning systems, evacuation facilities, and preparedness for recovery.

To strengthen resilience, villages need to improve transportation facilities and services for vulnerable groups, increase training and disaster response simulations, develop early warning systems based on simple technology (such as sirens, mosque loudspeakers, or emergency WhatsApp groups), and prepare safe and accessible evacuation routes and sites. In addition, it is important for villages to develop participatory post-disaster recovery plans, implement transparent aid management mechanisms, and apply the Build Back Better principle so that recovery can take place more quickly, resiliently, and sustainably.

Disaster Risk Assessment (DRA)

The results of the disaster risk assessment show that the main threat in Timpik Village is strong winds, which need to be watched out for even though their impact has been relatively small so far. Since Timpik Village is a rice-farming area, the risk assessment also identified rats as a significant threat to agricultural productivity. Threat and risk maps for the village have been successfully compiled, covering residential locations, public facilities, transportation routes, disaster-prone areas (mainly due to strong winds), and safe locations for community evacuation. However, although rats are a real threat to rice crops, this threat has not yet been addressed through the establishment of a Destana-based mitigation and preparedness system. This is because agricultural pest control, including rat control, has an impact on reducing crop yields and causing economic losses for farmers, but does not cause widespread damage to infrastructure, human safety, or community social systems, which are the main focus of disaster risk reduction. Thus, rat pests are less relevant to the disaster risk reduction (DRR) component directed by BNPB and BPBD.

Establishment of Mitigation and Preparedness Systems

Disaster mitigation and preparedness efforts in Timpik Village are systematically designed through four complementary main components. First, the Evacuation Plan (Revak) is developed using a participatory approach, involving village officials, community leaders, and vulnerable groups such as the elderly, women, and children. Assembly points are designated in strategic locations, including the village hall and open fields that are easily accessible, have adequate capacity, and are relatively far from potential hazards. Evacuation routes are mapped in detail, taking into account travel distance, road infrastructure conditions, and potential obstacles in the field (Murtiadi et al., 2022). The designation of assembly points and evacuation routes is important to minimize casualties. Without clear planning, the evacuation process has the potential to cause mass panic, obstacles to the movement of residents, and even the risk of being trapped in dangerous areas. The results of the mapping are visualized in a village risk map, which is then posted in public locations to make it easier for the community to understand the direction and destination of the evacuation in an emergency.

Second, the development of the Early Warning System (EWS) is aimed at integrating official information from the BMKG and BPBD, which is then quickly disseminated through local communication channels. The information dissemination mechanism includes the use of mosque loudspeakers that reach residents throughout the hamlet, the use of village WhatsApp groups as a real-

time communication medium, and the provision of simple radio communication devices for disaster preparedness volunteers at the neighborhood association (RT/RW) level. With this multi-layered system, it is hoped that warning information can be received by all levels of society without time or technological barriers.

Third, the preparation of a Disaster Management Plan (DMP) is a key document that details disaster management measures in three main stages. In the pre-disaster stage, activities focus on structural mitigation (cutting down trees that are prone to falling) and non-structural mitigation (socialization, evacuation simulations, and volunteer training). In the emergency response stage, the DRP regulates coordinated evacuation procedures, rescue operations that prioritize vulnerable groups, and first aid provision through village health posts. Finally, the post-disaster stage focuses on recovery efforts, including the rehabilitation of basic infrastructure, the psychosocial recovery of affected residents, and the restoration of community livelihoods through cooperation with external parties.

Fourth, the Contingency Plan (Renkon) was formulated based on the most frequent disaster scenarios in Timpik Village, namely strong winds and landslides. This document details the roles and responsibilities of each party, ranging from the village government, volunteer groups, educational institutions, community organizations, to the local private sector. Renkon not only establishes a coordination scheme ( ) during disasters, but also regulates logistics, resource mobilization, and inter-agency communication mechanisms. With Renkon in place, disaster management is expected to run faster, more measured, and more coordinated in accordance with the capacity of each party.

Establishment of the PRB Forum and Disaster Preparedness Volunteers

As a form of program sustainability, a Village Disaster Risk Reduction Forum (PRB) has been established to serve as a forum for coordination between institutions at the village level, as well as a Disaster Preparedness Volunteer Team. These volunteers consist of youth organization members, PKK representatives, religious leaders, and village officials. They have been provided with basic training in first aid, emergency communication, and evacuation mechanisms, so that they are expected to be able to act quickly in pre-disaster, emergency response, and post-disaster situations. The existence of this forum and volunteer team strengthens village institutions in implementing the Destana program in a sustainable manner. In addition, the DRR forum and volunteer team can also increase the adaptive capacity of the community, strengthen communication between team members, and accelerate response and recovery processes when disasters occur (Wicaksono et al., 2022).

Overall, the results of the activities show that the establishment of Destana in Timpik Village was effective through a participatory approach. Community involvement in every stage of the PKD, up to the preparation of disaster management documents, is the main foundation for strengthening community resilience. In line with the literature (Huda et al., 2024), villages that have experience and initial awareness of disaster risks are easier to guide towards building resilience. Although the PKD achievements of Timpik Village are still at a moderate/sufficiently resilient level, this process provides an initial picture of the village's capacity and potential for improvement.

The biggest challenges lie in institutional aspects, the preparation of formal documents, and the development of an early warning system that is still rudimentary. However, with the Village Disaster Management Forum and the Disaster Preparedness Volunteer Team, the sustainability of the program can be better ensured. Therefore, the establishment of Destana in Timpik Village is not just a formal program, but also a tangible manifestation of community involvement in disaster risk reduction efforts. It is hoped that with follow-up actions in the form of capacity building and the preparation of official documents, Timpik Village can be upgraded to the level of a primary disaster-resilient village in future village resilience assessments.

CONCLUSION

Based on the results and discussion, the establishment of a Disaster Resilient Village (Destana) in Timpik Village shows significant progress in increasing community resilience to disaster threats, particularly strong winds, with an increase in the Village Resilience Index from 36.27 (primary resilience) to 51.73 (sufficient resilience). The village's main strengths lie in basic services, basic disaster management regulations and policies, and the implementation of prevention and mitigation efforts. However, weaknesses are still evident in transportation, services for vulnerable groups, early warning systems, evacuation facilities, and post-disaster recovery mechanisms. The disaster risk assessment also confirmed that strong winds are the main threat, while rat infestations have a greater

impact on the economy and are not included in the focus of disaster risk reduction. Through the establishment of mitigation systems, preparedness, evacuation plans, contingency plans, the Disaster Management Forum, and Disaster Preparedness Volunteers, the village has a strong institutional foundation, although it still needs capacity building, training, simulations, and formal documents to achieve the main level of resilience. Overall, the Destana program in Timpik Village has been effective with its participatory approach, providing a good foundation for sustainability and increased disaster resilience in the future.

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