



Regular Article

Vulnerability and Resilience: A Study of Disaster Risk Reduction Management in Hazard-Prone Schools of Eastern Visayas, Philippines

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Abstract Eastern Visayas continues to face recurring natural threats, typhoons, floods, earthquakes and landslides that disrupts schooling and place learners and educators at risk. Although the Department of Education has long introduced the School Disaster Risk Reduction and Management (DRRM) program to address these hazards, many schools still struggle with its day-to-day implementation. This study takes a closer look at how hazard-prone schools in Region VIII deal with these risks by exploring the challenges they encounter, the practices they have adopted, and the strategies that appear to work in their context.

Using a multiple case study design, the research involved 12 schools across the region. Participants included school heads, DRRM coordinators and several teachers who were directly involved in or familiar with DRRM activities. Data were gathered through interviews, questionnaires, and a review of school documents to capture both policy and practice.

The findings indicated that while schools are making efforts to prepare for and respond to disasters, several recurring concerns impede progress. Budget limitations, uneven access to training and minimal engagement from teachers are common issues. In some cases, students and community stakeholders are present but not consistently involved in planning or drills. Despite these challenges, many schools have begun to develop localized and creative approaches that show promise in building resilience.

In response to the identified gaps, the study introduces the Localized Spiral DRRM model. This framework is grounded in the experiences of the participating schools and is intended to be practical rather than theoretical. It provides a step-by-step, community-informed approach to integrating DRRM into both elementary and secondary education. With proper adoption the model aims to strengthen preparedness and promote safer, more resilient learning environments in areas where hazards are part of daily reality.

Keywords: disaster risk reduction, school-based DRRM, eastern visayas, hazard prone-schools, disaster preparedness, resilience

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1. INTRODUCTION

Eastern Visayas, Philippines, is exposed to destructive natural hazards such as typhoons, earthquakes, and storm surges which cause frequent disruption of the delivery of education. These risks were addressed as the Department of Education introduced the Comprehensive Disaster Risk Reduction and Management (DRRM) Framework (Department of Education, 2015), aligning with the Sendai Framework's four-phase cycle (prevention, preparedness, response, recovery) and promoting safety through facilities, management planning, and curriculum integration.

Despite this policy direction, hazard-prone schools in Region VIII face persistent challenges in translating the framework into practice. Reactive spending dominates school budgeting (65%), limiting proactive risk reduction investments. Training remains insufficient, with only 32% of DRRM coordinators receiving annual capacity-building support. Furthermore, stakeholder engagement is uneven: while parents contribute 73% of volunteer time, their roles often exclude planning and decision-making responsibilities (Firmo, 2022; Regis, 2020). These systemic barriers highlight a policy–practice disconnect, where standardized national strategies fail to adequately respond to the hyper-local threats of geographically and economically diverse communities.

Nevertheless, schools in the region have demonstrated resilience, often finding ways to recover from disasters by informally integrating local best practices into their DRRM initiatives (Sabalza, 2020). While existing studies have documented broad challenges in school-based DRRM, less attention has been given to context-specific hurdles and locally derived coping strategies in Eastern Visayas.

To address this gap, the present study examines the hazards encountered, the mitigating practices, the challenges faced, and the best practices adopted by 12 hazard-prone schools in Region VIII. Building from these findings, it proposes the Localized Spiral DRRM Model, a framework that integrates disaster prevention and mitigation principles in a progressive, cyclical manner, providing schools with a more systematic and context-sensitive approach to resilience.

2. LITERATURE REVIEW

2.1 DRRM Frameworks and Policy Directions

Globally, the Sendai Framework for Disaster Risk Reduction (2015–2030) emphasizes a proactive, multi-hazard, and community-based approach to disaster governance. Education is identified as a key sector where resilience must be embedded through risk-informed curricula, safe learning environments, and inclusive preparedness programs (GADRRES, 2022). In alignment, the Philippine government institutionalized DRRM through Republic Act No. 10121 (2010), shifting the national paradigm from reactive disaster relief to risk reduction and

resilience building. Within the education sector, DepEd Order 37 (2015) operationalized the Comprehensive School DRRM Framework, integrating hazard-informed planning, preparedness, and continuity of learning. These frameworks mirror international best practices but require strong local adaptation to address context-specific risks.

2.2 Challenges in School-Based DRRM Implementation

Despite comprehensive frameworks, both international and Philippine studies reveal persistent gaps between policy and practice. In the Philippines, reactive spending dominates resource allocation, with 65% of school DRRM budgets used for post-disaster relief rather than prevention (Firmo, 2022). In Indonesia, Mulia and Handayani (2024) found that economic challenges make it difficult for schools to invest proactively in safety measures and evacuation facilities. This situation shows the same funding constraints observed in Eastern Visayas (Baldomar, 2024). In addition, many programs fall short due to a lack of proper training, only 32% of DRRM coordinators in Region VIII receive annual training. A similar pattern appears in Sri Lanka, where limited institutional capacity has weakened school and community resilience planning (Adikaram & Sheresha, 2024). Taken together, these examples show that issues like underfunding, limited capacity, and weak monitoring are widespread across developing regions, underscoring the need for context-based strategies rather than one-size-fits-all national models.

2.3 International Practices on Community and Stakeholder Engagement

International evidence indicates that resilience is most effective when communities actively participate in disaster planning. In Japan, for instance, school-based DRRM initiatives emphasize regular drills and coordinated evacuation exercises that involve parents and local authorities, fostering shared accountability for safety (Shiwaku & Shaw, 2016). In the Philippines, however, stakeholder engagement remains uneven. Parents often contribute volunteer time yet are seldom included in planning and decision-making processes (Regis, 2020). This imbalance diminishes community ownership and undermines the sustainability of DRRM programs. Comparable challenges have been noted in Padang, Indonesia, where disparities in community involvement have exacerbated disaster impacts, particularly among marginalized groups (Mulia & Handayani, 2024). Taken together, these findings underscore the importance of participatory and culturally responsive DRRM approaches that reinforce both social cohesion and institutional capacity.

2.4 Capacity Building and Knowledge Integration

Capacity development remains a key foundation for effective DRRM implementation. Internationally, capacity-building initiatives have proven most effective when they are sustained, experiential, and inclusive of both teachers and learners (UNESCO, 2019). In the Philippines, however, training opportunities are often limited to DRRM coordinators, with minimal dissemination to teachers and students (Alarte, 2024). This concern aligns with

findings from Sri Lanka, where incomplete knowledge transfer weakened organizational preparedness (Adikaram & Sheresha, 2024). Beyond technical training, the integration of indigenous knowledge with scientific practice has been identified as a best practice in countries such as Indonesia and Nepal, where local coping strategies complement formal DRRM education (Shiwaku & Fernandez, 2011). In the Philippine context, however, reliance on traditional practices at times overrides scientific warnings (Rico, 2022), delaying evacuation and intensifying risks. This tension highlights the need to harmonize indigenous and scientific knowledge systems within formal school DRRM plans.

Overall, the literature suggests that while policy frameworks for school-based DRRM are relatively strong, their implementation is hindered by resource constraints, insufficient training, fragmented coordination, and uneven stakeholder participation. Comparative evidence from across Asia points to similar challenges but also illustrates the benefits of participatory, context-specific, and knowledge-integrated approaches. In the Philippines—particularly in Eastern Visayas, where recurrent disasters such as Typhoons Haiyan and Odette have severely disrupted education—the key gap lies in understanding how hazard-prone schools adapt to systemic limitations while developing local coping mechanisms. This study seeks to address that gap by examining the challenges, practices, and emerging innovations among 12 schools in Region VIII and by proposing the Localized Spiral DRRM Model as a framework that aligns global principles with local realities.

3. METHODOLOGY

This section details the study's qualitative multiple case design, including how participants and sites were chosen, and the methods used for data gathering and interpretation. The research focused on hazard-prone schools in Region VIII identified by the Division DRRM Office. Semi-structured interviews and document reviews were conducted with due regard for ethical protocols. Data were analyzed through thematic coding and cross-case comparison to highlight recurring challenges and effective practices. Credibility was strengthened through triangulation, member checking, and reflective analysis. Finally, study limitations were acknowledged to clarify the scope of the findings.

3.1 Research Design

This study adopted a qualitative multiple case study design to explore how hazard-prone schools in Eastern Visayas implement their Disaster Risk Reduction and Management (DRRM) programs. This design allowed researcher to examine real practices and challenges within each school context and to compare findings across cases to uncover both shared patterns and unique responses to local hazards.

3.2 Site and School Selection

Twelve schools six elementary and six secondary were purposively selected after consultation with the Division DRRM Office. Selection was guided by their frequent exposure to hazards such as typhoons, floods, landslides, and storm surges, as well as by their accessibility and administrative endorsement. The sample was designed to represent schools from different geographic settings across Region VIII, providing a balanced view of risk conditions and management practices (Figure 1).

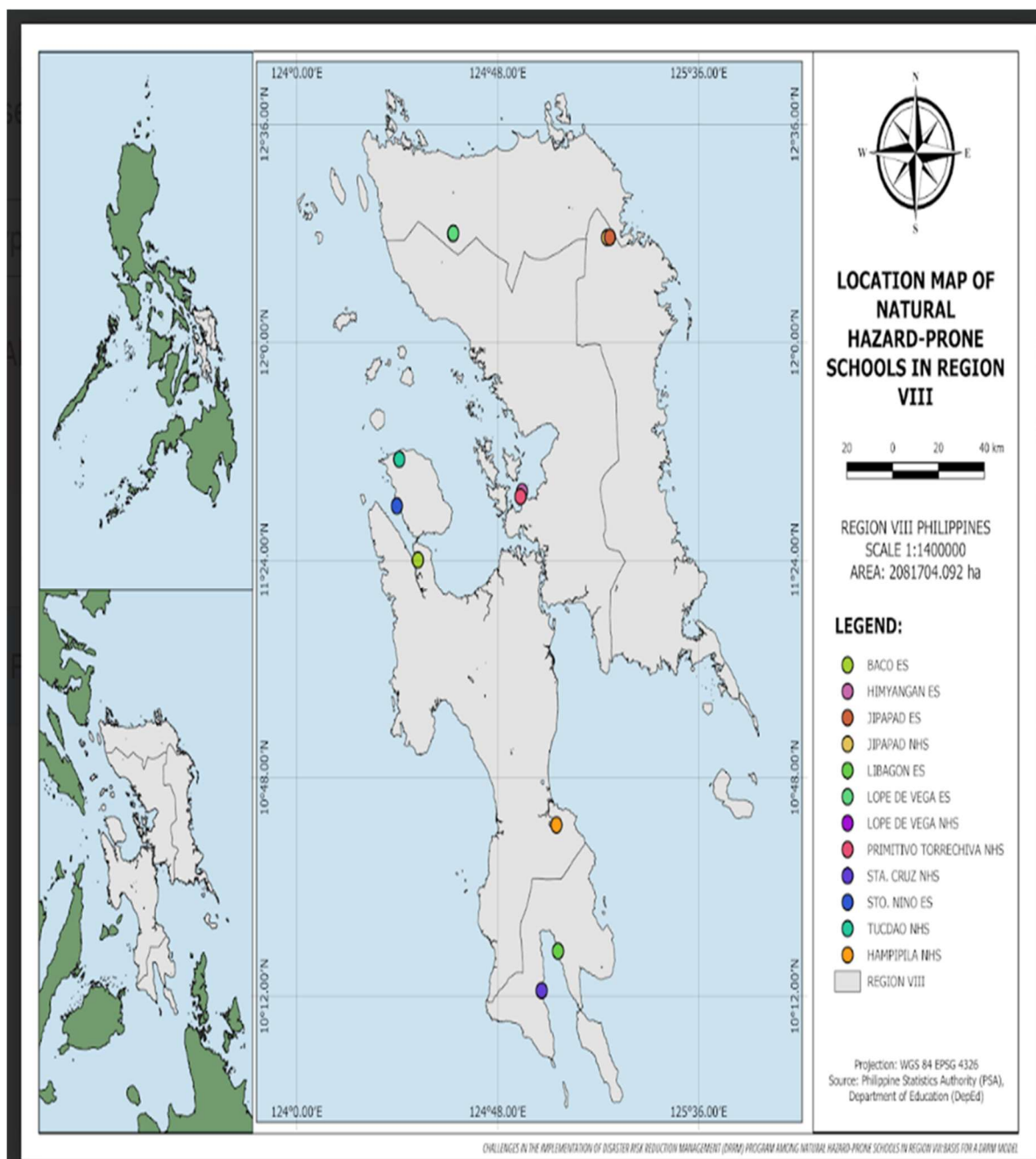


Figure 1. Location of identified hazard-prone schools in Region VIII

3.3 Participants of the Study

The study used purposive sampling to select respondents from schools located in hazard-prone areas, as identified through the assessment conducted by the Division Disaster Risk Reduction and Management Office. A total of 36 participants including the elementary and secondary schools in Region VIII. The participants include 12 school heads (SH), 12 DRRM Coordinators (D) and 12 teachers (T). Data was gathered through semi-structured interviews, guided by an interview questionnaire with four open ended questions focusing on, (1) natural hazards experienced, (2) prevention and mitigation activities, (3) challenges in DRRM program implementation, and (4) best practices adopted by identified hazard prone schools. To ensure clarity in presenting interview excerpt, the participants are coded as follows: school heads are labeled as SH1, SH2, ETC. The DRRM coordinators as D1, D2, etc. and teachers as T1, T2, etc. corresponding to order in which they were interviewed.

3.4 Data Collection and Analysis

The study collected data mainly through semi-structured interviews with school heads, DRRM coordinators, and teachers to gather their insights on disaster preparedness and response practices. In addition, relevant documents, including school DRRM plans and reports, were reviewed to supplement and verify the information obtained from the interviews.

Thematic analysis, guided by Braun and Clarke's six-step framework, was used to interpret the findings. The process began with familiarization through repeated reading of the interview transcripts, followed by systematic coding to identify significant patterns. These codes were organized into emerging themes, which were reviewed, refined, and clearly defined to maintain consistency with the study's objectives. This approach made it possible to connect participants' experiences with relevant literature and DRRM frameworks, leading to a deeper understanding of best practices and challenges in school-based disaster risk reduction.

3.5 Reliability and Validity

To ensure the credibility of the findings, several validation strategies were applied. With participants' consent, all interviews were audio-recorded and transcribed word for word, then checked carefully against the recordings for accuracy. Participants also reviewed their responses through member checking to confirm that their views were represented correctly. Triangulation of data from interviews and document reviews strengthened the consistency of the results. Throughout the process, I engaged in reflexive journaling to monitor possible biases, while peer consultations and an audit trail helped maintain transparency. These combined efforts enhanced the trustworthiness of the study and ensured that the results reflected the actual experiences of schools in hazard-prone areas.

3.6 Ethical Considerations

Approval for the study was obtained from the Department of Education's regional and division offices. Before data collection, participants were informed about the purpose of the study, assured of confidentiality, and asked to provide their written consent.

3.7 Limitations of the Study

This study acknowledges several limitations. Because it used a qualitative case study design and purposive sampling, the findings cannot be generalized beyond the twelve participating schools in Region VIII. The data were based on self-reported accounts from DRRM coordinators, teachers, and school administrators, which may involve some degree of response bias despite the measures taken to maintain credibility and trustworthiness. Even so, their participation was essential since they are directly engaged in the planning, implementation, and assessment of DRRM initiatives at the school level.

The translation of participants' responses may also have affected the precision of meaning, as certain cultural or contextual nuances might not have been fully conveyed despite careful attention. Finally, the study reflects conditions during a specific period and may not capture subsequent changes or emerging developments in DRRM practices.

4. RESULTS AND DISCUSSION

This section presents the findings from a multiple case study on Disaster Risk Reduction and Management (DRRM) in 12 hazard-prone elementary and secondary schools in Region VIII. The analysis highlights the natural hazards these schools face, the strategies they use to reduce risk, the challenges encountered in implementing DRRM, and the best practices that have emerged. Using qualitative data from interviews, questionnaires, and document reviews, the results are organized around the key components of the proposed Localized Spiral DRRM Model: Prevention and Mitigation, Preparedness, Response, and Recovery/Adaptation. This framework provides a clear view of current DRRM practices and serves as a foundation for developing a context-sensitive model. The findings offer practical insights for strengthening disaster preparedness, resilience, and adaptive capacity in local schools.

4.1 Hazards Affecting Hazard-Prone Schools in Region VIII and Reasons for Vulnerability

The Eastern Visayas Region (Region VIII) faces frequent natural hazards that threaten both the safety of the school communities and the continuity of education. This vulnerability is shaped not only by geographic and environmental conditions but also by broader systemic gaps in disaster preparedness and resilience.

Respondents highlighted six major hazards—typhoons, earthquakes, landslides, flooding, storm surges, and volcanic eruptions—with vulnerability stemming from both natural and human-induced factors. Typhoons are frequent in the region because of its location within the Pacific typhoon belt, a risk further intensified by climate change. Earthquake risk is intensified by active fault lines and the country’s tectonic setting. Meanwhile, landslides and flooding are linked to denuded slopes, unstable soil, and insufficient drainage systems, often worsened by prolonged rainfall. Coastal schools remain highly exposed to storm surges, while volcanic eruptions pose threats in mountainous zones. These insights reflect broader findings in Philippine DRR literature, which emphasize the intersection of hazard exposure, environmental degradation, and inadequate infrastructure (Bello, 2020; Regis, 2020; Bicar et al., 2023).

The data in Table 1 show how these hazards interrelate with specific vulnerabilities. For example, flooding and landslides were not only attributed to natural terrain but also to anthropogenic pressures such as poorly planned settlements and deforestation. This supports Wisner et al.’s (2004) Pressure and Release (PAR) model, which frames disasters as products of social vulnerability layered upon natural hazards. In Region VIII, weak land-use planning, insufficient drainage, and the use of schools as evacuation centers exacerbate risk, reflecting the systemic dimension of vulnerability beyond hazard exposure alone.

Table 1. Summary of hazards affecting the hazard-prone schools in Region VIII and reasons for vulnerability as viewed by the respondents

Hazard	Reasons for Vulnerability (As viewed by the respondents)
Typhoon	a. Natural hazards are inevitable b. Location in the Pacific Ocean typhoon belt c. Effects of climate change
Earthquake	a. Presence of Active fault lines b. Geographical location of the Philippines c. Located between two mountains d. Intense rainfall e. Mountainous terrain near schools
Landslides	a. Denuded slopes b. Newly built houses on unstable soil c. Prolonged rainfall d. Climate Change impact
Flooding	a. Low-lying or landlocked areas surrounded by rivers b. Heavy rain from typhoons and mountains c. Insufficient drainage and exit points d. Prolonged rainfall weakening soil absorption e. Denuded mountains f. Location near river, shorelines or riverbanks
Storm Surge	a. Schools located near seashore areas b. Effects of climate change
Volcanic Eruption	a. Proximity to mountainous areas

Typhoons remain the most frequent and damaging hazard. Historical events such as Typhoon Ursula (2019) and Typhoon Odette (2021), which caused P3 billion (approximately \$51.8 million USD) in infrastructure losses and destroyed learning materials, highlight the educational disruption caused by extreme weather (Bernardo, 2022; Sabalza, 2020). These cases illustrate how climate change amplifies existing risks, consistent with global projections

of more intense tropical cyclones (Regis, 2020). Similarly, earthquake vulnerability reflects the Philippines' location on the Pacific Ring of Fire, where seismic risks are unavoidable but can be mitigated through resilient school design (Regis, 2020).

The cascading impact of these hazards on education is well documented. Studies show that repeated school closures, damage to classrooms, and the diversion of schools into evacuation centers weaken learning continuity and contribute to declining performance (David et al., 2019). Recent reports from Eastern Visayas highlight the effects of hazards on education, including canceled classes, disrupted exams, and the shift to alternative learning methods (Marticio, 2023).

These disruptions reveal the vulnerability of the education system, where infrastructure, governance, and teaching practices are all affected by natural hazards. The findings suggest that schools in Region VIII are at risk not only because of their geographic location but also due to environmental degradation, weak infrastructure, and gaps in DRRM policy. Addressing these challenges requires strategies tailored to the local context, such as climate-resilient infrastructure, improved early warning systems, and the integration of DRRM into school governance and curriculum. As Regis (2020) and Bello (2020) note, strengthening school resilience supports both educational continuity and wider community protection, since schools often function as centers for safety and recovery.

4.2 Prevention and Mitigation in Hazard-Prone Schools

The prevention and mitigation efforts of schools in Region VIII show a developing but uneven approach to disaster risk reduction and management (DRRM). As shown in Table 2, schools implement activities that include information campaigns, capacity-building programs, curriculum integration, organizational planning, and environmental initiatives. These actions reflect an understanding that disaster resilience requires both structural and non-structural measures. This approach aligns with the Hyogo Framework for Action and the Sendai Framework for Disaster Risk Reduction, which stress the importance of integrating DRR into education and governance systems (UNDRR, 2015).

A notable strength of schools in the region is the integration of DRRM into everyday teaching. Teachers include hazard awareness and emergency procedures across subjects such as Science, MAPEH, Filipino, and English, making preparedness part of daily learning rather than a separate activity. As one teacher explained, "There are Science topics discussing various kinds of typhoons and what to do during emergencies... Filipino and English also integrate DRRM, and in MAPEH, particularly health, DRRM concepts are included" (T7, L49–55). This demonstrates that DRRM is embedded in the curriculum across disciplines, ensuring that disaster preparedness becomes a continuous and contextualized learning experience. Salita et al. (2021) note that embedding DRRM in lesson plans helps students develop lasting knowledge and practical skills, which are vital in minimizing disaster-related risks.

Table 2. Summary of prevention and mitigation activities conducted by the hazard-prone schools

Category	Prevention and Mitigation Activities
Information Dissemination and Awareness	a. Posting of DRRM signages and emergency updates on bulletin boards and DRRM corners b. Posting emergency hotline numbers c. Public announcements and social media alerts regarding cancellations
Capacity Building and Training	a. Orientation programs for parents and students b. Re-echoing of attended trainings c. Participation in earthquake, fire and rescue drills.
Curriculum Integration	a. Integration of DRRM concepts into teachers' lesson plans b. Incorporation of DRRM in scouting activities
Planning and Organizational Measures	a. Crafting and implementation of school contingency plans b. Formation and mobilization of DRRM teams c. Regular assessment and monitoring of DRRM program implementation
Infrastructure and Environmental Efforts	a. Tree planting activities b. School renovation and reconstruction projects.

Beyond the classroom, DRRM is also embedded in extracurricular activities such as scouting, which includes training on first aid and rescue operations, further enhancing students' practical skills and engagement (T11, L93–94). These activities reinforce classroom learning by promoting hands-on experiences that build confidence and readiness. Such initiatives reflect Wisner et al.'s (2004) concept of risk reduction through knowledge building, which enhances adaptive capacity for individuals and communities. By combining formal instruction with experiential learning, schools nurture not only awareness but also concrete response skills among students.

Schools also maintain multiple channels for sharing information, including bulletin boards, hotlines, and social media. Although these tools improve the timely dissemination of hazard alerts and class updates, they highlight existing inequalities, as families with limited access to digital platforms may receive information more slowly. This supports David et al.'s (2019) observation that communication gaps can increase vulnerability in rural and marginalized areas.

Schools in Region VIII have implemented planning and organizational measures, including the development of contingency plans and the formation of DRRM teams, as a way to institutionalize preparedness. However, the execution of these plans varies, reflecting uneven institutional capacity. While some schools maintain proactive monitoring and regular drills, others face resource constraints that limit consistent implementation. This disparity highlights the “implementation gap” often noted in Philippine DRRM literature, where national policies, such as DepEd Order No. 32 s. 2020, are well-formulated but difficult to apply locally due to limited manpower and funding (Bello, 2020).

Environmental initiatives, including tree planting and school rehabilitation, show an awareness of hazard mitigation at both ecological and structural levels. Yet, these efforts are

frequently small-scale and reliant on temporary funding or voluntary labor. Without sustained investment, they risk remaining symbolic rather than producing lasting impact. This reflects a broader challenge in the Philippine DRRM system, where structural mitigation tends to be reactive and project-based rather than systemic and long-term (Bicar et al., 2023).

Schools have also adopted adaptive strategies to maintain learning continuity during suspensions, such as distributing modules and conducting make-up classes. As one school head shared, “When there are suspensions, we send modules or conduct make-up classes to cover competencies. We organize both teaching and non-teaching personnel accordingly” (SH4, L38–41). This adaptive approach aligns with DepEd’s blended learning policy and highlights schools’ capacity to uphold educational continuity amid disruptions. While these measures are valuable, their effectiveness depends on teacher workload, parental support, and resource availability, all of which differ across communities. This illustrates the tension between policy expectations and local realities, where schools already stretched by teaching responsibilities struggle to balance educational and disaster response duties.

Overall, Region VIII’s hazard-prone schools display a comprehensive yet uneven approach to prevention and mitigation. Efforts such as curriculum integration and community engagement represent meaningful progress toward building a culture of safety. Nevertheless, systemic barriers including resource limitations, inconsistent implementation, and socio-economic inequities continue to constrain resilience. These findings support DRR theories that view disasters not merely as “natural” events but as outcomes of social vulnerability and governance gaps (Wisner et al., 2004). Strengthening resilience, therefore, requires not only school-level initiatives but also structural reforms in resource allocation, policy support, and community engagement to ensure that prevention and mitigation strategies are both effective and sustainable.

4.3 Challenges in DRRM Implementation in Hazard-Prone Schools

Schools in Region VIII face multiple, interconnected challenges that limit the effectiveness of Disaster Risk Reduction and Management (DRRM) programs. As shown in Table 3, these challenges include limited resources, inadequate capacity, weak stakeholder engagement, and environmental vulnerabilities. Together, they reflect the idea described by Wisner et al. (2004) in the Pressure and Release (PAR) model: disasters arise not only from exposure to hazards but also from underlying social and structural conditions that create vulnerability.

Schools reported that limited funding was the biggest obstacle to implementing DRRM effectively. Respondents noted that DRRM budgets within the Maintenance and Other Operating Expenses (MOOE) were insufficient even for basic materials, forcing schools to prioritize other needs over disaster preparedness. As one school head explained, “The fund allocated for DRRM in our MOOE is too little. We cannot buy enough materials to build a facility. The only option is to connect with stakeholders, but we need to prioritize the library first” (SH3, L12–18). This statement captures the competing financial priorities schools face, which often relegate DRRM initiatives to secondary importance. This finding mirrors prior

research identifying underfunding as a systemic weakness in Philippine school-based DRRM (Cubillas, 2020; Firmo, 2022; Shaw et al., 2014). The absence of dedicated funds undermines both sustainability and innovation, limiting schools' capacity to procure equipment or build resilient infrastructure.

Table 3. Summary of challenges encountered and suggested activities in the implementation of DRRM programs in hazard-prone schools in Region VIII

Challenges Encountered	Suggested Activities to address challenges
Limited financial resources	a. Allocation of dedicated funds for DRRM programs b. Procurement of DRRM materials c. Production of substitute or low-cost materials
Insufficient DRRM trainings for teachers and students	a. Conduct regular capacity-building trainings and seminars
Lack of DRRM equipment and facilities	a. Procure essential DRRM tools and materials b. Utilize available local resource creatively
Connectivity Issues	a. Explore alternative modes of communication and coordination b. Strengthen offline DRRM resources
Low stakeholder participation	a. Improve coordination with community stakeholders b. Enhance public and private partnerships
Overwhelming workload for DRRM implementers	a. Promote effective time and task management b. Designate specific roles among the staff to distribute responsibilities evenly
Inadequate Time allocation for DRRM activities	a. Integrate DRRM content into lessons and co-curricular activities.
Low student and teacher participation	a. Require active involvement from both students and teachers Offer incentives or recognition
Lack of passion and commitment among teachers	a. Foster culture of motivation and recognition b. Provide support and mentorship.
Limited support from higher authorities	a. Advocate for stronger administrative backing and inclusion of DRRM policies and priorities.
Environmental Degradation around school premises	a. Initiate tree planting and school greening programs

Another key challenge is the insufficiency and inconsistency of training. Opportunities for DRRM capacity building are often limited to coordinators, with knowledge rarely shared across the wider school community. As one teacher described, "Only the DRRM coordinator usually attends, and when it's time to share, the information is incomplete. When we can attend, we become aware, but if not, it's as if nothing happened" (T4, L123–126). This highlights the fragmented nature of training dissemination and the loss of institutional learning when knowledge is not effectively cascaded. It aligns with Alarte (2024) and Dollentas and Gamba (2025), who emphasize that regular, inclusive, and hands-on training is essential for cultivating a culture of preparedness. Without such efforts, schools risk maintaining tokenistic rather than meaningful DRRM practices.

Participation and coordination among stakeholders also remain weak. Respondents reported low involvement from students, parents, and community members, as well as poor coordination among school staff. As one division official emphasized, “The challenge that must be enhanced in the DRRM Program is, of course, the coordination of the school personnel” (D8, L103–114), underscoring the internal organizational barriers that hinder the effective flow of communication and action. Additionally, “One of the challenges we have encountered is a lack of community support” (D12, L39–41), reflecting the external engagement gaps that weaken collective resilience. These issues echo findings by Baldomar (2024) and Rozikin (2024), who argue that strong partnerships between schools, communities, and local government are crucial for effective disaster risk reduction. Limited engagement not only undermines preparedness but also reinforces the isolation of schools in managing disaster risks.

Beyond participation, structural challenges such as limited equipment, poor connectivity, and heavy workloads further hinder DRRM implementation. In remote areas, communication gaps weaken early warning systems and coordination. Teachers often manage multiple responsibilities, leaving little time for disaster preparedness activities. These institutional constraints align with UNDRR (2020), which identifies governance and workload distribution as key factors that are often overlooked in local DRRM systems.

The study also revealed low motivation and uneven commitment among staff and learners, often linked to a lack of incentives and recognition. This supports findings in educational resilience literature, which emphasize the importance of institutional culture and leadership in maintaining engagement (Salita et al., 2021). Without stronger administrative support, DRRM risks being seen as an added responsibility rather than a core component of school operations.

Finally, environmental degradation around school grounds—such as eroded slopes and sparse vegetation—increases vulnerability to hazards. While schools make efforts through greening initiatives and tree planting, these actions are often small-scale and symbolic. This highlights the gap between local initiatives and the need for broader, systemic approaches to environmental risk management.

To address these challenges, participants recommended practical measures such as allocating dedicated DRRM funds, providing regular training, clarifying roles and responsibilities, fostering community partnerships, and integrating DRRM into the curriculum. While these strategies are consistent with current research and policy frameworks (Salita et al., 2021; Department of Education, 2020; UNDRR, 2020), the study revealed ongoing gaps in implementation. These gaps point to broader governance issues, including underfunding, uneven policy support, and reliance on individual commitment rather than institutionalized structures.

Overall, the experiences of hazard-prone schools in Region VIII demonstrate that vulnerability is shaped not only by natural hazards but also by social and institutional factors. Effectively addressing these challenges requires more than isolated school initiatives. Structural reforms in funding, training, and governance, combined with stronger multi-

stakeholder collaboration, are needed to ensure that DRRM is not only mandated but meaningfully integrated into both education and community resilience

4.4 Best Practices in DRRM Implementation in Hazard-Prone Schools

Hazard-prone schools in Region VIII have developed a range of best practices that demonstrate how educational institutions can serve as frontline actors in disaster risk reduction and management (DRRM). These practices span multiple domains—capacity building, stakeholder engagement, preparedness and mitigation, instructional integration, infrastructure management, policy development, and environmental sustainability—reflecting a holistic approach that resonates with the Sendai Framework’s call for comprehensive, multi-sectoral strategies in risk reduction (UNDRR, 2015) (Table 4).

Table 4. Summary of best practices implemented by hazard-prone schools in Region VIII

Category	Best Practices
Capacity Building and awareness	a. Conducting orientations and training sessions for students, teachers, and stakeholders to raise awareness on disaster risk reduction and management (DRRM).
Stakeholder Engagement	a. Establishing strong partnerships with local government units (LGUs), non-governmental organizations (NGOs), and other community-based agencies.
Preparedness and Mitigation Measures	a. Forming Disaster Risk Reduction and Management (DRRM) teams. b. Conducting regular emergency drills. c. Installing informative DRRM signages.
Instructional Integration	a. Integrating DRRM concepts into lesson plans and classroom activities across subjects.
Infrastructure and Resource Management	a. Setting up makeshift classrooms and conducting make-up classes to ensure learning continuity during disasters.
Planning and Policy Implementation	a. Developing and regularly updating contingency plans. b. Implementing DRRM programs as part of school competitions to encourage active participation.
Environmental Sustainability	a. Organizing tree planting and other environmental activities that support climate adaptation and risk reduction.

A defining strength across schools is the establishment of strong partnerships with local government units (LGUs), NGOs, and community-based organizations. These linkages mobilize resources beyond the school’s limited budget and ensure external support during crises. As one school head explained, “Establishing a good partnership with them is one of the best practices because it keeps us a priority for help, which is indeed necessary especially the LGU. We need that, and they’re a big help to us” (SH3). This sentiment was echoed by teachers who noted that such coordination raises community awareness and mobilizes critical resources, thereby augmenting limited school budgets and reinforcing resilience (TF, L86–90). These

insights reinforce Tolentino (2021) and Rico's (2022) argument that sustainable DRRM depends on collaborative governance rather than isolated institutional action.

The establishment of functional DRRM teams with clearly defined roles was also identified as a key practice. One teacher emphasized, “Having a functional DRRM team is also a best practice. We know what to do; we already have assigned tasks we can implement the program more efficiently” (T6, L91–93). Such organizational clarity fosters accountability, responsiveness, and teamwork during crises. This approach reflects the governance dimension of resilience described in Wisner et al.’s (2004) Pressure and Release (PAR) model, where organized preparedness helps reduce social vulnerability by ensuring that schools operate as coordinated systems rather than fragmented units.

Capacity building and preparedness drills—including orientations, training sessions, and regular simulations—further cultivate a culture of readiness among students, teachers, and parents. As one teacher shared, “Conducting earthquake drills... is our best practice because they can adopt the drills we do” (T9, L64–66). These drills allow learners to internalize emergency procedures and replicate them at home, contributing to household-level preparedness. The use of technology, as reported by a division official who said, “We disseminate [information] through Messenger, phone calls, and text messages” (D9, L89–96), enhances the timeliness and reach of communication, ensuring that DRRM information flows rapidly during emergencies. These practices are consistent with Shaw et al. (2014), who highlight the importance of ongoing training and technological adaptation in strengthening adaptive capacity.

Instructional integration of DRRM concepts into core subjects such as Science, MAPEH, Filipino, and English ensures that disaster awareness becomes embedded in daily learning, rather than treated as an add-on. Teachers requiring students to prepare family disaster plans exemplify how education can extend resilience-building beyond the school to households. As one teacher explained, “In my class, I always made it a point that every student has a family disaster preparedness plan... every building has a contingency plan posted on the walls” (D11, L166–174). This initiative shows how classroom instruction translates into real-world preparedness, supporting Oro and Benavides’ (2020) recommendation that embedding DRRM in curricula fosters long-term behavioral change and community resilience.

Infrastructure and resource management practices—such as setting up makeshift classrooms, conducting make-up classes, and maintaining continuity of learning during disruptions—demonstrate adaptive strategies consistent with DepEd’s blended learning policies. However, these practices also reveal resource gaps, since not all schools have the capacity to sustain them equitably.

Planning and policy innovations, such as updating contingency plans, institutionalizing drills, and embedding DRRM in school competitions (e.g., “DRRM-lympics”), further enhance preparedness by turning risk reduction into routine, community-wide engagement. These initiatives not only reinforce practical skills but also cultivate a sense of shared responsibility and collaboration across the school community.

Finally, environmental initiatives—particularly tree planting and greening programs—reflect a localized response to climate and ecological risks. As one division representative noted, “Tree planting was our intervention... this does not only benefit the school but the whole community” (D3, L79–81). Such efforts illustrate how environmental stewardship operates as both a mitigation and educational tool, connecting schools to the broader discourse on ecosystem-based disaster risk reduction (PEDRR, 2010). While often small-scale, these activities strengthen collective environmental responsibility and link ecological care with community safety.

Despite these strengths, the study also reveals uneven adoption across schools. While some institutions excel in integrating DRRM into daily routines, others remain limited by funding, capacity, and administrative support. This unevenness suggests the need for a more structured, context-sensitive model—such as a localized spiral DRRM framework—that enables schools to systematically adopt and scale proven strategies according to their unique hazard profiles and resources.

In summary, the best practices of Region VIII schools illustrate how partnerships, institutional readiness, capacity building, curricular integration, and environmental stewardship collectively enhance disaster resilience. However, sustaining these practices requires addressing systemic issues—particularly funding gaps, policy alignment, and institutional support—to ensure that resilience is embedded across the educational system as a whole, and not merely dependent on isolated schools’ initiative.

The findings of this study highlight the urgent need for a DRRM approach that is both context-sensitive and sustainably implemented across hazard-prone schools in Region VIII. Although schools have shown adaptability through localized practices and stakeholder engagement, persistent challenges—such as limited resources, gaps in training, infrastructural weaknesses, and inconsistent policy enforcement—continue to hinder the full implementation of DRRM measures. These conditions point to the need for a structured yet flexible framework that addresses these ongoing obstacles while building on the adaptive strategies already in practice at the school level.

In response to these findings, a localized, practice-oriented DRRM model is proposed to strengthen and sustain DRRM implementation in both elementary and secondary schools in the region, ensuring that the principles of prevention, preparedness, and resilience are institutionalized within the broader framework of educational governance.

4.5 Suggested Framework for Improved DRRM Implementation

The "Localized Spiral Disaster Risk Reduction Management (DRRM) Model for Elementary and Secondary Schools" is to be proposed founded on the research outcomes of assessing challenges in DRRM implementation for hazard schools in Region VIII. Research involved six DepEd primary schools and six DepEd secondary schools.

This model responds to the challenges in DRRM with a spiral pattern, underpinning concepts on disaster prevention and mitigation gradually. Schools which experience hazards reinforce learning and action capabilities through procedural means: assessment of hazards, identification of capacities, intervention towards hazards, evaluation and monitoring, and enhanced practice on DRRM. Climate change's enlarging influence poses, therefore, a need for a localized cyclical approach towards DRRM.

Region VIII is characterized as being extensively vulnerable to earthquake, typhons, flooding, landslides, and storm surges. Schools are exposed to threats because of their location, climate, and poor infrastructure. Successful implementation of DRRM demands stringent teachers' training, administrative assurance, and creative approaches. Disasters are not inevitable; their effects can be managed. Schools are critical agents in building a safety and resilience culture. The Localized Spiral DRRM Model fosters cooperation between schools, stakeholders (BFP, PNP, MDRRMO), and the community. The main stakeholders who contribute are the DRRM proponents, school administrators, professionally trained teachers and students, bolstered by their local government units (LGU, MDRRMO, PNP, BFP, DOH, DENR), parents, Non-Governmental Organizations (NGOs), and community residents.

The model ties in with DRRM's four thematic topics: (a) prevention/mitigation, (b) readiness, (c) response, and (d) recovery/rehabilitation. The model executes a five-stage process:

Hazard Assessment: Schools engage partners in determining and prioritizing vulnerabilities through site inspection and vulnerability scanning.

Capacity Identification: Schools assess their assets, knowledge, and capabilities to maximize disaster preparedness and response.

Hazard Intervention: Schools carry out specific mitigation measures, including DRRM signage, integration into the curriculum, student and parent orientations, and teacher training.

Assessment and Monitoring: Schools regularly analyze DRRM interventions through safety audits and progress reports.

Improved DRRM Practices: Schools continue to strengthen resilience through clearer policies, regular training, and active community engagement.

The Localized Spiral DRRM Model builds on traditional DRRM approaches by emphasizing continuous monitoring, context-specific interventions, and proactive local participation. By fostering a culture of preparedness, this model enhances the resilience of both schools and their surrounding communities, enabling more effective implementation of DRRM in hazard-prone areas (Figure 2).

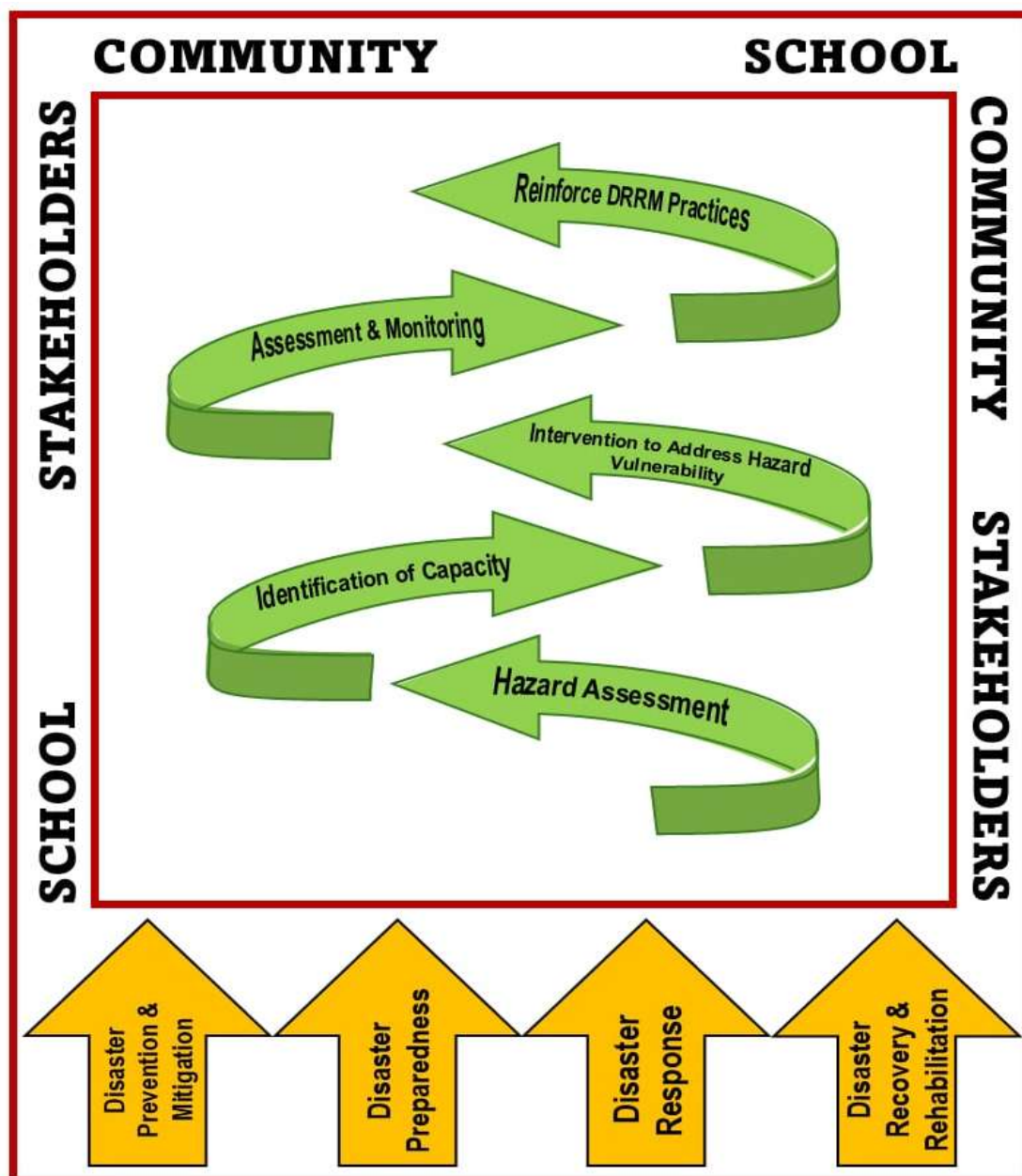


Figure 2. Localized Disaster Risk Reduction Model

5. CONCLUSION

This study examined the implementation of School Disaster Risk Reduction and Management (SDRRM) programs in hazard-prone schools across Eastern Visayas, Philippines, using a qualitative multiple-case study approach. The research identified several challenges that limit effective DRRM implementation, including resource shortages, capacity gaps, weak stakeholder engagement, and discrepancies between policy and practice, despite the guidance of a comprehensive national framework (Department of Education, 2015). Financial constraints at both the school and local government levels restrict essential investments in

infrastructure, equipment, and training, while limited capacity-building efforts reduce the preparedness and responsiveness of school personnel. Additionally, low participation from students, parents, and community members exacerbates vulnerabilities, highlighting the need for more inclusive and participatory approaches.

Despite these obstacles, schools in Eastern Visayas have shown notable resilience by developing innovative practices tailored to their local contexts. These strategies demonstrate the potential of strengthening SDRRM programs through interventions that are sensitive to context and that build on existing school and community capacities. Based on these findings, this study proposes the Localized Spiral DRRM Model—a cyclical, iterative, and community-driven framework designed to systematically enhance disaster readiness and resilience in schools. The model comprises five core components: hazard analysis, capacity development, intervention, assessment and monitoring, and sustained DRRM practices. These components provide a practical, step-by-step guide for schools seeking to institutionalize and progressively improve their DRRM efforts.

6. RECOMMENDATIONS

Based on the study's findings and conclusions, the following recommendations are advanced to improve SDRRM implementation and foster disaster resilience in Eastern Visayas:

1. Increase Financial Support and Resource Allocation

Advocate for increased and dedicated budget allocations for SDRRM at both the school and LGU levels. Prioritize investments in essential infrastructure, emergency equipment, and comprehensive training programs for teachers and support staff. Establish transparent and accountable financial management systems to mitigate risks of mismanagement and corruption. Target at least 5% of the school budget to School DRRM annually and ensure emergency kits are provided to all schools within every school year.

2. Enhance Capacity Building and Training

Develop and implement specialized, contextually relevant training programs for teachers, school administrators, and DRRM coordinators. Training should emphasize core DRRM concepts, emergency response protocols, and effective community engagement strategies. Incorporate indigenous knowledge and local expertise to enhance the cultural relevance and impact of capacity-building initiatives. Practice quarterly training workshops per school with post-training evaluations to measure competency improvements.

3. Encourage Stakeholder Participation and Community Involvement

Promote active and sustained involvement of students, parents, community members, and local organizations in DRRM activities. Conduct awareness campaigns to increase understanding of disaster risks and preparedness measures. Facilitate regular communication and coordination channels among schools, LGUs, and other stakeholders to strengthen

collaborative disaster management. Organize monthly emergency drills among the community, and weekly coordination meetings with MDRRMO (Municipal Disaster Risk Reduction Management) of every LGU. Aim to reach at least 50 % participation of parents and local volunteers in each drill.

4. Institutionalize and Apply the Localized Spiral DRRM Model

Support the formal adoption of the Localized Spiral DRRM Model as a guiding framework for SDRRM planning and implementation in schools. Provide technical assistance and training to enable schools to operationalize the model's five core functions effectively. Encourage schools to adapt the model flexibly to their unique contexts, fostering innovation and ownership.

5. Strengthen Monitoring and Evaluation Mechanisms

Establish robust, data-driven monitoring and evaluation systems to track SDRRM implementation progress and assess intervention effectiveness. Use findings to inform continuous improvement of DRRM plans and strategies. Regularly review and update DRRM policies and practices based on evidence and emerging risk profiles.

6. Enhance Collaboration and Knowledge Sharing

Facilitate stronger partnerships and knowledge exchange among schools, LGUs, research institutions, and other relevant stakeholders. Develop a regional DRRM knowledge hub to disseminate best practices, lessons learned, and innovative approaches. Encourage documentation and sharing of school experiences to inspire and inform broader DRRM efforts.

By implementing these recommendations, schools and their communities in Eastern Visayas can build a more resilient educational environment capable of effectively mitigating disaster risks, ensuring learner safety, and sustaining educational continuity in the face of increasing natural hazards.

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