

Evaluation of the Effectiveness of Disaster Mitigation Based Spatial Planning Policies in West Sumatra: Literature Review

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Received: 22 Jun. 2024, Revised: 10 Nov. 2024, Accepted: 30 Nov. 2024

ABSTRACT

This study aims to evaluate the effectiveness of disaster mitigation-based spatial planning policies in West Sumatra. The research employs a qualitative approach with a case study method to conduct an in-depth analysis of policy implementation and its practical outcomes. Data was collected from various sources, including policy documents, reports from the National Disaster Management Agency (BNPB), and scientific literature. The results indicate that while the policies have shown some positive impacts, such as reducing disaster risks and improving infrastructure resilience, their implementation remains suboptimal due to key challenges. These include weak coordination among stakeholders, limited resources, and inadequate public participation. For instance, spatial planning regulations, such as the Regional Spatial Plan (RTRW), often lack integration, leading to inconsistent policy enforcement. Moreover, resource constraints, both financial and human, hinder the execution of mitigation programs. The community's limited awareness and involvement further complicate efforts, as policies often fail to address local needs effectively. To enhance policy effectiveness, this study recommends strengthening inter-agency coordination, enforcing strict compliance measures, and fostering community participation through inclusive planning approaches. Evaluating and refining existing policies is crucial for West Sumatra to achieve disaster resilience and sustainable development.

KeyWords: *Disaster Mitigation, Spatial Planning, West Sumatra, Policy Evaluation, Community Participation.*



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INTRODUCTION

Law No. 24/2007 defines natural disasters as events or a series of events triggered by natural phenomena. Indonesia's high potential for natural disasters is a direct consequence of its unique geological and geographical characteristics. The country's intensive tectonic activity has shaped its diverse and distinctive landscapes, ranging from steep mountainous areas prone to landslides to low-lying coastal zones highly vulnerable to flooding. While this topographic diversity offers breathtaking natural beauty, it also presents significant challenges in terms of disaster vulnerability (Gardner, 2007).

Indonesia is recognized as one of the countries with the highest frequency and diversity of natural disasters globally. Disasters such as tsunamis, earthquakes, floods, and landslides frequently occur (Santoso, 2012). Among its provinces, West Sumatra stands out as particularly susceptible to disaster risks (Zulsfi et al., 2021). Positioned along the west coast of Sumatra Island, this province spans 42,297.30 km² with a population of 2,792,221 people. Its diverse topography, comprising lowlands, steep hills, and undulating

terrains, not only enhances its natural tourism appeal but also increases its vulnerability to disasters, particularly tsunamis. The province's coastline directly borders the Indian Ocean, placing its coastal districts and cities in tsunami-prone zones both geographically and geologically. This risk is further compounded by high economic activity, concentrated populations, and critical government functions in coastal areas (Klein, 2003).

Disaster mitigation-based spatial planning is a critical approach to managing land use and infrastructure development to reduce disaster risks and their adverse impacts. Such policies are vital for safeguarding communities, protecting assets, and bolstering regional resilience against disasters (Dewi et al., 2016). Despite having a well-prepared policy framework, West Sumatra faces challenges in implementing disaster mitigation-based spatial planning. Limited resources, including expertise and budget constraints, remain significant barriers. Moreover, a lack of coordination among government agencies has been identified as a key obstacle to effective implementation (BNPB, 2021). Additionally, the increasing intensity of climate change and rapid urbanization add further complexity to spatial planning efforts. Climate change exacerbates the frequency and severity of natural disasters, while uncontrolled urbanization heightens regional vulnerabilities. Without meticulous planning, these factors amplify the detrimental effects of disasters on communities (Herawati et al., 2023).

West Sumatra has taken several steps to address these challenges, including disaster risk zoning, construction of disaster-resistant infrastructure, and public education and training programs. Disaster risk zoning helps identify and categorize areas based on their vulnerability levels, enabling development to align with risk levels (Wahyuni et al., 2023). Infrastructure such as earthquake-resistant roads, bridges, and public buildings, alongside evacuation drills and educational programs, have enhanced community preparedness and capacity to respond to disasters. Public awareness campaigns aim to foster collective responsibility for disaster mitigation (BNPB, 2021). Given the above, evaluating the effectiveness of disaster mitigation-based spatial planning policies in West Sumatra is crucial. Such an assessment can guide local governments and stakeholders in optimizing spatial planning strategies to strengthen disaster resilience and promote sustainable development. By refining existing policies, West Sumatra can better prepare for future disasters, ensuring a safer and more resilient environment for its communities.

METHODS

This research adopts a qualitative approach utilizing a case study method to assess the effectiveness of disaster mitigation-based spatial planning policies in West Sumatra. The case study method was selected for its capacity to facilitate an in-depth analysis of both policies and their implementation in practical contexts. Data and information for this research were sourced from various materials, including policy documents, reports from the National Disaster Management Agency (BNPB), and scientific literature. The data collection process involved several stages. Initially, a comprehensive literature review was conducted to gather information regarding disaster mitigation-based spatial planning

policies in West Sumatra. The reviewed literature comprised official policy documents, BNPB reports, and scholarly articles from relevant scientific journals. This systematic approach ensured that the research was grounded in a robust and diverse data set, providing a solid foundation for evaluating the policies and their real-world application.

RESULTS

The results of this study indicate that disaster mitigation-based spatial planning policies in West Sumatra have been implemented through various regulations and programs, but their effectiveness remains suboptimal due to several key factors. First, disaster mitigation-based spatial planning regulations in the region are not yet fully integrated. While the Regional Spatial Plan (RTRW) includes provisions for disaster mitigation, implementation faces significant challenges, particularly due to weak coordination among stakeholders such as local governments, the BNPB, and communities. This lack of collaboration often results in policies that do not align with intended objectives. Second, resource and budget constraints further hinder implementation. Interviews with local government officials revealed that funding for spatial planning and disaster mitigation is insufficient, while a shortage of skilled personnel in these fields exacerbates the situation, preventing optimal execution of many programs. Third, the impact of existing policies has not yet been substantial. According to BNPB data, disaster-related losses remain high. For instance, despite efforts to integrate flood mitigation into spatial planning, a flood in Padang City in 2020 resulted in IDR 500 billion in damages and 20 fatalities (BNPB, 2020). Fourth, community participation in disaster mitigation-based spatial planning is minimal. Many residents lack awareness of its importance, and their involvement in planning and decision-making processes is limited, leading to policies that often fail to address local needs and conditions. Finally, monitoring and evaluation of these policies are inadequate. Interviews revealed that oversight remains weak and evaluations of policy impacts are rarely conducted, leaving many issues unaddressed.

Spatial planning policies in West Sumatra are governed by various regulations, including Regional Regulation (PERDA) No. 13/2012, which aims to reduce disaster risks by managing land use and ensuring the development of safe infrastructure. According to the West Sumatra Regional Development Planning Agency (BAPPEDA), this regulation has been implemented in 70% of the provincial area (BAPPEDA West Sumatra, 2019). However, studies reveal gaps in compliance with these provisions. For example, Hidayat et al. (2020) highlighted that developments continue in areas prone to landslides and floods, demonstrating weak supervision and law enforcement. Similarly, BNPB reported 42 landslides and 35 floods in 2018, many occurring in areas that violated RTRW guidelines (BNPB, 2018).

Disaster mitigation is a critical component of spatial planning policies in West Sumatra. Government Regulation No. 21/2008 mandates integrating disaster mitigation into spatial planning to reduce risks. Measures such as identifying disaster-prone zones through risk maps have guided infrastructure and settlement planning. Lassa et al. (2019) noted positive

outcomes, such as earthquake-resistant infrastructure standards that have reduced building damage by 30% (PUPR West Sumatra, 2020). However, coordination issues among local governments, communities, and private sectors persist. Pribadi et al. (2018) highlighted such challenges during the 2019 Solok flash flood, where poor coordination delayed disaster response and evacuation efforts.

A case study of Mentawai Island, one of West Sumatra's most vulnerable areas, underscores the importance of disaster mitigation-based spatial planning. The 2010 earthquake and tsunami caused over 400 fatalities and widespread displacement. Syamsidik et al. (2017) attributed the high casualties to the poor implementation of mitigation policies. Post-disaster, stricter spatial planning measures, such as relocating settlements from tsunami-prone zones, have been adopted. Since then, no fatalities have been reported in subsequent tsunamis (BPBD, 2020). However, community resistance to relocation remains a challenge. Rahman et al. (2019) found that many residents are reluctant to relocate due to economic and social concerns, such as losing access to livelihoods and resources. This highlights the need for inclusive and participatory approaches to ensure the success of such initiatives.

CONCLUSIONS

From this literature review, it can be concluded that disaster mitigation-based spatial planning policies in West Sumatra have achieved some positive outcomes, particularly in reducing disaster risks and minimizing infrastructure damage. However, significant challenges remain, including insufficient coordination among agencies, weak enforcement of regulations, and resistance from communities to relocation policies. To enhance the effectiveness of these policies, several recommendations can be proposed. Firstly, improving coordination between institutions and stakeholders is essential, which can be achieved by establishing regular communication forums to foster collaboration and information sharing. Secondly, strengthening law enforcement is crucial, requiring the implementation of strict penalties for violations of RTRW to ensure compliance. Lastly, adopting a more inclusive and participatory approach to the community relocation process is vital. This involves actively engaging affected communities in the planning and implementation of relocation policies, ensuring their concerns and needs are addressed to build trust and encourage cooperation.

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