

School Safety and Disaster Management in Balicutro Public Elementary Schools, Northern Samar

Marill D. Alcera, PhD*

Independent Researcher

*Corresponding Author

DOI: <https://doi.org/10.47772/IJRISS.2026.100700986>

Received: 02 August 2026; Accepted: 08 August 2026; Published: 19 August 2026

ABSTRACT

School safety and disaster management jointly protect learners and sustain education in hazard-prone communities. **Objective:** This study assessed school safety and disaster management in public elementary schools in the Balicutro Area of Northern Samar, compared school-head and teacher perceptions, examined their relationship, and developed a contextualized enhancement plan. **Methods:** A cross-sectional descriptive-correlational design involved 332 respondents: 79 school heads through complete enumeration and 253 teachers randomly selected from 731. An expert-reviewed, researcher-developed questionnaire measured seven school-safety dimensions and five disaster-management domains (Cronbach's $\alpha = .901$). Means, ranks, Mann-Whitney U tests, and Kendall's tau-b were applied at $\alpha = .05$. **Results:** Overall school safety was "Much Safe" ($M = 3.49$); water safety ranked highest ($M = 3.81$), while non-structural safety ($M = 3.22$), school security ($M = 3.27$), and structural safety ($M = 3.29$) ranked lowest. Disaster management was "High" ($M = 3.66$), with response ($M = 3.51$) and recovery ($M = 3.52$) as the weakest domains. School heads and teachers differed significantly in non-structural safety, food and sanitation, and school grounds, but not in disaster-management domains. School safety was strongly associated with disaster management ($\text{tau-b} = .757$, $p < .001$), and all domain-level relationships were significant. **Conclusion:** Schools showed generally favorable practices, but non-structural safety, school security, response, and recovery require priority action. The proposed plan emphasizes evidence-based audits, corrective works, functional exercises, continuity planning, coordinated responsibilities, and performance monitoring.

Keywords: school safety; disaster risk reduction; disaster management; public elementary schools; Northern Samar

INTRODUCTION

Safe schools protect learners and personnel and support education continuity before, during, and after emergencies. In the Philippines, Republic Act No. 10121 establishes an all-hazards, community-based disaster risk reduction and management system, while the Sendai Framework prioritizes risk understanding, governance, resilience investment, preparedness, response, and recovery (Republic Act No. 10121, 2010; United Nations Office for Disaster Risk Reduction [UNDRR], 2015). The Department of Education operationalizes these commitments through its Comprehensive Disaster Risk Reduction and Management in Basic Education Framework (Department of Education [DepEd], 2015b).

The Comprehensive School Safety Framework positions resilience as a school-wide system supported by safer learning facilities, educational continuity management, and risk reduction and resilience education (Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector [GADRRRES], 2022). This perspective is especially relevant to rural and geographically dispersed schools, where facilities, water and sanitation, access routes, communications, and local response capacity determine whether education can remain safe and functional.

Disaster education, repeated practice, and institutional coordination can improve preparedness, but implementation is often constrained by infrastructure, funding, training, participation, and weak translation of policy into action (Johnson et al., 2014; Mutanda & Ngcamu, 2026). Education strengthens risk awareness and

adaptive capacity, yet its protective value depends on supportive facilities and management systems (Muttarak & Lutz, 2014). Northern Samar's exposure to typhoons, flooding, landslides, and service disruption makes combined assessment of physical safety and operational readiness particularly important.

This study assessed school safety and disaster management in public elementary schools in the Balicuatro Area of Northern Samar during School Year 2024-2025. It described seven school-safety dimensions and five disaster-management domains, compared the perceptions of school heads and teachers, examined overall and domain-level relationships, and used the findings to develop a Contextualized School Safety and Disaster Management Enhancement Plan.

METHODS

Research Design

The study used a cross-sectional descriptive-correlational design to describe perceived school safety and disaster-management practices, compare school-head and teacher ratings, and examine associations between the constructs in their existing school settings (Creswell & Creswell, 2018).

Research Locale

The study was conducted during School Year 2024-2025 in public elementary schools in the Balicuatro Area of the First District of Northern Samar. The schools represent varied coastal, lowland, upland, and access conditions and are exposed to recurrent hydro-meteorological hazards and related service disruptions.

Participants and Sampling

The 332 respondents comprised all 79 public elementary school heads in the study area and 253 teachers randomly selected from a population of 731. Complete enumeration was used for school heads because of their governance and emergency-coordination roles. Eligible respondents had at least one year of continuous service and sufficient familiarity with school safety and school DRRM activities. Participation was voluntary.

Research Instrument

A researcher-developed questionnaire measured seven school-safety dimensions (structural safety, non-structural safety, local infrastructure, water safety, food and sanitation, school security, and school grounds) and five disaster-management domains (disaster risk reduction management; preparedness, training and mitigation; response; recovery; and resilience in DRRM education). Expert review established clarity, relevance, objective alignment, and contextual suitability. The combined instrument demonstrated excellent internal consistency (Cronbach's $\alpha = .901$) (Boateng et al., 2018). Items used a five-point scale. School-safety scores ranged from "Very Much Safe" (4.20-5.00) to "Not Safe" (1.00-1.79); equivalent intervals described disaster management from "Very High" to "Very Low."

Data Collection and Analysis

After approval from the appropriate education authorities, informed consent was obtained and questionnaires were administered during authorized activities with minimal disruption to official duties. Responses were checked, coded without personal identifiers, and securely stored. Means, ranks, and verbal interpretations summarized the ratings. Mann-Whitney U tests compared the two independent respondent groups, and Kendall's tau-b assessed overall and domain-level relationships (Field, 2018). Statistical significance was evaluated at $\alpha = .05$; multiple bivariate results were interpreted as exploratory associations rather than causal effects.

RESULTS

School Safety Dimensions

Overall school safety was rated "Much Safe" ($M = 3.49$). Water safety ranked highest ($M = 3.81$), followed by school grounds ($M = 3.70$), food and sanitation ($M = 3.61$), and local infrastructure ($M = 3.51$). Non-structural

safety ($M = 3.22$), school security ($M = 3.27$), and structural safety ($M = 3.29$) were only "Fairly Safe." The results identify non-structural hazards and school security as immediate management priorities, while structural concerns require technical assessment and capital support. This pattern is consistent with the safer-learning-facilities pillar and DepEd requirements for school watching and hazard mapping (DepEd, 2015a; GADRRRES, 2022).

Table 1 Status of School Safety as Perceived by School Heads and Teachers

School-safety dimension	M	Interpretation	Rank
Structural safety	3.29	Fairly safe	5
Non-structural safety	3.22	Fairly safe	7
Local infrastructure	3.51	Much safe	4
Water safety	3.81	Much safe	1
Food and sanitation	3.61	Much safe	3
School security	3.27	Fairly safe	6
School grounds	3.70	Much safe	2
Overall	3.49	Much safe	-

Note. Interpretive scale: 4.20-5.00 = very much safe; 3.40-4.19 = much safe; 2.60-3.39 = fairly safe; 1.80-2.59 = less safe; 1.00-1.79 = not safe.

Disaster Management

Disaster management was rated "High" overall ($M = 3.66$). Disaster risk reduction management ranked first ($M = 3.92$), followed by preparedness, training and mitigation ($M = 3.69$) and resilience in DRRM education ($M = 3.64$). Response ($M = 3.51$) and recovery ($M = 3.52$) ranked lowest. Although both remained within the high range, they involve real-time coordination, logistics, learner accountability, service continuity, damage assessment, and restoration that cannot be verified through policy dissemination or routine drills alone. The results support greater emphasis on performance-based response and recovery exercises (DepEd, 2015b; Mutanda & Ngcamu, 2026).

Table 2 Level of Disaster Management as Perceived by School Heads and Teachers

Disaster-management domain	M	Interpretation	Rank
Disaster risk reduction management	3.92	High	1
Preparedness, training and mitigation	3.69	High	2
Disaster response	3.51	High	5
Disaster recovery	3.52	High	4
Resilience in DRRM education	3.64	High	3
Overall	3.66	High	-

Note. The five-point scale used equal interval widths: 4.20-5.00 = very high; 3.40-4.19 = high; 2.60-3.39 = moderate; 1.80-2.59 = low; 1.00-1.79 = very low.

Differences in School-Safety Perceptions

School heads and teachers differed significantly in non-structural safety ($U = 6,990$, $p < .001$), food and sanitation ($U = 8,315$, $p = .039$), and school grounds ($U = 7,416$, $p = .001$), but not in structural safety, local infrastructure, water safety, or school security. Because group-specific means or medians were unavailable, the tests show divergence but not which group rated a dimension higher. Joint inspections and common evidence-based scoring criteria are therefore more appropriate than privileging either perspective.

Table 3 Differences in Perceptions of School Heads and Teachers on School Safety

School-safety dimension	U	p	Result
Structural safety	8,553	.083	Not significant
Non-structural safety	6,990	< .001	Significant
Local infrastructure	8,945	.229	Not significant
Water safety	8,493	.069	Not significant
Food and sanitation	8,315	.039	Significant
School security	9,005	.263	Not significant
School grounds	7,416	.001	Significant

Note. U = Mann-Whitney U statistic. Statistical significance was evaluated at alpha = .05.

Differences in Disaster-Management Perceptions

No significant differences were found between school heads and teachers in disaster risk reduction management ($p = .546$), preparedness, training and mitigation ($p = .711$), response ($p = .913$), recovery ($p = .923$), or resilience in DRRM education ($p = .156$). The convergence suggests a shared view of school-level DRRM arrangements; however, operational proficiency should still be verified through records, observations, simulation checklists, and after-action reviews.

Table 4 Differences in Perceptions of School Heads and Teachers on Disaster Management

Disaster-management domain	p	Result
Disaster risk reduction management	.546	Not significant
Preparedness, training and mitigation	.711	Not significant
Disaster response	.913	Not significant
Disaster recovery	.923	Not significant
Resilience in DRRM education	.156	Not significant

Note. Statistical significance was evaluated at alpha = .05. The source output did not report the corresponding U statistics for these domains.

Overall Relationship

School safety had a strong positive relationship with disaster management (Kendall's tau-b = .757, $p < .001$). Schools with higher safety ratings also tended to report stronger disaster-management practices. The result supports coordinated planning across facilities, water and sanitation, security, preparedness, response, recovery, and resilience education, but it does not establish causality.

Table 5 Relationship Between School Safety and Disaster Management

Variables	tau-b	p	Interpretation
School safety and disaster management	.757	< .001	Strong positive relationship

Note. tau-b = Kendall's tau-b. Statistical significance was evaluated at alpha = .05.

Domain-Level Relationships

All 35 domain-level relationships were positive and statistically significant ($p < .001$), with coefficients from tau-b = .324 to .556. The strongest relationships involved school grounds with risk reduction (tau-b = .556) and

resilience education ($\tau\text{-}b = .535$), followed by water safety with risk reduction ($\tau\text{-}b = .506$). The smallest coefficient, between school security and risk reduction ($\tau\text{-}b = .324$), remained significant. The consistent pattern shows that each safety dimension is associated with several phases of disaster management.

Table 6 Domain-Level Relationships Between School Safety and Disaster Management

School-safety dimension	Risk reduction	Preparedness and mitigation	Response	Recovery	Resilience education
Structural safety	.327	.329	.395	.373	.390
Non-structural safety	.351	.393	.429	.416	.424
Local infrastructure	.393	.445	.450	.410	.454
Water safety	.506	.421	.366	.349	.412
Food and sanitation	.462	.439	.427	.425	.442
School security	.324	.472	.482	.430	.413
School grounds	.556	.478	.461	.465	.535

Note. Entries are Kendall's $\tau\text{-}b$ coefficients. All p -values were $< .001$.

DISCUSSION

Priority Safety Gaps

The overall "Much Safe" rating indicates generally functional school environments, particularly in water safety, school grounds, food and sanitation, and local infrastructure. These visible, routinely monitored areas may benefit from established WASH and site-management practices (DepEd, 2016). By contrast, structural and non-structural safety often depend on technical inspection, maintenance funding, engineering decisions, and corrective works. The World Bank's national school-infrastructure program similarly prioritizes repair, rehabilitation, retrofitting, operations and maintenance, WASH, and site measures for typhoon, flood, landslide, and heat risks (World Bank, 2024).

Non-structural safety was the lowest-rated dimension and offers the clearest opportunity for immediate improvement. Securing cabinets and equipment, removing falling and electrical hazards, clearing passageways, and improving storage can reduce injury without major capital investment. School security also requires attention to perimeter control, visitor management, learner release, lighting, and emergency access without obstructing evacuation. Differences in ratings for non-structural safety, food and sanitation, and school grounds further justify joint walkthroughs, observable scoring criteria, and documented calibration among school heads, teachers, and DRRM coordinators.

Response and Recovery Readiness

The high overall disaster-management rating suggests that preventive and planning practices are established. Response and recovery, however, ranked lowest and require more than knowledge of procedures. Effective response depends on accountability, first aid, communication, evacuation, reunification, incident documentation, and coordination with external responders. Recovery requires damage and needs assessment, psychosocial support, temporary learning arrangements, restoration of WASH and essential services, resource mobilization, and safe re-entry decisions. Philippine and international evidence similarly shows uneven implementation when funding, training, and operational support are limited (Dela Cruz & Ormilla, 2022; Mutanda & Ngcamu, 2026).

Scenario-based tabletop, functional, and field exercises should test assigned roles, communications, equipment, records, and continuity arrangements. Every exercise should end with an after-action review, assigned corrective measures, and closure dates. The absence of group differences in disaster-management ratings is encouraging, but shared perceptions remain self-reported; drill times, head counts, supplies, communication functionality, role-performance checklists, and incident records provide stronger evidence of readiness.

Relationship and Domain Patterns

The strong association between school safety and disaster management is the study's central finding. It supports the systems logic of the Comprehensive School Safety Framework: facility conditions, continuity management, and resilience education reinforce school capacity when planned together (GADRRRES, 2022). A sound building cannot ensure accountability or recovery, while a clear evacuation plan cannot compensate for blocked routes or hazardous contents. Because the study was cross-sectional, the direction of influence cannot be established; leadership, resources, community support, and prior hazard experience may affect both constructs.

The domain-level pattern provides practical direction. School grounds were strongly related to risk reduction and resilience education because grounds influence drainage, hazard visibility, access, evacuation flow, and assembly areas. Water safety and food and sanitation were closely associated with risk reduction and service continuity. School security showed its strongest relationship with response, underscoring controlled access, crowd management, learner release, and responder coordination during incidents.

Management Priorities

Four priorities emerge for DepEd managers: (1) correct non-structural hazards promptly and refer structural defects through technical and budgeting channels; (2) strengthen school security, grounds safety, and WASH continuity; (3) test response and recovery through evaluated exercises and continuity planning; and (4) align roles, evidence standards, resources, and monitoring across school, district, division, local government, and response partners. These priorities provide the organizing structure for the enhancement plan.

CONTEXTUALIZED ENHANCEMENT PLAN

The Contextualized School Safety and Disaster Management Enhancement Plan translates the four priority findings into a streamlined action matrix. Targets should be finalized after baseline validation, technical review, and resource assessment by the Schools Division Office and participating schools.

Table 7 Contextualized School Safety and Disaster Management Enhancement Plan

Priority and objective	Key actions	Lead units and partners	Time frame	Performance indicators
1. Safer facilities and non-structural controls Basis: non-structural M = 3.22; structural M = 3.29 Objective: reduce injury and service-disruption risks.	Conduct joint walkthroughs and qualified inspections. Secure furniture, equipment, ceilings, and hazardous materials. Clear exits; correct electrical, storage, and signage hazards. Refer structural defects for assessment, costing, and programmed repair.	School heads; property custodians; SDO engineer; LGU/municipal engineer; DPWH; BFP; PTA	Months 1-6; quarterly follow-up	100% of hazards logged. Urgent life-safety risks isolated or corrected. At least 80% of due school-level actions completed.
2. Security, grounds, and WASH continuity Basis: security M = 3.27; perception gaps in grounds and food/sanitation Objective: improve safe access, movement, and essential services.	Review gates, perimeter, visitor control, learner release, lighting, and emergency access. Clear routes and assembly areas; inspect drainage, trees, slopes, and play areas. Validate water, sanitation, hygiene, food-safety, and interruption procedures.	School safety committee; WinS/health coordinators; teachers; barangay; PNP; BFP; RHU; LGU engineering/environment offices	Months 1-5; monthly checks	Inspection logs maintained. Emergency routes unobstructed. Priority grounds/security risks acted on or referred. WASH and food-continuity procedures documented.

Priority and objective	Key actions	Lead units and partners	Time frame	Performance indicators
3. Operational response and recovery Basis: response M = 3.51; recovery M = 3.52 Objective: improve first-period action and safe restoration of learning.	Update roles for command, accountability, first aid, communication, evacuation, reunification, and protection. Prepare damage and needs assessment, psychosocial support, temporary learning, and safe re-entry procedures. Conduct tabletop, functional, and hazard-specific exercises with after-action tracking.	SDO DRRM; school heads; DRRM coordinators; MDRRMO; BFP; PNP; RHU/DOH; Red Cross; social welfare office	Months 2-9; at least two evaluated exercises annually	Two evaluated exercises per school each year. At least 90% of assigned personnel meet role standards. After-action review within 72 hours when feasible; corrective actions closed within 60 days.
4. Governance, role alignment, and monitoring Basis: strong overall association and selected perception gaps Objective: sustain evidence-based action and accountability.	Complete a common baseline audit and update hazard maps, continuity plans, contacts, and role matrices. Conduct joint scoring calibration and stakeholder review. Link priorities to SIP/AIP, maintenance, procurement, and partner support. Use quarterly dashboards and an annual management review.	SDS/ASDS; SGOD; CID; PSDS; school heads; DRRM coordinators; finance/procurement units; LGU; PTA; partners	Months 1-12; quarterly and annual review	100% of schools have updated plans and role matrices. Quarterly dashboard submitted. At least 80% of due corrective actions closed. Annual review documents trends, participation, and revisions.

Note. AIP = Annual Implementation Plan; ASDS = Assistant Schools Division Superintendent; BFP = Bureau of Fire Protection; CID = Curriculum Implementation Division; DOH = Department of Health; DRRM = disaster risk reduction and management; LGU = local government unit; MDRRMO = Municipal Disaster Risk Reduction and Management Office; PNP = Philippine National Police; PSDS = Public Schools District Supervisor; PTA = Parent-Teacher Association; RHU = Rural Health Unit; SDS = Schools Division Superintendent; SDO = Schools Division Office; SGOD = School Governance and Operations Division; SIP = School Improvement Plan; WinS = Water, Sanitation and Hygiene in Schools. Targets may be adjusted after baseline and resource validation.

Implementation and Evaluation

Implementation should begin with SDO endorsement, accountable focal persons, and baseline validation. Each school should adapt the matrix to its hazard profile, learner vulnerabilities, facilities, grounds, access, communications, evacuation arrangements, and available partners. Low-cost corrections should proceed immediately, while structural and major infrastructure needs should follow documented technical and budgeting channels.

Evaluation should track process indicators (audits, participation, training, exercises, records, and referrals), performance indicators (accountability, role execution, communication, first aid, documentation, continuity decisions, and after-action closure), and outcomes (fewer unresolved hazards, improved scores, reduced perception gaps, and faster restoration of essential functions). Baseline, midyear, and annual reviews should inform the succeeding SIP and AIP cycle.

LIMITATIONS

The study relied on self-reported perceptions that may reflect social desirability, uneven familiarity with standards, or differences in access to facility and management information. The results do not replace engineering assessments, direct observation, document audits, or performance-based exercises.

The cross-sectional design identifies associations at one point in time and cannot establish causality. Multiple bivariate tests may increase type I error, and the analysis did not account for respondents clustered within schools or adjust simultaneously for school-level characteristics.

The study was limited to public elementary schools in the Balicuatro Area. Comparative outputs did not include group-specific distributions or effect sizes, and the researcher-developed instrument requires further construct, criterion, test-retest, and measurement-equivalence validation. Future studies should address these limitations through objective measures, longitudinal or multilevel designs, and broader school samples.

CONCLUSION

Public elementary schools in the Balicuatro Area were perceived as generally safe and to have a high level of disaster management. Water safety, school grounds, food and sanitation, risk reduction, and preparedness were relative strengths. The clearest priorities were non-structural safety, school security, response, and recovery, with structural concerns requiring technical referral. Selected differences between school heads and teachers support joint evidence-based assessment, while the strong positive association between school safety and disaster management indicates that facility improvements should be planned alongside operational DRRM capacity. The streamlined enhancement plan provides a practical framework for coordinated action and monitoring.

RECOMMENDATIONS

1. Institutionalize an annual evidence-based school-safety and DRRM audit, prioritize immediate correction of non-structural and security hazards, and maintain a documented referral system for structural, drainage, access, perimeter, and other capital-intensive needs.
2. Strengthen response and recovery through evaluated tabletop, functional, and field exercises covering accountability, first aid, communication, learner reunification, damage and needs assessment, psychosocial support, temporary learning, safe re-entry, and after-action closure.
3. Require joint walkthroughs and scoring calibration among school heads, teachers, DRRM coordinators, learners, parents, and barangay partners, and integrate verified priorities into SIP, AIP, maintenance, procurement, technical assistance, quarterly dashboards, and annual performance reviews.
4. Future research should combine survey data with engineering assessment, observation, document audit, and evaluated simulation; report group-specific estimates and effect sizes; and use longitudinal or multilevel designs to examine changes in school resilience over time.

Ethical Considerations

Approval was obtained from the Division Research Committee of the Department of Education, Schools Division of Northern Samar, consistent with DepEd Order No. 16, s. 2017. Respondents received information about the study purpose, voluntary participation, confidentiality, and the right to decline or withdraw before giving informed consent. In accordance with the Data Privacy Act of 2012 (Republic Act No. 10173), questionnaires and datasets excluded personally identifying information from reported results; records were coded, securely stored, and accessed only for authorized research purposes.

REFERENCES

1. Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quinonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in Public Health*, 6, 149. <https://doi.org/10.3389/fpubh.2018.00149>
2. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
3. Dela Cruz, R. D., & Ormilla, R. C. G. (2022). Disaster risk reduction management implementation in the public elementary schools of the Department of Education, Philippines. *International Journal of Disaster Risk Management*, 4(2), 1-14. <https://doi.org/10.18485/ijdrm.2022.4.2.1>

4. Department of Education. (2015a). DepEd Order No. 23, s. 2015: Student-led school watching and hazard mapping.
5. Department of Education. (2015b). DepEd Order No. 37, s. 2015: The comprehensive disaster risk reduction and management in basic education framework.
6. Department of Education. (2016). DepEd Order No. 10, s. 2016: Policy and guidelines for the comprehensive Water, Sanitation and Hygiene in Schools (WinS) Program.
7. Department of Education. (2017). DepEd Order No. 16, s. 2017: Research management guidelines.
8. Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). SAGE Publications.
9. Global Alliance for Disaster Risk Reduction and Resilience in the Education Sector. (2022). *Comprehensive school safety framework 2022-2030*.
10. Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R. (2014). Evaluations of disaster education programs for children: A methodological review. *International Journal of Disaster Risk Reduction*, 9, 107-123. <https://doi.org/10.1016/j.ijdrr.2014.04.001>
11. Mutanda, G. W., & Ngcamu, B. S. (2026). Disaster risk reduction in schools: A systematic review of the implementation strategies and challenges. *Frontiers in Sustainability*, 7, 1795059. <https://doi.org/10.3389/frsus.2026.1795059>
12. Muttarak, R., & Lutz, W. (2014). Is education a key to reducing vulnerability to natural disasters and hence unavoidable climate change? *Ecology and Society*, 19(1), 42. <https://doi.org/10.5751/ES-06476-190142>
13. Republic Act No. 10121. (2010). *Philippine Disaster Risk Reduction and Management Act of 2010*.
14. Republic Act No. 10173. (2012). *Data Privacy Act of 2012*.
15. United Nations Office for Disaster Risk Reduction. (2015). *Sendai framework for disaster risk reduction 2015-2030*.
16. World Bank. (2024). *Infrastructure for safer and resilient schools (P180936): Project appraisal document (Report No. PAD00126)*.