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Flood Disaster Management and Prevention, and Risk Reduction through Active Community Participation in Batanguru Village, Mamasa

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Abstract
Background: *Batanguru Village, Sumarorong District, Mamasa Regency, is an area prone to flooding and landslides, as evidenced in 2019 when approximately 24 houses were destroyed and lives were lost due to the community's lack of knowledge regarding disaster preparedness.*
Service objective: *The objective of this service is to provide education and understanding through socialization regarding the definition of floods, their impacts, and the actions that must be taken before, during, and after a disaster.*
Method: *The method used was socialization through the stages of licensing, preparation, implementation, and evaluation. The activity was carried out at the Batanguru Village office on June 27, 2024.*
Results: *The results showed an increase in public understanding and awareness of the importance of maintaining environmental cleanliness and quality, as well as knowledge for disaster mitigation planning. This activity had a positive impact in raising public awareness to be prepared.*

Introduction

Indonesia is a country that is highly vulnerable to disasters, especially hydrometeorological disasters such as floods and landslides, which account for around 96% of the total disasters that occur in Indonesia. Human helplessness due to poor preparedness and emergency management often causes financial and structural losses, and even deaths (Usiono, 2018). Disaster management, including floods, is regulated by Law No. 24 of 2007. Disaster management is a series of activities carried out before, during, and after a disaster to

prevent, reduce risks, and recover from the impact of disasters (IDEP, 2007).

In the pre-disaster context, Spatial and Urban Planning (PWK) plays a vital role as a non-structural mitigation instrument. As emphasized in Law No. 26 of 2007 concerning Spatial Planning, spatial planning must be implemented concretely to mitigate disaster risks and protect the community (Wamen ATR/Waka BPN, 2025). Good spatial planning must include the identification of disaster-prone areas, the reduction of infrastructure vulnerability, and the determination of the location of vital infrastructure in safe areas (Fleischhauer et al., 2005). Ideally, the preparation of a Spatial Plan (RTRW) needs to use a disaster risk management-based assessment framework (Rozita & Setiadi, 2020). However, the implementation of spatial planning policies in the field often faces challenges in the form of conflicts of interest between sectors, lack of synchronization, and suboptimal spatial planning in mitigation efforts (RTRW Implementation, 2025; Coastal Planning, 2014).

Therefore, disaster risk reduction (DRR) efforts must be strengthened through community participation. The concept of Community-Based Disaster Risk Reduction (CBDRR) emphasizes that the community must be active subjects in the entire disaster cycle, not merely objects receiving assistance (Yasin, 2022; Susanto & Putri, 2022). This active participation is essential to realize preparedness behavior and attitude changes that support environmental preservation, which is the key to effective flood mitigation (Ningrum, 2021). Forms of community participation can include labor, money, and property (Holil, 2007), and are influenced by various social factors, including age and education (Angell, 1967). However, community participation, especially in formal planning and involvement in Disaster Preparedness Groups (KSB), is still low in many areas due to a lack of socialization and supporting facilities from the government (Muhammad Rifqi, 2025; Dakhi & Sinaga, 2023; Metuak et al., 2022). This shows the need for strong synergy between the government and the community to create a participatory disaster management system.

One location that has this problem is Batanguru Village, Sumarorong District, Mamasa Regency, West Sulawesi Province. This village is geographically located in a mountainous area and is prone to flooding. In 2019, Batanguru Village experienced flash floods and landslides due to heavy rains. The disaster caused severe damage to around 24 houses and resulted in casualties and injuries. Heavy rains caused the Batanguru River to overflow, exacerbated by deforestation and forest fires, which reduced the soil's ability to absorb water, triggering floods and landslides.

The main priority issue is the community's lack of knowledge and understanding of disaster preparedness measures. In fact, disaster mitigation, both structural and non-structural, must involve raising public awareness (Ningrum, 2021). Therefore, education and capacity building are essential to shape preparedness behaviors and reduce the impact of disasters.

This community service activity aims to: (1) Involve active community participation in flood prevention efforts; (2) Provide the community with an understanding of the impact and importance of flood prevention efforts; and (3) Reduce the impact of floods. Through this socialization, it is hoped that the community will know what actions to take before and after a

flood occurs.

Method

This community service activity was carried out at the Batanguru Village Office, Sumarorong District, Mamasa Regency, West Sulawesi Province. This activity was conducted on Thursday, June 27, 2024, from 09.00-13.00 WITA.

The target audience of this socialization program was the entire community of Batanguru Village, with the aim of increasing awareness and understanding of flood disaster risks. This activity involved 14 participants who were representatives of the village head, village secretary, village treasurer, hamlet head, community leaders, youth organization leaders, community members, and youth groups.

The community service method used was education through the stages of socialization, licensing, preparation, implementation, and evaluation. The steps of the activity carried out were:

1. Initial Stage (Observation and Permits): Observing the activity location and cooperating with the Batanguru Village government in terms of processing activity permits.
2. Implementation Stage (Socialization): Conducting socialization in the form of presenting material on the importance of mitigation and prevention in overcoming floods and reducing disaster risks. The material presented included flood disaster education, the vulnerability of the village, a presentation of the flood-based master plan, and a video screening of the Batanguru Village master plan.
3. Evaluation Stage: Holding a question and answer session and discussion about the socialization program to determine whether the material presented was understood. The success of the program is measured by the interaction of the community during the discussion session and the achievement of knowledge from not knowing to knowing

Results

This socialization activity was held on Thursday, June 27, 2024, at the Batanguru Village office. The event began with participant registration, remarks from the Village Head and the Community Service Team Leader, followed by a presentation on the importance of flood disaster management and prevention, and concluded with a video screening of the master plan and a question and answer discussion session.

Throughout the event, the community was very enthusiastic and actively participated in all activities, from listening to the presentation, discussing, to asking questions. The active involvement of the community and youth organization members is a tangible form of community service activities.

Figure 1. Socialization activity

he results and achievements of the socialization activity are as follows:

1. Increased Awareness and Understanding: The results of the activity showed that the community cares about the importance of maintaining cleanliness. The presentation of the material aimed to raise public awareness by preparing them to be alert and able to respond to disasters that may occur. The community has successfully learned the importance of maintaining the quality of the environment and understanding the theory and actions that can be taken.
2. Knowledge of Preventive Measures: The community has gained a better understanding of the measures that can be taken to prevent flooding, such as:
   a. Ensuring that trash is not carelessly disposed of in rivers or drainage systems so as not to block water flow.
   b. Carrying out reforestation by planting trees around rivers and water catchment areas to help absorb rainwater.
   c. Educating neighbors and family about flood risks and how to deal with them.
3. Disaster Risk Reduction (DRR): This activity increases community understanding of flood disasters and knowledge for planning to overcome and reduce disaster risks. Community participation is essential to assist the government in implementing DRR efforts.

The outcomes achieved for participants are an increased understanding of flood disaster management and prevention, as well as fostering awareness of the importance of

being prepared.

The success of this PkM program was measured qualitatively and descriptively through participatory observation and a Final Evaluation, which consisted of question and answer sessions and discussions. There was no pre-post questionnaire survey using inferential statistical analysis to determine the percentage of significance. This method is suitable for efforts focused on capacity building and information dissemination. Two main parameters were planned to measure success: (1) active community interaction during discussion sessions; and (2) gaining knowledge from a state of "not knowing to knowing." Qualitative research results show very active and enthusiastic community interaction, indicating that the material was well received. This directly shows that the educational objectives were communicated and captured the audience's attention, which requires behavioral change.

The community has a better understanding of how to prevent flooding. The following qualitative parameters support this statement: 1. Recognition of Local Disaster Causes: Participants were able to identify that the overflowing of the Batanguru River was the main cause of flooding in Batanguru, exacerbated by littering and deforestation, which hindered water absorption. 2. Commitment to Environmental Action: During discussions, participants verbally acknowledged the importance of maintaining environmental cleanliness and not littering in rivers and waterways. 3. Acceptance of Vegetation Efforts: 4. Active Role of the Community: The community recognizes their role as active subjects in mitigation by committing to educate their families and neighbors. This demonstrates the achievement of the empowerment goal from a passive to an active position.

The Batanguru Village community has a better understanding of flooding disasters and how to plan for them. The following qualitative parameters support this statement: 1. Understanding the Disaster Cycle: Participants must understand what to do before, during, and after a disaster, which is an important part of disaster management as regulated by Law No. 24 of 2007. 2. Integration of Spatial Planning and Disasters: Participants can learn about mitigation and spatial planning (spatial and environmental-based mitigation), as described in the flood-based Master Plan. This understanding is important because the identification of disaster-prone areas is part of good spatial planning. 3. Increased Adaptive Capacity: There was discussion about the need for guidelines or references for dealing with future disasters, indicating that there is a need for increased collective adaptive capacity. This adaptive capacity is a key component in building Community Resilience. 4. Preparedness Awareness: Increased public awareness to prepare for and be alert to disasters was demonstrated by the enthusiasm and comments provided during the discussion. This preparedness is essential to reduce losses caused by poor preparedness.

Discussion

The implementation of this community service activity achieved its objectives, namely to provide education and encourage active participation from the Batanguru Village community. The high level of enthusiasm and active participation from the community in the

discussion and question and answer sessions showed that the material presented was well received.

From the perspective of Regional and Urban Planning (PWK) and Social Sciences, this activity integrated two important theoretical concepts:

1. Community Empowerment Theory: This concept, as explained by Rappaport (1984), emphasizes that empowerment is a process in which individuals acquire sufficient skills, knowledge, and power to participate in and influence events that impact their lives (Sulistiyani, 2004). In this context, socialization activities serve as an enabling mechanism, namely a process of increasing community capacity from a state of 'not knowing to knowing' and from passive to active. The results of increased knowledge and awareness achieved in Batanguru Village demonstrate success in shifting the position of the community from being recipients of aid to active subjects in disaster mitigation (Active Participation), in line with the principles of empowerment.
2. Community Resilience Theory: Resilience, as defined by Adger (2005), is the extent to which a socio-ecological system can maintain important structures, processes, and positive responses in the face of disasters, as well as its ability to learn and continue to adapt (Maliati & Chalid, 2021). With an increased understanding of pre-disaster actions (waste management and reforestation) and a mitigation master plan, the Batanguru Village community has built adaptive capacity. This adaptive capacity is an important prerequisite for communities to recover more quickly and return to functional conditions after a disaster, thereby increasing their collective resilience.

Additionally, this activity also applies the principle of Spatial/Environmental-Based Mitigation. The socialization focused not only on emergency response but also on prevention, in line with the integration of Disaster Risk Management (DRM) in the Spatial Plan. The presentation of the flood-based master plan demonstrated integrated mitigation planning efforts, which are key to reducing physical vulnerability in disaster-prone areas. The increase in community knowledge, as demonstrated by their understanding of the importance of maintaining environmental quality and preventive measures (not littering, reforestation), is an indicator of the success of the Community Service Program. This is in line with the need to plant trees for communities on the banks of rivers as an effort to minimize flooding. With this understanding, the community now has guidelines or references for dealing with future disasters.

Conclusion

The implementation of the socialization activities in Batanguru Village went well and smoothly, with the material presented attracting the interest of participants and encouraging

active participation in the discussion.

This activity succeeded in increasing the community's knowledge and awareness of the dangers of disasters and fostering a culture of preparedness. This improvement includes an understanding of the importance of preserving the environment and the ability to carry out mitigation measures (such as waste management and reforestation). This shows that PkM interventions through socialization and education play a vital role in supporting sustainable environmental quality improvement and reducing the negative impacts of potential disasters.

Recommendations

It is hoped that the outreach activity, which consists of presenting material on the importance of preserving the environment for the community in Batanguru Village, can be continued and maintained to the next stage. In addition, consistency is needed in empowerment and dialogical implementation to open a special forum on risk reduction efforts.

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Conflict of Interest

All authors declare that there are no financial or non-financial conflicts of interest related to this article.

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