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Disaster Prevention Management for Landslide Risk Reduction: A Qualitative Study in Purbalingga Regency, Indonesia

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Abstract:
Landslides represent a major disaster risk in many regions of Indonesia, requiring effective disaster prevention management at the local government level. This study aims to examine disaster prevention management for landslide risk reduction in Purbalingga Regency, Central Java, Indonesia, using George R. Terry's management framework as an analytical lens. A qualitative descriptive approach was employed, with data collected through in-depth interviews, field observations, and document analysis involving local government officials and community representatives in landslide-prone areas. The findings indicate that disaster prevention management has been implemented through planning, organizing, actuating, and controlling functions. Planning activities include hazard identification and risk mapping, while organizing focuses on institutional coordination led by the Regional Disaster Management Agency. Actuating is reflected in community awareness programs and preventive actions, although community participation remains uneven. Controlling functions are primarily administrative, with limited outcome-based evaluation. The discussion reveals that while the basic structure of disaster prevention management exists, its effectiveness is constrained by limited institutional capacity, resource availability, and weak monitoring mechanisms. This study contributes to disaster governance literature by demonstrating the applicability of classical management theory to disaster prevention in a local government context. The findings provide practical insights for strengthening managerial capacity and improving landslide risk reduction strategies in disaster-prone regions of developing countries.

Keywords: Disaster prevention management; Landslide risk reduction; Local government; Disaster governance; Qualitative study

1. Introduction

Landslides represent one of the most frequent and destructive natural hazards in many developing countries, particularly in regions characterized by steep topography, high rainfall intensity, and land-use change. In Indonesia, landslides are classified as a major geological disaster that repeatedly causes loss of life, damage to infrastructure, and disruption of socio-economic activities. The country's geological position at the convergence of major tectonic plates, combined with tropical climatic conditions, makes many regions highly vulnerable to slope failures, especially during the rainy season (BNPB, 2023; UNDRR, 2019).

Central Java Province is among the regions with a high incidence of landslide disasters in Indonesia. Several regencies within this province experience recurrent landslides due to hilly terrain, unstable soil structures, and increasing human pressure on land resources. Purbalingga Regency is one of the areas identified as having significant landslide risk, as indicated by repeated disaster events over recent years that have resulted in casualties, displacement of residents, and damage to settlements and public facilities. These conditions highlight the urgency of strengthening disaster prevention efforts at the local government level, particularly through effective management practices that address hazard identification, risk reduction, and community preparedness.

Disaster risk reduction has increasingly shifted from a reactive, response-oriented approach toward a preventive and proactive paradigm. International frameworks such as the Sendai Framework for Disaster

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Risk Reduction 2015–2030 emphasize the importance of disaster prevention, risk governance, and the role of local authorities in reducing disaster impacts (UNDRR, 2015). In this context, disaster prevention management is not merely a technical activity but a governance process that involves planning, coordination, implementation, and control of resources and stakeholders to minimize disaster risks before hazards occur.

Previous studies on landslide disasters in Indonesia have largely focused on hazard mapping, physical mitigation measures, community preparedness, or emergency response mechanisms. Several researchers have examined the causes of landslides, including rainfall intensity, slope gradients, soil characteristics, and land-use change (Isnaini, 2019; Ulfa et al., 2023). Other studies have emphasized community-based disaster risk reduction and the role of education in improving public awareness and preparedness (Ariyani, 2020). While these studies provide valuable insights, they tend to prioritize technical or social dimensions of disaster management rather than examining disaster prevention as an integrated managerial process within local government institutions.

Moreover, existing literature on disaster management in Indonesia often concentrates on emergency response and post-disaster recovery, with limited attention given to the managerial capacity of local governments in the pre-disaster phase. Studies that explicitly analyze disaster prevention through a management framework—such as planning, organizing, implementing, and controlling—remain relatively scarce, particularly at the regency level. As a result, there is a limited understanding of how local disaster management agencies operationalize prevention policies, allocate resources, coordinate stakeholders, and monitor prevention programs in landslide-prone areas.

This study seeks to address this research gap by examining disaster prevention management for landslide risk reduction at the local government level in Indonesia. Using George R. Terry's management framework, this research analyzes how the Regional Disaster Management Agency (BPBD) of Purbalingga Regency conducts planning, organizing, actuating, and controlling in its efforts to prevent landslide disasters. By adopting a qualitative approach, this study captures institutional practices, challenges, and contextual factors that influence the effectiveness of disaster prevention management.

The objectives of this study are threefold. First, it aims to analyze how disaster prevention management is implemented by the local government in reducing landslide risk in Purbalingga Regency. Second, it seeks to identify factors that influence the success or limitations of disaster prevention management, including institutional capacity, resource availability, and community involvement. Third, the study examines the role of communities living in landslide-prone areas in supporting disaster prevention initiatives and local government programs.

This study offers several scientific contributions. Theoretically, it contributes to the literature on disaster governance and public sector management by applying a classical management framework to disaster prevention practices in a developing country context. Empirically, it provides in-depth evidence from a landslide-prone regency, enriching comparative studies on local disaster management in Southeast Asia. Practically, the findings offer policy-relevant insights for local governments and disaster management agencies seeking to strengthen preventive strategies, enhance community participation, and improve institutional coordination in disaster risk reduction. By emphasizing disaster prevention as a managerial process, this study underscores the importance of proactive governance in reducing landslide risks and building resilient local communities.

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2. Literature Review

a. Disaster Prevention and Landslide Risk Reduction

Disaster prevention is a fundamental component of disaster risk reduction (DRR), emphasizing proactive measures aimed at minimizing potential losses before a hazard occurs. In landslide-prone regions, prevention strategies focus on reducing exposure, lowering vulnerability, and strengthening local capacity to manage risk. Previous studies highlight that landslide disasters are influenced by a complex interaction of natural factors—such as rainfall intensity, slope gradient, and soil characteristics—and human-induced factors, including land-use change, deforestation, and settlement expansion in hazardous areas (UNDRR, 2019; Ulfa et al., 2023).

While technical approaches such as hazard mapping, early warning systems, and structural mitigation have proven effective in reducing landslide impacts, scholars increasingly argue that these measures alone are insufficient without strong institutional management. Disaster prevention requires coordinated governance mechanisms that integrate planning, resource allocation, stakeholder engagement, and continuous monitoring. Consequently, attention has shifted toward understanding how local governments organize and manage prevention efforts as part of broader disaster governance systems (Ariyani, 2020; Isnaini, 2019).

b. Management Theory as an Analytical Lens

Management theory provides a useful analytical lens for examining disaster prevention as an organizational and governance process. George R. Terry's classical management framework conceptualizes management as a series of interrelated functions: planning, organizing, actuating, and controlling (Terry, 1958). Although originally developed for organizational and business management, this framework has been widely applied in public administration and public sector management to analyze how governmental institutions pursue policy objectives.

In the context of disaster prevention, **planning** refers to the identification of hazards, risk assessment, and formulation of preventive strategies. **Organizing** involves structuring institutions, allocating human and material resources, and establishing coordination mechanisms among stakeholders. **Actuating** focuses on the implementation of prevention programs, including public education, training, and community engagement. **Controlling** encompasses monitoring, evaluation, and corrective actions to ensure that prevention efforts align with established objectives and adapt to emerging risks.

Several scholars argue that applying a management framework to disaster prevention allows researchers to move beyond fragmented analyses of individual activities and instead assess the coherence and effectiveness of institutional processes as a whole. This approach is particularly relevant in decentralized governance systems, where local governments play a central role in translating national disaster policies into concrete actions at the community level.

c. Previous Studies on Landslide Disaster Management

Existing studies on landslide disasters in Indonesia and other developing countries reveal diverse analytical emphases. Research focusing on physical and environmental dimensions underscores the importance of land-use management, vegetation cover, and hydrological conditions in reducing landslide risk (Isnaini,

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2019). These studies provide essential insights into hazard characteristics but often pay limited attention to institutional processes that govern prevention efforts.

Other studies emphasize community-based disaster risk reduction, highlighting education, awareness, and local participation as key factors in enhancing preparedness and resilience (Ariyani, 2020). While such studies demonstrate the value of social capital and community engagement, they frequently treat government institutions as facilitators rather than analyzing their managerial capacity in depth.

Studies that explicitly address disaster management from a managerial perspective tend to focus on emergency response or post-disaster recovery. For instance, research on disaster response management highlights coordination efficiency, speed of action, and inter-agency collaboration during emergencies. However, these studies often overlook how preventive measures are systematically planned, organized, and monitored prior to disaster events. As a result, the pre-disaster phase remains underexplored in terms of management effectiveness, particularly at the local government level.

Overall, the literature suggests a gap between technical and social approaches to landslide risk reduction and institutional management analyses. Few studies integrate management theory with empirical examination of disaster prevention practices, especially in the context of local disaster management agencies in landslide-prone regions.

d. Conceptual Framework

Based on the reviewed literature, this study adopts George R. Terry's management framework as an analytical tool to examine disaster prevention management for landslide risk reduction. The framework conceptualizes disaster prevention as a managerial process consisting of four interrelated functions: planning, organizing, actuating, and controlling. These functions are assumed to collectively influence the effectiveness of landslide risk reduction efforts.

In this study, effective **planning** enables accurate identification of landslide hazards and formulation of preventive strategies; effective **organizing** ensures adequate institutional structure, resource allocation, and stakeholder coordination; effective **actuating** facilitates the implementation of prevention programs and community engagement; and effective **controlling** supports continuous monitoring and improvement of disaster prevention efforts. The interaction of these managerial functions shapes the capacity of local governments to reduce landslide risks and enhance community resilience.

Accordingly, the conceptual framework positions disaster prevention management as the key independent process, operationalized through Terry's four management functions, while landslide risk reduction serves as the primary outcome. Community involvement and institutional capacity are treated as contextual factors that influence how management functions are implemented in practice.

3. Methodology

a. Research Design

This study employed a qualitative descriptive research design to examine disaster prevention management for landslide risk reduction at the local government level. A qualitative approach was considered appropriate because the study aimed to explore managerial processes, institutional practices, and contextual factors that

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shape disaster prevention efforts rather than to measure variables quantitatively. By adopting a descriptive design, the research sought to provide an in-depth understanding of how disaster prevention management is planned, organized, implemented, and controlled by local government institutions in a landslide-prone region.

b.Study Area

The research was conducted in Purbalingga Regency, Central Java Province, Indonesia, an area characterized by hilly topography and recurrent landslide events. The regency was selected purposively due to its high landslide risk and the active role of the local government, particularly the Regional Disaster Management Agency (BPBD), in implementing disaster prevention programs. This context provided a relevant setting to examine disaster prevention management practices at the regency level.

c. Data Collection Techniques

Data were collected using three primary techniques: in-depth interviews, field observations, and documentation review. In-depth interviews were conducted to obtain detailed information regarding disaster prevention planning, institutional coordination, implementation strategies, and monitoring mechanisms. Field observations were carried out in landslide-prone areas to understand the actual conditions of preventive measures and community involvement. Documentation review included analysis of disaster management plans, reports, standard operating procedures, and other relevant institutional documents related to landslide prevention. The use of multiple data collection techniques enabled the researcher to capture both formal institutional perspectives and practical realities of disaster prevention management.

d.Informants

Informants were selected using purposive sampling based on their relevance and involvement in disaster prevention activities. The primary informants included officials of the Regional Disaster Management Agency (BPBD) of Purbalingga Regency, local government officers involved in disaster-related planning and implementation, and community representatives living in landslide-prone areas. These informants were chosen to ensure a comprehensive understanding of disaster prevention management from both institutional and community perspectives.

e. Data Analysis Technique

Data analysis was conducted using an interactive qualitative analysis process consisting of data reduction, data display, and conclusion drawing. Interview transcripts, observation notes, and documents were systematically coded and categorized based on the four management functions proposed by George R. Terry: planning, organizing, actuating, and controlling. This analytical framework guided the interpretation of data by linking empirical findings to theoretical concepts of management.

Through this process, patterns and relationships among managerial practices, institutional capacity, and disaster prevention outcomes were identified. The analysis emphasized how management functions were operationalized in practice and the challenges encountered in implementing disaster prevention strategies.

f. Validity and Trustworthiness

To ensure the validity and trustworthiness of the findings, data triangulation was applied by comparing information obtained from different data sources and collection techniques. Triangulation among interviews, observations, and documents helped to verify the consistency of findings and reduce potential bias. In

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addition, cross-checking information from government officials and community members enhanced the credibility of the analysis by capturing multiple perspectives on disaster prevention management.

4. Results and Discussions

a. Planning

The planning function of disaster prevention management in Purbalingga Regency focused on identifying landslide-prone areas, assessing potential risks, and formulating preventive strategies. The Regional Disaster Management Agency (BPBD) conducted hazard identification through disaster risk mapping and analysis of historical landslide events. These planning activities were used to determine priority areas for disaster prevention programs, particularly villages located in hilly and high-risk zones.

Planning efforts also included the formulation of annual disaster prevention programs, such as community awareness campaigns, evacuation route preparation, and coordination with relevant local agencies. However, the findings indicate that planning was not always fully supported by comprehensive data updates and long-term budget certainty. As a result, some prevention plans were implemented incrementally rather than systematically, depending on available resources and situational urgency.

b. Organizing

In terms of organizing, BPBD played a central role as the coordinating institution for landslide disaster prevention. Organizational arrangements involved the division of roles and responsibilities among internal BPBD units as well as coordination with other local government agencies, village administrations, and community groups. Task allocation was generally aligned with institutional mandates, enabling basic coordination in disaster prevention activities.

Despite these arrangements, the results reveal limitations in organizational capacity, particularly related to human resources and inter-agency coordination. The number of personnel dedicated to disaster prevention was relatively limited compared to the extent of landslide-prone areas. Coordination with non-governmental stakeholders and community organizations was present but not yet institutionalized, resulting in varying levels of effectiveness across different locations.

c. Actuating

The actuating function was reflected in the implementation of disaster prevention programs and activities. BPBD conducted community socialization, disaster education, and basic training aimed at increasing public awareness of landslide risks. These activities were designed to encourage communities to recognize early warning signs, understand evacuation procedures, and participate in preventive actions.

In addition, preventive measures such as monitoring high-risk slopes and promoting simple mitigation practices were implemented in collaboration with local communities. However, the level of community participation varied, with some residents actively engaging in prevention programs while others remained passive. Limited public awareness and socio-economic constraints were identified as factors influencing the uneven implementation of disaster prevention activities.

d. Controlling

Controlling activities in disaster prevention management included monitoring, evaluation, and reporting of prevention programs. BPBD conducted periodic supervision to assess the implementation of planned

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activities and to identify obstacles encountered during execution. Evaluation results were generally used as internal feedback to adjust subsequent programs and activities.

Nevertheless, the findings indicate that controlling mechanisms were largely informal and focused on administrative reporting rather than performance-based evaluation. Systematic indicators to measure the effectiveness of disaster prevention outcomes were not consistently applied. Consequently, lessons learned from previous prevention efforts were not always fully integrated into future planning, limiting opportunities for continuous improvement in landslide risk reduction.

5. Discussion

This study demonstrates that disaster prevention management for landslide risk reduction in Purbalingga Regency has been implemented through the core managerial functions of planning, organizing, actuating, and controlling. However, the effectiveness of these functions varies, reflecting both institutional strengths and structural constraints at the local government level. The findings confirm that disaster prevention is not merely a technical or community-based activity but a managerial process that requires coherent governance and sustained institutional capacity.

From a planning perspective, the results indicate that hazard identification and risk mapping constitute a fundamental basis for disaster prevention efforts. This finding aligns with previous studies emphasizing the importance of risk assessment as a prerequisite for effective disaster risk reduction (UNDRR, 2019; Ulfa et al., 2023). However, inconsistent data updating and limited budget certainty constrain the strategic quality of planning. In relation to George R. Terry's framework, planning in Purbalingga Regency can be categorized as partially effective, as it provides direction for action but lacks long-term integration and resource assurance. Similar limitations have been observed in other local disaster management contexts in developing countries, where planning often depends on short-term priorities rather than systematic risk reduction strategies.

The organizing function reveals that BPBD has assumed a central coordinating role in landslide disaster prevention, which is consistent with institutional mandates in decentralized governance systems. This finding supports earlier research suggesting that clear institutional roles are essential for disaster governance effectiveness. Nevertheless, limited human resources and weak institutionalized coordination with external stakeholders reduce organizational effectiveness. Compared with studies that highlight strong inter-agency collaboration as a determinant of successful disaster management, the findings suggest that organizational arrangements in Purbalingga Regency remain largely administrative rather than collaborative. From a managerial perspective, this indicates that organizing has not yet fully optimized available resources and stakeholder networks.

Regarding actuating, the implementation of community awareness programs and preventive activities reflects efforts to translate plans into concrete actions. This finding resonates with studies emphasizing the role of community participation in disaster risk reduction (Ariyani, 2020). However, uneven community engagement and limited public awareness constrain the overall impact of these initiatives. In Terry's framework, actuating depends heavily on leadership, motivation, and communication. The results suggest that while basic implementation has occurred, stronger leadership and more inclusive engagement strategies are required to mobilize communities consistently across landslide-prone areas.

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The controlling function appears to be the weakest component of disaster prevention management in this study. Monitoring and evaluation activities are conducted, but they focus primarily on administrative compliance rather than outcome-based performance. This finding diverges from best practices in disaster management literature, which emphasize continuous learning and evidence-based evaluation as key elements of effective disaster prevention (UNDRR, 2015). Within Terry's framework, controlling is essential for ensuring that management processes remain adaptive and responsive to changing risks. The absence of systematic performance indicators limits the ability of local authorities to assess the effectiveness of prevention measures and integrate lessons learned into future planning.

Overall, the findings highlight a critical gap between managerial processes and disaster prevention outcomes. While the basic structure of disaster prevention management is in place, its effectiveness is constrained by limited institutional capacity, resource availability, and community engagement. Compared with previous studies that focus on technical mitigation or social preparedness, this study contributes by demonstrating that weaknesses in management functions can significantly reduce the effectiveness of disaster prevention efforts, even when technical knowledge and community programs exist.

These findings underscore the importance of strengthening disaster prevention management as an integrated governance process. Enhancing planning through data-driven and long-term strategies, improving organizing through institutionalized collaboration, reinforcing actuating through inclusive community engagement, and strengthening controlling through outcome-based evaluation are essential steps toward effective landslide risk reduction. In this sense, disaster prevention should be understood not only as a set of activities but as a continuous managerial cycle that requires adaptive leadership and sustained commitment at the local government level.

6. Conclusion

This study examined disaster prevention management for landslide risk reduction in Purbalingga Regency, Indonesia, using George R. Terry's management framework as an analytical lens. The findings demonstrate that disaster prevention has been implemented through the core management functions of planning, organizing, actuating, and controlling. However, the effectiveness of these functions varies, indicating that disaster prevention management at the local government level remains partially effective rather than fully integrated.

In terms of planning, local authorities have undertaken hazard identification and risk mapping as a basis for preventive action. Nevertheless, limitations in data updating and long-term resource planning reduce the strategic effectiveness of these efforts. Organizing functions show that institutional roles are clearly defined, with the Regional Disaster Management Agency acting as the main coordinator. Yet, constraints in human resources and the absence of institutionalized inter-agency collaboration limit organizational capacity. Actuating functions reveal that community awareness programs and preventive activities have been implemented, but uneven community participation and limited public awareness weaken their overall impact. Controlling functions are the least developed, as monitoring and evaluation remain focused on administrative reporting rather than outcome-based performance assessment.

Theoretically, this study contributes to disaster governance literature by demonstrating the relevance of classical management theory in analyzing disaster prevention processes within local government institutions. By applying George R. Terry's framework to the pre-disaster phase, this research extends existing studies

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that predominantly focus on emergency response and post-disaster recovery. Empirically, the study provides evidence from a landslide-prone regency in Indonesia, offering insights that may be relevant to other regions facing similar disaster risks and institutional challenges.

From a practical perspective, the findings suggest that strengthening disaster prevention requires improvements across all management functions. Local governments should enhance planning through data-driven and long-term risk reduction strategies, improve organizing by institutionalizing cross-sector collaboration, strengthen actuating through inclusive and sustained community engagement, and reinforce controlling through systematic, outcome-based monitoring and evaluation. Such improvements are essential to transform disaster prevention from fragmented activities into a coherent and adaptive governance process.

This study has several limitations. The research focuses on a single regency and employs a qualitative approach, which may limit the generalizability of findings. In addition, the analysis relies on institutional and community perspectives without incorporating quantitative risk indicators. Future research could adopt comparative or mixed-method approaches to examine disaster prevention management across different regions or disaster types. Further studies may also explore the integration of technological tools and data analytics to enhance management effectiveness in disaster risk reduction.

Overall, this study underscores that effective landslide risk reduction depends not only on technical measures and community awareness but also on the quality of disaster prevention management. Strengthening managerial capacity at the local government level is therefore crucial for building resilient communities and reducing disaster risks in landslide-prone areas.

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