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A case study of disaster risk reduction governance in Philippine rural higher education: Toward contextualized policy support

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Abstract: This study assesses the implementation of disaster preparedness programs in a rural state university system in the Philippines, in line with the United Nations Sustainable Development Goals (SDGs), particularly SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action). It aims to evaluate preparedness levels and identify factors that influence the resilience of under-resourced higher education institutions. A mixed-methods design was adopted to capture both quantitative indicators and qualitative insights, ensuring a comprehensive understanding of disaster risk reduction efforts in a rural academic setting. This study involved 538 participants across four university campuses. Stratified random sampling was used to select students and faculty, while purposive sampling was applied to DRRM officers, deans, and program chairs. Data were collected using an adapted tool based on the UN International Strategy for Disaster Risk Reduction, and challenges were identified using the Asian Disaster Preparedness Center guidelines. Quantitative data were analyzed using descriptive statistics, Mann-Whitney U, and Kruskal-Wallis H tests. At the same time, qualitative insights from focus group discussions were thematically coded based on Braun and Clarke [1] framework. The results revealed high levels of preparedness in facilities, training, and programs. While no significant differences were found by gender, age, and campus location significantly influenced preparedness levels, with Campus B showing the highest scores. Major challenges included resource limitations, coordination issues, and technical constraints. Despite these, DRRM officers demonstrated a strong commitment to program improvement and innovation. This study contributes to the principles outlined in the Disaster Studies Manifesto by emphasizing the critical role of local institutions in building disaster resilience. It advocates for integrating DRRM into education and governance systems, positioning rural state universities as key actors in promoting community preparedness and sustainable development.

Keywords: *Disaster preparedness program, DRRM implementation, Higher education institutions, Integrated disaster preparedness, Policymaking, Stakeholder engagement.*

1. Introduction

State universities and colleges (SUCs), which are essential to building resilient structures and communities, must be prepared for disasters immediately. This is highlighted by Sustainable Development Goals (SDGs) 11 and 13—Sustainable Cities and Communities, Climate Action. To safeguard institutional operations and the local population amid environmental challenges, SUCs, being knowledge centers, must integrate disaster risk reduction (DRR) and climate adaption strategies [2]. Their readiness promotes larger environmental initiatives in addition to protecting employees and children. The importance of education is also emphasized by the Sendai Framework for Disaster Risk Reduction, which promotes disaster risk reduction inclusion in the curriculum, regular and unannounce emergency drills, and outing budget in order to have safer educational facilities [3].

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Educational institutions in Asia have progressively adopted disaster preparedness measures in response to the region's susceptibility to natural hazards. Many institutions have adopted a holistic approach to resilience, informed by global and regional frameworks such as the Sendai Framework and the ASEAN Agreement on Disaster Management [4]. This involves the incorporation of disaster risk reduction into educational curricula, the formulation of institutional disaster management strategies, and the establishment of safer educational settings [5]. Key elements of a resilient school culture encompass accessible evacuation routes, digital learning systems to ensure continuity, and robust community engagement. International case studies, including Finland's emphasis on mental health in education and Japan's strategies for earthquake preparedness, illustrate the effectiveness of proactive school-based disaster risk reduction initiatives [6].

In the Philippines, the Commission on Higher Education (CHED) has issued regulatory policies like CMO No. 9 (2013) and CMO No. 38 (2021) that require DRRM to be integrated into higher education institutions, especially in their curriculum offerings. These call for HEIs to build comprehensive emergency response systems and disaster-resilient infrastructure. By training future leaders, acting as research centers, and collaborating with the community on disaster preparedness, these mandates establish SUCs as essential agents of resilience [7].

Thus, a lot of State Universities and Colleges will have a hard time implementing these policies. Effective preparedness measures is obstructed by limitations such as low budget, substandard infrastructure, weak internet connectivity, and not enough DRRM training for employees [8]. Proper coordination and resource mobilization are made more difficult by rural higher institutions' location and frequent lack of assistance from local government units [3, 9]. These universities continue to be underrepresented in research and policy development, despite their vital roles as evacuation centers and local information centers, especially on disaster preparedness and mitigation [10]. Research-based policies that are adapted to rural settings are needed to address these issues [6].

Even with the existence of initiatives in the national level like the National School Disaster Risk Reduction and Management Program (NSDRRMP), these programs frequently fail to sufficiently meet the requirements of rural higher institutions. The majority of implementation occurs in cities with higher administrative and infrastructural capabilities [11, 12]. To accommodate national mandates with the reality on the grassroots level in the context of rural SUCs, a more comprehensive and nondiscriminatory approach is required. Higher infrastructure spending, better collaboration and networking with local governments, and formalized assessment procedures are all necessary for this. The lived experiences of marginalized and vulnerable people must serve as the foundation for disaster governance, in accordance with the Disaster Studies Manifesto [13].

The aim of this study is to determine the age, location, sex, designation, and professional profile of the participants. With an emphasis on infrastructure preparation, DRRM-related programs, and training received by administrators, staff, and students, it additionally seeks to evaluate the degree of disaster preparedness implementation on college campuses. Furthermore, by analyzing participant demographics and training exposure, the study hopes to pinpoint notable variations in disaster readiness. It also looks at the connection between teacher and student training and the degree of readiness for disasters. The study concludes by examining the difficulties DRRM officers encounter when putting disaster-related initiatives into place inside the organization.

2. Method

2.1. Campus Selection

To provide wide-ranging and comprehensive insights into disaster risk reduction and management (DRRM) implementation across institutional campuses, this study encompassed all four university campuses. To account for possible differences in DRRM readiness, campuses were chosen based on administrative organizational structure, available resources, and the geographical location of their campuses. The Office of the Vice President for Academic Affairs provided ethical clearance, guaranteeing adherence at all campuses.

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2.2. Sampling Methods and Data Collection

To ensure proper representativeness, a mix of purposive and stratified random sampling was used. Students and faculty members across academic disciplines and year levels at each school were chosen using stratified random sampling. This strategy guaranteed proportional representation. Purposive sampling, on the other hand, was used for program chairs, administrators, and deans—people who are directly involved in the planning, execution, and assessment of DRRM. Coordinators of campus DRRM serve as gatekeepers and help find eligible participants for this group.

Standardized instruments such as surveys, questionnaires, interviews, and focus group discussions (FGDs) were used in the data collection process. A panel of ten DRRM experts validated the instruments, and they received a Content Validity Index (CVI) of 0.92. The results of a pilot test also showed good internal consistency, with a Cronbach's alpha of 0.87. To guarantee comparability across campuses, the identical set of standardized questions was given to each respondent. To ensure procedural coherence, formal guides were used throughout interviews and focus group discussions, and data collectors received training on identical practices.

2.3. Qualitative Data Analysis

Focus group data were analyzed using Braun and Clarke [1] six-phase thematic analysis framework: (1) data familiarization, (2) initial coding, (3) theme identification, (4) theme review, (5) theme definition and naming, and (6) report generation. Researchers applied a hybrid coding approach, deductive coding based on research objectives, and inductive coding to capture emerging insights. Manual coding was conducted by the research team, with intercoder reliability checks performed to ensure analytical consistency. Discrepancies were resolved collaboratively. Thematic insights were then triangulated with quantitative findings to develop a comprehensive view of campus-specific and system-wide DRRM readiness.

2.4. Ethical Considerations

Ethical standards guided all study phases, from participant recruitment to data reporting. Informed consent was obtained using detailed forms that outlined the study's purpose, voluntary nature, and the participants' right to withdraw at any time [14, 15]. Ethical approval was granted through the university's internal review process. Participant confidentiality was strictly maintained; personal identifiers were anonymized, and data were securely stored in encrypted files [16]. Ethical integrity was upheld following the principles of beneficence, respect, and justice [17]. These principles were also applied during the analysis and reporting stages to protect participant dignity and ensure transparency.

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Table 1.
Profile of the school and summary results.

Variable	F	%	Preparedness of School Buildings & Facilities		Project Implemented by School		Preparedness of Faculties and Students	
			M	SD	M	SD	M	SD
Location								
Campus A	95	17.66	3.93	0.66	3.51	0.97	3.47	1.13
Campus B	118	21.93	4.12	0.54	3.99	0.63	4.04	0.72
Campus C	97	18.03	3.63	0.63	3.30	0.76	3.25	0.89
Campus D	228	42.38	3.90	0.72	3.55	0.87	3.53	0.96
Sex								
Female	303	56.32	3.87	0.68	3.55	0.82	3.51	0.93
Male	235	43.68	3.95	0.66	3.65	0.90	3.67	1.01
Age								
Older (28 years old & above)	169	31.41	3.48	0.68	2.99	0.83	2.96	0.92
Younger (Below 28 years old)	369	68.59	4.10	0.57	3.87	0.71	3.86	0.85
Designation								
Dean	5	0.93	3.41	0.52	2.74	0.70	2.65	0.78
Director	13	2.42	3.58	0.55	2.77	0.62	2.83	0.71
Executive Director	2	0.37	3.66	0.41	3.01	0.15	3.00	0.00
Faculty	118	21.93	3.43	0.72	3.04	0.88	2.96	0.98
Program Chair	31	5.76	3.53	0.61	2.85	0.69	3.02	0.78
Student	369	68.59	4.11	0.57	3.88	0.71	3.87	0.85
Whole	538	100	3.90	0.67	3.59	0.85	3.58	0.97

Note: 1.00 – 1.49 Very low, 1.50 – 2.49 Low, 2.50 – 3.49 Average, 3.50 – 4.49 High, and 4.50 – 5.00 Very high.

3. Result and Discussion

3.1. Result

Table 1 presents the demographic profile of the study's 538 respondents, including the extent of Disaster Preparedness Implementation in the University regarding Preparedness of School Buildings and Facilities, Project Implemented by School, and Preparedness of Faculties and Students.

Out of 538 respondents, Campus D had the highest participation rate with 228 individuals (42.38%), while Campus A had the lowest with 95 (17.66%). In terms of sex, female respondents constituted the majority at 56.32%, while males accounted for 43.68%. A larger proportion of respondents were younger than 28 years old (68.59%), compared to older participants (31.41%). By designation, students were the dominant group, making up 68.59% of the total, while higher-level administrators like deans and executive directors collectively made up less than 4%, indicating that the sample is heavily student-centered with moderate faculty representation.

The mean scores in Preparedness of School Buildings and Facilities show a moderately high level of readiness across campuses, with the highest rating observed in Campus B (M = 4.12, SD = 0.54) and the lowest in Campus C (M = 3.63, SD = 0.63). Overall, the university system posted a mean of 3.90 (SD = 0.67), suggesting that respondents generally perceive their school buildings and facilities as adequately prepared for disasters. Notably, students (M = 4.11) and younger respondents (M = 4.10) rated this dimension more positively than older participants and faculty members. In contrast, deans and faculty gave lower scores, which reflects their higher awareness of structural or compliance limitations. This suggests a potential perceptual gap regarding infrastructure readiness between administrative staff and students.

Regarding Projects Implemented by Schools, the overall mean was 3.59 (SD = 0.85), indicating a moderate level of implementation. Again, Campus B rated highest at M = 3.99, while Campus C scored the lowest at M = 3.30. The data reveal that students (M = 3.88) and younger individuals (M = 3.87) were more favorable in their assessment compared to older respondents (M = 2.99) and faculty (M = 3.04). This difference implies a disparity in awareness or participation in such projects, or a greater optimism among younger respondents. The low scores from administrators such as deans and directors

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(around M = 2.74–2.85) indicate that school-led DRRM initiatives are either insufficiently implemented or inadequately communicated to stakeholders in leadership roles.

The area of Preparedness of Faculties and Students also reflected moderately positive perceptions, with an overall mean of 3.58 (SD = 0.97). The highest ratings again came from Campus B (M = 4.04) and students (M = 3.87), while the lowest were from faculty (M = 2.96) and deans (M = 2.65). Younger respondents rated their preparedness much higher (M = 3.86) than their older counterparts (M = 2.96), suggesting a generational divide in either training received or perceived readiness. Faculty and administrators appear to express lower confidence in both their own preparedness and that of the students, which could reflect gaps in training quality, availability, or engagement. This calls for targeted capacity-building efforts, especially among teaching and administrative personnel.

Table 2 presents the results of the Mann-Whitney U test, examining differences in the extent of disaster preparedness between male and female respondents across four key areas.

Table 2.
Differences in the extent of disaster preparedness of the implementing campus in different areas and when grouped according to sex.

Preparedness	U	p	Interpretation
Preparedness of School Buildings & Facilities	33275.50	0.193	Not significant
Project Implemented by School	32640.50	0.098	Not significant
Preparedness of Faculties and Students	31300.50*	0.016	Significant
Extent	32158.00	0.054	Not significant

Note: * $p < 0.05$.

The findings show that there are no significant differences between sexes in terms of the preparedness of school buildings and facilities (U = 33275.50, p = 0.193), projects implemented by the school (U = 32640.50, p = 0.098), and the overall extent of preparedness (U = 32158.00, p = 0.054). However, a statistically significant difference was observed in the preparedness of faculty and students (U = 31300.50, p = 0.016), indicating that perceptions or levels of readiness between male and female respondents differed specifically in this area. This suggests that gender can influence how faculty and student preparedness is experienced or assessed.

Table 3 shows the results of the Mann-Whitney U test comparing the extent of disaster preparedness between older and younger respondents across four key areas.

Table 3.
Differences in the extent of disaster preparedness of the implementing campus in different areas, and when grouped according to age.

Preparedness	U	p	Interpretation
Preparedness of School Buildings & Facilities	14656.00*	< 0.001	Significant
Project Implemented by School	12877.00*	< 0.001	Significant
Preparedness of Faculties and Students	14528.50*	< 0.001	Significant
Extent	12843.00*	< 0.001	Significant

Note: * $p < 0.05$.

The results reveal statistically significant differences in all areas, including the preparedness of school buildings and facilities (U = 14656.00, p < .001), projects implemented by the school (U = 12877.00, p < .001), preparedness of faculties and students (U = 14528.50, p < .001), and the overall extent of preparedness (U = 12843.00, p < .001). These findings suggest that age significantly influences perceptions or experiences of disaster preparedness, with younger and older groups differing consistently across all measured domains.

Table 4 presents the results of the Kruskal-Wallis test assessing differences in the extent of disaster preparedness across campuses when grouped according to location.

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Table 4.
Differences in the extent of disaster preparedness of the implementing campus in different areas, and when grouped according to location.

Preparedness	df	X^2	p	Interpretation
Preparedness of School Buildings & Facilities	3	28.90*	< 0.001	Significant
Project Implemented by School		38.66*	< 0.001	Significant
Preparedness of Faculties and Students		38.54*	< 0.001	Significant
Extent		*40.62**	< 0.001	Significant

Note: * $p < 0.05$.

The findings indicate statistically significant differences across all areas of disaster preparedness, including preparedness of school buildings and facilities ($\chi^2(3) = 28.90$, $p < .001$), projects implemented by the school ($\chi^2 = 38.66$, $p < .001$), preparedness of faculties and students ($\chi^2 = 38.54$, $p < .001$), and the overall extent of preparedness ($\chi^2 = 40.62$, $p < .001$). These results suggest that campus location is critical in shaping disaster preparedness levels, pointing to variability in resources, infrastructure, and program implementation across the different sites.

Table 5 presents the post hoc analysis results for the differences in disaster preparedness across campuses based on location, using pairwise comparisons.

Table 5.
Post hoc analysis on the difference in the extent of disaster preparedness of the implementing campus in different areas, and when grouped according to location.

Preparedness of School Buildings & Facilities	z	W_i	W_j	p
Campus A- Campus B	-1.992	274.021	316.703	0.023
Campus A – Campus C	3.177	274.021	202.753	< .001
Campus B – Campus C	5.350	316.703	202.753	< .001
Campus B – Campus D	2.560	316.703	271.583	0.005
Campus C – Campus D	-3.653	202.753	271.583	< .001
Project Implemented by School				
Campus A - Campus B	-3.803	258.021	339.492	< 0.001
Campus A – Campus C	2.102	258.021	210.866	0.018
Campus B – Campus C	6.039	339.492	210.866	< 0.001
Campus B – Campus D	4.340	339.492	263.004	< 0.001
Campus C – Campus D	-2.768	210.866	263.004	0.003
Preparedness of Faculties and Students				
Campus A – Campus B	-3.867	258.274	340.898	< 0.001
Campus B – Campus C	5.956	340.898	214.361	< 0.001
Campus B – Campus D	4.563	340.898	260.684	< 0.001
Campus C – Campus D	-2.465	214.361	260.684	0.007
Extent				
Campus A – Campus B	-3.852	257.516	340.055	< .001
Campus A – Campus C	2.264	257.516	206.716	0.012
Campus B – Campus C	6.259	340.055	206.716	< .001
Campus B – Campus D	4.275	340.055	264.689	< .001
Campus C – Campus D	-3.076	206.716	264.689	0.001

Significant differences were observed in nearly all pairings across four areas: school building preparedness, projects implemented, faculty and student preparedness, and the overall extent of preparedness. Notably, Campus B consistently showed higher preparedness scores compared to other campuses, with significant differences found in comparisons with Campus A, C, and D (all $p < .001$). Campus C consistently received lower rankings, particularly when compared with Campus B and D. For example, in the "Preparedness of Faculties and Students," the comparison between Campus B and

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Campus C yielded a z-score of 5.956 ($p < .001$), highlighting a stark contrast. Similarly, in terms of "Projects Implemented by Schools," Campus B outperformed both Campus A and Campus C with statistically significant differences. These findings confirm that preparedness levels vary significantly by campus, reinforcing the impact of location-specific factors.

Table 6 presents the results of a Kruskal-Wallis test examining differences in disaster preparedness across respondent groups based on their designation.

Table 6.
Differences in the extent of disaster preparedness of the implementing campus in different areas, and when grouped according to the designation.

Preparedness	df	X^2	p	Interpretation
Preparedness of School Buildings & Facilities	5	104.35*	< 0.001	Significant
Project Implemented by School		127.63*	< 0.001	Significant
Preparedness of Faculties and Students		104.53*	< 0.001	Significant
Extent		126.72*	< 0.001	Significant

Note: * $p < 0.05$.

The analysis reveals statistically significant differences in all four areas: preparedness of school buildings and facilities ($\chi^2(5) = 104.35$, $p < .001$), projects implemented by the school ($\chi^2 = 127.63$, $p < .001$), preparedness of faculties and students ($\chi^2 = 104.53$, $p < .001$), and the overall extent of preparedness ($\chi^2 = 126.72$, $p < .001$). These findings suggest that perceptions or experiences of disaster preparedness vary significantly among different groups, such as deans, directors, faculty, program chairs, and students.

Table 7 displays the results of a post hoc analysis assessing differences in disaster preparedness based on respondent designation, with students serving as the reference group.

Table 7.
Post hoc analysis on the difference in the extent of disaster preparedness of the implementing campus in different areas, and when grouped according to designation.

Preparedness of School Buildings & Facilities	z	W_i	W_j	p
Dean - Student	-2.41	147.1	315.732	0.008
Director - Student	-2.912	188.038	315.732	0.002
Project Implemented by School				
Dean - Student	-2.913	116.3	320.089	0.002
Director - Student	-4.644	116.423	320.089	< 0.001
Executive Director - Student	-1.766	125.5	320.089	0.039
Faculty - Student	-8.971	172.644	320.089	< 0.001
Program Chair - Student	-6.397	134.194	320.089	< 0.001
Preparedness of Faculties and Students				
Dean - Student	-2.828	118.1	315.469	0.002
Director - Student	-4.016	139.769	315.469	< 0.001
Faculty - Student	-8.594	174.572	315.469	< 0.001
Program Chair - Student	-4.986	170.935	315.469	< 0.001
Extent				
Dean - Student	-2.873	119.3	320.382	0.002
Director - Student	-4.187	136.731	320.382	< 0.001
Faculty - Student	-9.47	164.703	320.382	< 0.001
Program Chair - Student	-5.835	150.758	320.382	< 0.001

Note: * $p < 0.05$.

The findings show statistically significant differences across all areas of preparedness between students and various other roles, including deans, directors, faculty, program chairs, and executive directors. Faculty members and program chairs consistently rated disaster preparedness significantly lower than students, with highly significant p-values (e.g., faculty vs. student in "Projects Implemented"

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with z = -8.971, p < .001). Even higher-level administrators like deans and directors showed lower perceptions compared to students in multiple areas, such as building preparedness (p = 0.008 and p = 0.002, respectively) and overall preparedness (p = 0.002 and p < .001, respectively). These discrepancies suggest a notable perceptual gap, where students view preparedness efforts more favorably, possibly due to differing levels of exposure to program limitations or critical implementation details.

3.2. Discussion

The study reveals that while most respondent groups, when classified by location, sex, and other factors, demonstrated a high level of disaster preparedness in school buildings and facilities, a notable exception emerged among those aged 28 and above, particularly faculty members and deans, who reported only an average level of preparedness. This suggests that age, professional role, and institutional responsibilities significantly influence how disaster preparedness is implemented and perceived within SUCs. This disparity can be explained by the fact that people in higher positions have different administrative and academic responsibilities, which may restrict their participation in disaster-related activities. Such positions frequently include conflicting responsibilities, which limit the time and focus available for readiness efforts. Furthermore, perceptions of risk are influenced by differences between generations [18].

Significant disparities in disaster readiness were also found among university stakeholders, especially between students and professors or between administrative executives like directors and deans, according to the results [19]. Faculty and administrators, who are 28 years of age and older, demonstrated average levels of implementation, although most respondents showed high levels of readiness. This disparity can be explained by limited exposure to official disaster preparedness programs, conflicting academic and administrative obligations, and generational disparities in how people perceive the risk of disasters [20, 21]. According to Cutter, et al. [22] and Abejuela, et al. [23] public institutions frequently confront resource constraints that affect program implementation, especially those in rural or underfunded areas. Faculty and administrators are generally less involved in DRRM because of institutional culture and the preference for academic work over disaster preparation, according to Coveleski [24] and Perry and Lindell [25].

Meanwhile, younger respondents scored significantly higher (M = 4.10, SD = 0.57) than older respondents (M = 3.48, SD = 0.68), likely due to their participation in disaster education integrated into the Philippine K-12 curriculum since 2012. These students received structured training in Health, Science, and Social Studies, which translated into higher familiarity and engagement in DRRM activities, thus yielding higher results than older respondents. Ronan, et al. [26]; Nakano, et al. [27] and Paton [18] also support this, showing that disaster education significantly improves preparedness behaviors, risk awareness, and responsiveness. On the other hand, older people who finished their schooling before the implementation of the K-12 program have not been taught DRRM, which emphasizes the necessity of modern training for all age groups.

Inconsistent training methods on campuses increase this gap between generations. Many colleges continue to use reactive, theoretical approaches devoid of realistic simulations, even though others, including the Sultan Kudarat State University [28] and Isabela State University (ISU) [29] have made significant progress in institutionalizing DRRM programs. According to the National Disaster Risk Reduction and Management Council (NDRRMC) [30] maintaining thorough, system-wide preparedness initiatives continues to pose difficulties. The significance of school-level readiness is emphasized by research by Islam, et al. [31] and Southeast Asian Ministers of Education Organization [32] however, disparities in scores from campuses A, B, and D point to uneven implementation because of variations in infrastructural capabilities, training levels, and resource allocation.

In addition to infrastructure, human capital is crucial in determining a university's ability to withstand disasters. According to Brown [6]; Seddighi, et al. [33] and Tkachuck, et al. [34] disaster knowledge is not enough on its own without action. Disaster risk reduction and management outcomes are affected directly by faculty and student involvement, and a lack of communication between

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administrators and students can prevent students from being fully prepared [35, 36]. Although there were no statistically significant differences by sex in this research, possibly because of institutional standardization, gender-related behavioral tendencies can also affect DRRM involvement [37, 38]. Nonetheless, disparities in preparedness between male and female students are indicative of underlying social customs and should be investigated further.

Leadership commitment is another determinant of success. Widowati, et al. [39] and Coveleski [24] found that effective DRRM implementation in schools is often tied to active engagement by administrators. Community involvement is equally important; Morrow-Gorton, et al. [40] emphasize that collaborative partnerships enhance response capacity and foster a culture of preparedness. Furthermore, historical exposure to disasters explains why some campuses, such as Campus B, demonstrate higher readiness levels. Such localized experiences strengthen institutional memory and influence both campus policy and student engagement.

Several legislative and institutional efforts have laid the foundation for improving DRRM in Philippine higher education. Republic Act 10121 mandates collaborative planning and customized emergency procedures, while CHED policies aim to embed DRRM in academic programs. Nonetheless, as observed by Ortizo [41] gaps remain in the depth and consistency of implementation, particularly in SUCs with lower preparedness levels. Cabiles and Bernido [42] and Robielos, et al. [43] advocate for risk-based, campus-specific strategies and emphasize the need for strong interdepartmental collaboration and leadership.

Finally, the link between stakeholder readiness and campus-wide preparedness is well established. Smith, et al. [44] and Jones and Williams [45] found that student and faculty engagement significantly improves overall disaster resilience. Davis [46] and Alkalash, et al. [47] further argue that access to training and a clear understanding of protocols enhance self-efficacy, while Jaradat, et al. [48] and Patel, et al. [10] point out that one-size-fits-all models are ineffective. Regular evaluation, inclusive communication, and customized programs are crucial. These observations highlight the necessity for Philippine higher public-school institutions to prioritize leadership development, institutional coordination, and focused DRRM education for all stakeholders in order to close the "awareness-to-action" gap.

3.3. Qualitative Responses

Table 8 presents four overarching themes that summarize the key challenges and opportunities related to disaster risk reduction and management (DRRM) implementation in academic institutions, along with their corresponding sub-themes.

Table 8.
Overarching Themes and Sub-Themes.

No.	Overarching Theme		Sub-themes
1	Resource Scarcity and Technical Constraints	1.1	Lack of Funding
		1.2	Inadequate Equipment and Tools
		1.3	Shortage of Trained Personnel
		1.4	Limited Technical Capacity
2	Coordination Problems and Institutional Barriers	2.1	Bureaucratic Inefficiencies
		2.2	Inter-Organizational Resistance
		2.3	Ineffective Communication Channels
		2.4	Unclear Roles and Authority
3	Community Engagement Challenges	3.1	Lack of Awareness and Information
		3.2	Misconceptions about DRRM
		3.3	Limited Access to Education and Training
		3.4	Weak Community-Government Linkages
		3.5	Low Participation in Planning
4	Commitment to Improvement and Innovation	4.1	Continuous Assessment and Program Evaluation
		4.2	Embracing Creativity and Adaptive Solutions
		4.3	Institutional Reform and Policy Enhancement

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Technical difficulties and budgetary constraints: DRRM officers encounter several challenges that hinder their ability to advocate disaster resilience in the school community and its stakeholders. The most significant of these is the budgetary constraint, which includes inadequate finance, outdated machinery, and a continuous lack of support staff. The ability to put proactive and successful disaster risk reduction initiatives into practice is significantly impacted by these limitations. Underfunded DRRM programs are more likely to use reactive tactics, which makes school communities more susceptible to disaster risks, according to Tatham and Christopher [49] and Perry and Lindell [25]. Additionally, inadequate training and expertise impede reaction and planning [50, 51]. Without the right equipment and assistance, even trained responders feel worthless, which makes them feel helpless during crises [51, 52].

Participant 1: *"Even* if responders have the necessary knowledge, the lack of proper equipment makes them ineffective and powerless during emergencies".

Participant 3: *"When* staff lacks proper training, they are unable to help effectively during emergencies, making the community more vulnerable".

Issues with coordination and institutional obstacles: DRRM efforts are made more difficult by institutional obstacles coordination issues, and resource constraints. Decision-making is delayed and solutions are dispersed as a result of bureaucratic inefficiencies, interagency resistance, and confusing authority structures. Comfort [53] and Alampay [54] draw attention to the ways in which these systemic issues impede effective disaster management. Additionally, Boin and Bynander [55] stress that a lack of clear roles among agencies leads to misunderstandings and hinders cooperation. Officers' qualitative testimonies attest to the fact that unclear communication between government agencies during emergencies causes ambiguity over leadership responsibilities and essential actions, which severely impairs response activities.

Participant 4: "In times of disaster, the lack of clear communication and coordination among government agencies greatly affects the response. They are unable to immediately determine who should take the lead and what actions need to be taken".

Lack of Community Engagement: Another major concern is the lack of community engagement in DRRM initiatives. Officers noted that local populations often view disaster preparedness as the sole responsibility of the government, leading to passive attitudes and low participation. Pongan [56]; Twigg [57] and Cutter, et al. [22] underscore the importance of grassroots involvement in building disaster-resilient communities. Yet, misconceptions about DRRM, limited access to education and training, and weak linkages between communities and authorities continue to obstruct meaningful engagement. Community members expressed a desire to participate but cited a lack of clear channels for involvement and communication with officials, highlighting a gap between institutional efforts and public outreach.

Participant 3: "Some people think disasters aren't their problem because the government will help anyway. They don't realize that their role in preparation is also important".

Participant 5: "I want to help, but there's no clear meeting or way for officials to hear us out".

Commitment to Improvement and Innovation: Despite the significant barriers identified earlier, DRRM officers have shown a strong commitment to continuous improvement and innovation. They emphasize the importance of periodic program assessments, adaptive management, and institutional reform in facing the changing threats and governance issues [49, 58]. DRRM Officers expressed a forward-thinking mindset, advocating for change, embracing innovation, and calling for reforms that align policy frameworks with on-the-ground realities. Their perspectives reflect a deep, personal investment in safeguarding communities, viewing disaster preparedness not merely as a professional duty but as a moral responsibility.

Participant 2: "We must not remain in our comfort zones; the strength of public service begins with embracing change".

Participant 4: "A person with a vision for a better future never stops searching for better solutions".

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4. Conclusion

The findings of this study confirm that in building resilient communities, academic institutions require academic institutions, particularly rural SUCs, to implement comprehensive, inclusive, and context-sensitive disaster preparedness programs. The high levels of preparedness observed in university-led trainings, structural safety measures, and DRRM initiatives highlight the effectiveness of well-executed programs in enhancing institutional readiness and mitigating disaster risks. Notably, the absence of significant sex-based differences suggests that these initiatives are broadly inclusive. However, disparities based on age and campus location point to the need for more targeted strategies that account for demographic and geographic variations.

From a policy and practice perspective, this implies that rural SUCs to institutionalize localized DRRM frameworks that integrate demographic profiles, geographic risks, and resource availability. Sustainable training mechanisms must be embedded within academic structures, accompanied by consistent funding and administrative support. Stronger collaboration with local government units (LGUs) and community stakeholders is also essential to harmonize university-based preparedness initiatives with broader regional DRRM agendas. Institutional policies should embody flexibility, equity, and proactive risk management to ensure long-term resilience.

Future research should investigate the longitudinal effects of integrating DRRM into the academic curriculum, especially in shaping student competencies and preparedness behaviors. It should also examine the influence of institutional leadership in sustaining a culture of readiness, as well as how community-based DRRM models involving SUCs contribute to local resilience outcomes. Comparative studies between rural and urban academic institutions can further illuminate contextual differences and identify scalable best practices.

In line with the Disaster Studies Manifesto, which demands that disaster research must engage with the lived experiences of marginalized communities, this study underscores the role of rural SUCs as recipients of DRRM policy and active agents of change. These institutions must take the lead in managing disaster information, encouraging grassroots involvement, and integrating resilience into academic operations and community collaborations because they are situated in underserved and frequently hazardous areas. Academic input is crucial to creating catastrophe systems of government that are more effective, inclusive, and equitable.

Table 9 shows the recommended Rural SUC Five-Year DRRM Policy. This policy framework acknowledges the critical role that rural SUCs play in promoting education and community development. It addresses systemic issues, including inadequate funding, aging infrastructure, and gaps in faculty development, while suggesting strategic improvements to improve disaster readiness.

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Table 9.
Proposed Five-Year DRRM Policy Implementation Plan for Rural SUCs.

Policy Component	Timeline	Implementation Plan	Persons/Offices Involved	Expected Outcomes
1. Institutionalized DRRM Framework	Year 1-2: Planning & Establishment Year 3 onwards: Regular implementation and assessment	Establish DRRM Committee, align with national/local plans, conduct risk assessments, and organize mandatory preparedness training for all stakeholders.	University President, DRRM Committee, Campus Security, Local DRRM Offices	A responsive DRRM structure and heightened awareness and preparedness among university constituents.
2. Capacity-Building and Community Engagement	Year 1: Curriculum and training design Year 2-5: Full implementation and partnership expansion	Design training programs and integrate DRRM modules into the curriculum. Coordinate with LGUs/NGOs for workshops and community programs.	Academic Affairs, LGUs, NGOs, Faculty Trainers, Student Affairs	Improved disaster response capacity within and beyond the campus; students with practical DRRM knowledge.
3. Infrastructure Resilience and Emergency Response	Year 1-2: Structural assessments & retrofitting Year 3 to 5: Drills and system maintenance	Assess and retrofit buildings, set up evacuation centers and warning systems, and conduct regular emergency drills and simulations.	Engineering Office, Campus Facilities, Local Fire and Rescue, Student Organizations	Disaster-resilient infrastructure and efficient, practiced emergency response systems.
4. Integration of DRRM into the Curriculum	Year 1: Curriculum revision Year 2: Implementation and evaluation	Develop DRRM-related modules and embed them in general education and major courses. Provide training for faculty on DRRM content delivery and assessment.	Academic Council, Curriculum Committee, DRRM Experts, Faculty Members	Increased DRRM awareness and knowledge among students; integration of risk reduction principles in various academic disciplines.
5. LGU-SUC Coordinated Disaster Planning and Information Sharing Policy	Year 1: Establish coordination protocol Year 2 onwards: Ongoing collaboration and review	Formally designate focal persons, conduct joint planning sessions, and share key disaster-related data including hazard maps and emergency protocols.	SUC Administration, LGU DRRM Offices, Local Disaster Councils, Liaison Officers	Aligned disaster response strategies, improved coordination, and more accurate and localized risk assessments.
6. Local Resource Mobilization and Policy Integration Initiative	Year 1-2: Policy development and resource inventory Year 3 onwards: Implementation and monitoring	Establish joint DRRM planning committees, identify resource-sharing opportunities, and include SUCs in LGU DRRM planning processes.	LGU Planning and Budget Offices, SUC Extension Offices, Community Leaders, DRRM Coordinators	Stronger SUC-LGU collaboration, better resourced DRRM initiatives, and enhanced public safety efforts at the grassroots level.

4.1. Institutionalized DRRM Framework

A specific Disaster Risk Management framework that is consistent with both local and national strategies must be established by each rural SUC. To ensure a coordinated and sustainable emergency response across institutional units, a campus DRRM committee will be established to oversee planning, training, and risk assessments.

4.2. Capacity-Building and Community Engagement

Regular capacity-building activities involving academics, staff, students, and community stakeholders must be carried out by SUCs. Academic programs will incorporate DRRM modules, and community-based preparedness initiatives will be implemented with assistance from partnerships with NGOs and LGUs.

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4.3. Infrastructure Resilience and Emergency Response

Facilities will undergo retrofits to meet disaster-resilient requirements. To improve institutional response capabilities, evacuation centers and early warning systems will be set up, and frequent emergency drills will be held.

4.4. Curriculum Integration of DRRM Education

Through instructional materials, field simulations, and student-led projects, Disaster Risk Management principles will be incorporated into many academic fields. To guarantee that they can teach disaster preparedness and resilience both theoretically and practically, faculty members will undergo training.

4.5. LGU-SUC Coordinated Disaster Planning and Information Sharing Policy

Through coordinated training seminars, shared data systems, and cooperative disaster preparedness, SUCs and LGUs should formally establish their partnership. To ensure active involvement in local DRRM councils and to improve communication, each party shall choose relationships.

4.6. Local Resource Mobilization and Policy Integration Initiative

SUCs and LGUs shall work together to mobilize local resources, such as funding, personnel, and logistics, for DRRM projects to guarantee their continued implementation. In order to enhance shared accountability in fostering resilient communities, SUCs should participate in local DRRM planning, and LGUs will assist university-led outreach and preparation initiatives.

Transparency:

The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

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