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Disaster Readiness in the Hills: A Case Study of Uphill Schools' Disaster Risk Reduction Management (DRRM) Programs

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Abstract

Background and Aim: Disaster preparedness in uphill schools focuses on mitigating the unique geophysical and environmental hazards they face; however, there remains a disconnect between students' high theoretical awareness of disaster protocols and their ability to execute them effectively in actual emergencies.

Materials and Methods: This case study examines the disaster preparedness and risk-reduction management practices of uphill schools, which are uniquely vulnerable to geophysical and structural hazards. Through in-depth interviews with selected school administrators, DRRM coordinators, and teachers, the study reveals key aspects of the school's disaster readiness, including the risks, preparedness measures, existing DRRM programs, perceived effectiveness, and challenges faced by these schools in the hills.

Results: Findings reveal that while schools employ proactive mitigation strategies through curriculum integration and regular disaster drills, stakeholders perceive significant implementation gaps that hinder the practical application of rehearsed protocols.

Conclusion: While theoretical awareness is high, the research concludes that the unique environmental and infrastructural challenges of uphill settings necessitate more context-specific DRRM approaches to bridge the gap between preparedness and actual resilience. This research provides practical evidence to advocate for infrastructure upgrades and specialized capacity-building for schools in high-risk geographic areas.

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Keywords

disaster mitigation; disaster preparedness; risk; hazard; uphill schools; DRRM

1. Introduction

The Philippines, situated along the Pacific Ring of Fire and the Typhoon Belt, faces an average of 20 typhoons and numerous seismic events annually, making it one of the most disaster-prone nations globally (Daren et al., 2023; Olores et al., 2023). Within this high-risk landscape, the education sector bears a disproportionate burden, particularly in geographically isolated and disadvantaged communities. Uphill schools—educational institutions situated on elevated or mountainous terrain—are especially vulnerable due to limited transportation networks, structural inadequacies, and restricted access to emergency assistance (Rogayan & Dollete, 2020).

The inability to provide tailored disaster risk reduction and management (DRRM) strategies in these schools undermines their capacity to serve as safe shelters during emergencies. In addition to their educational function, schools are recognized community refuges; yet, in geographically isolated settings, the implementation of DRRM remains generally poor despite existing Department of Education (DepEd) mandates (D'Ayala et al., 2020; Opabola, 2023). The ongoing psychological impacts of repeated catastrophes and disrupted educational cycles further heighten the urgency for context-specific, resilient preparedness plans (Lapada, 2022).

Moreover, institutions in uphill areas face compounding threats—landslides, high winds, soil erosion, and failing telecommunications infrastructure—that render generic DRRM frameworks insufficient. With urbanization and climate change intensifying natural disaster risks, there is a critical need for proactive, localized disaster preparedness embedded within school systems. Developing comprehensive school-based DRRM plans and integrating disaster education into curricula are among the most effective ways to protect students and transform schools into community resources during crises (Garcia, 2016; Ecolin-Campilla, 2016).

This study investigates the disaster readiness of selected uphill schools in District 7 of the Ozamiz City Division, focusing on the unique risks they face and the implementation gaps in their DRRM programs. By generating context-specific insights, it aims to support the development of more inclusive, location-based disaster preparedness strategies for geographically vulnerable educational institutions.

2. Methodology

This study employed a qualitative, descriptive case study design following Merriam's methodology. This approach was selected to gain an in-depth understanding of how stakeholders of selected uphill schools in District 7, Ozamiz City Division perceive and implement DRRM programs. The design enabled the researcher to capture nuanced, real-world accounts without manipulating variables, facilitating a rich, contextually grounded narrative.

Three integrated schools in District 7 served as the research environments, selected based on their elevated topographic location, integrated school structure (primary and secondary learners), and active DRRM activities. Participants consisted of DRRM Coordinators as primary informants, supplemented by school heads and selected teachers for data triangulation. Purposive sampling was employed to select participants with direct, firsthand experience in DRRM operations.

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Data were gathered through semi-structured interviews conducted face-to-face in private settings on school premises, with sessions audio-recorded upon participants' consent. The researcher also served as the primary instrument of data collection, conducting interviews, taking field notes, and interpreting contextual cues. Data analysis followed thematic analysis guided by Merriam's Case Study Approach, involving verbatim transcription, open coding, axial coding, and selective coding to develop overarching themes addressing each research question. Data triangulation across interviews, observations, and school records enhanced the credibility of findings. Ethical standards of informed consent, confidentiality, data protection, and equity were strictly observed throughout.

3. Results and Discussion

The findings reveal that uphill schools operate within a "dual-gap reality": a disconnect between theoretical disaster awareness and practical execution, and a mismatch between the existence of DRRM programs and their adequacy for the specific geographic and structural conditions of elevated schools. While mandatory drills and curriculum integration have built foundational knowledge among students and teachers, the absence of real disaster experience, compounded by behavioral disengagement and resource scarcity, limits actual readiness.

These findings resonate with broader literature emphasizing that school-based DRRM effectiveness is contingent on contextual fit (Dania et al., 2022; Pant, 2024). The proactive stakeholder engagement documented in this study—spanning LGUs, BFP, parents, and community leaders—represents a strength that aligns with the Sendai Framework's call for multi-level governance in disaster risk reduction. However, without adequate infrastructure, sustained funding, and advanced simulation-based training, these collaborative efforts cannot fully bridge the preparedness gap. The results support the conclusion that localized, terrain-informed DRRM models are not merely beneficial but essential for uphill schools in geohazard-prone areas.

4. Knowledge Contribution

This study contributes a grounded, context-specific understanding of disaster readiness in uphill schools—a setting that remains underrepresented in Philippine DRRM literature. Through a qualitative case study design, it surfaces what may be called the dual-gap reality of uphill school DRRM: a simultaneous gap between theoretical awareness and practical execution, and a gap between the existence of DRRM programs and their adequacy for the unique geographic and structural realities of elevated schools.

The first gap—between awareness and action—is evidenced by findings showing that while students demonstrate familiarity with disaster protocols through regular drills, behavioral limitations and a lack of real disaster exposure raise serious concerns about their ability to respond effectively in actual emergencies. The second gap—between program presence and contextual fit—is revealed through the schools' compounding vulnerabilities: steep terrains that restrict evacuation routes, aging and makeshift structures, poor communication infrastructure, and insufficient capacity-building for DRRM coordinators.

Taken together, these findings advance a crucial argument: that standard implementation of national DRRM frameworks, while valuable, is insufficient for schools in geographically isolated, elevated environments without deliberate localization. This study provides empirical evidence supporting three intersecting recommendations—upgrading school infrastructure through targeted policy, shifting from routine to scenario-based experiential drills, and developing localized DRRM models tailored to elevation and terrain. In doing so, it enriches the discourse on school-based disaster

resilience and offers a replicable framework for understanding DRRM readiness in similarly vulnerable educational settings.

5. Conclusion

Based on the findings of this study, the researcher concluded that most uphill schools operate in a high-risk environment. To mitigate these risks, uphill schools have developed proactive, multifaceted disaster risk reduction management (DRRM) strategies that include enhancements to structural performance, mitigation of environmental factors, and improved administrative planning. Furthermore, these schools have incorporated disaster preparedness education into their curricula and have developed effective methods for communicating with school personnel and stakeholders, thereby establishing a system for continuing educational services while protecting students' and teachers' safety

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