Disaster Risk Reduction and Management Programs: Compliance, Issues, and Challenges

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ABSTRACT

This study examined the compliance of the top five disaster-prone barangays of Dapitan City, Zamboanga del Norte, with Disaster Risk Reduction and Management (DRRM) programs across four thematic areas: prevention and mitigation, preparedness, response, and rehabilitation. Employing a mixed-methods design, the quantitative component used a descriptive survey administered to 100 respondents (50 residents and 50 Barangay DRRM Committee members), complemented by qualitative interviews with five Incident Commanders analyzed through thematic content analysis. Results indicated moderate compliance in prevention–mitigation and preparedness, strong compliance in response, and fair compliance in rehabilitation. However, compliance was uneven across activities, strong in administrative coordination and fund utilization, but weak in structural measures and reporting. Statistical tests found no significant differences across demographic variables, indicating shared experiences within the community. Qualitative findings highlighted challenges such as inadequate drainage, signage, and early warning devices, limited resources, and resident unresponsiveness. Overall, the study underscores the need for integrated funding, infrastructure investment, and community-based interventions. Enhanced regression and correlational analyses in future research could deepen insights into predictors of compliance and improve local disaster governance.

Keywords: disaster risk reduction, compliance, preparedness, disaster response, rehabilitation, community resilience

INTRODUCTION

Disasters continue to threaten global human security, necessitating resilient, community-based governance frameworks. Recent global research demonstrates that localized risk reduction strategies and citizen participation substantially mitigate disaster impacts (Jayasinghe et al., 2024; Vu et al., 2025; UNDRR, 2023). In the Philippines, the Disaster Risk Reduction and Management Act of 2010 (RA 10121) institutionalizes the four pillars, prevention and mitigation, preparedness, response, and rehabilitation. Barangays are central to operationalizing DRRM mandates, yet local compliance varies due to uneven resources, technical capacity, and institutional continuity (Nacaya, 2023; National DRRMC, 2025).

While prior studies describe implementation gaps, few critically interrogate why barangay-level compliance diverges despite uniform policy frameworks. Literature shows recurring fragmentation in DRRM coordination (Hermosura et al., 2025) and fiscal limitations that hinder sustained infrastructure improvement (Yusay & Caelian, 2022; Andaya & Castañar-Alano, 2025). International comparisons suggest that local disaster resilience depends on integrating community participation with predictive and data-driven tools (Chong et al., 2025; Vu et al., 2025). However, Philippine research still underrepresents compliance analytics linking demographic, institutional, and infrastructural variables, an empirical gap this study aims to address.

The present research critically examines barangay compliance with DRRM programs in Dapitan City, a flood-prone locality where repeated events from 2018 to 2022 highlight persistent vulnerabilities. By identifying both the quantitative levels of compliance and qualitative implementation challenges, this study contributes evidence to strengthen barangay-level disaster governance and resilience-building initiatives.

Objectives

1. Assess the respondents' level of compliance with DRRM programs across prevention–mitigation, preparedness, response, and rehabilitation.
2. Determine whether significant differences exist in compliance based on respondents' profiles.
3. Identify issues and challenges encountered by Barangay DRRM Committees in program implementation.

METHODOLOGY

This study utilized a mixed-methods research design that integrated quantitative and qualitative approaches to comprehensively assess compliance with Disaster Risk Reduction and Management (DRRM) programs. The quantitative component employed a descriptive-survey method to determine the level of compliance across the four thematic areas, disaster prevention and mitigation, disaster preparedness, disaster response, and disaster rehabilitation and recovery, among five disaster-prone barangays in Dapitan City, Zamboanga del Norte: Ba-ao, Burgos, Opao, Ilaya, and Tamion. Complementing this, the qualitative component applied a transcendental phenomenological design to capture the lived experiences, issues, and challenges encountered by barangay stakeholders in implementing DRRM initiatives.

A total of 100 respondents participated in the study, consisting of 50 residents and 50 members of the Barangay Disaster Risk Reduction and Management Committees (BDRRMCs). To provide further insights, five (5) Incident Commanders, one from each barangay, were selected as key informants through purposive sampling for the qualitative interviews. Data collection employed two instruments: an adapted survey questionnaire measured on a 4-point Likert scale to determine compliance levels, and a structured Key Informant Interview (KII) guide to elicit in-depth perspectives on implementation challenges. Before administration, permission was obtained from barangay officials, and ethical considerations such as voluntary participation, informed consent, confidentiality, and anonymity were strictly observed.

Quantitative data were treated using frequency counts, percentages, means, and t-tests, with a 0.05 alpha level of significance as the decision point for hypothesis testing. Meanwhile, qualitative data from the KIIs were analyzed using the Thematic Content Analysis as cited in the study of Bacroya and Aranjuez (2025), which involved coding, clustering, and identifying recurring patterns to generate themes, which was also cited in Alipoyo (2022). The integration of results from both strands provided a well-rounded understanding of compliance with DRRM programs and the contextual challenges faced by local communities, ensuring methodological rigor and validity of findings.

RESULTS AND DISCUSSION

Compliance across thematic areas was moderate overall. Prevention–mitigation achieved the lowest mean (2.58), reflecting strong administrative coordination but weak infrastructure-based actions. Consistent with Yusay & Caelian (2022), barangays prioritize communication and planning over physical risk-reduction investments, a symptom of limited funds and competing local priorities. This reveals a "planning, implementation gap" (Lagrada, 2025) that weakens structural resilience.

These gaps may be explained by limited awareness or technical capacity among respondents, or by competing fiscal priorities that constrain implementation of infrastructure projects. The fact that administrative compliance (communication, planning) is higher than physical mitigation suggests a disconnect between planning and action, a phenomenon observed in local DRRM evaluations (Lagrada Jr., 2025). For effective disaster mitigation, technical measures must accompany enabling policies and strong community participation; failure to invest in drainage and warning systems leaves communities vulnerable despite compliance in coordination (Lauer et al., 2024). The dual compliance–gap pattern seen here reinforces calls for integrated funding mechanisms and performance accountability in barangay DRRM (Chong et al., 2025).

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Table 1. Level of Compliance in terms of Disaster Prevention and Mitigation

Items	*AWV*	*D*
1. Generate localized map in every barangay.	2.83	Complied
2. Establish the designated route to evacuation center, critical infrastructure like barangay hall, covered court, and numbers of possible affected household.	2.62	Complied
3. Conduct risk assessment regularly.	2.73	Complied
4. De-clog drainage.	1.78	Less Complied
5. Implement the solid waste management program properly through MRF.	3.04	Complied
6. Conduct regular clean-up drive.	3.08	Complied
7. Identify designated area for tree planting.	2.60	Complied
8. Participate or facilitate in tree planting.	2.33	Complied
9. Install alarm system and CCTV cameras.	1.98	Less Complied
10. Install warning signage for evacuation area, flood and landslide prone area.	2.24	Complied
11. Maintain constant direct communication with the City DRRMO.	3.16	Complied
Mean	*2.58*	Complied

Preparedness compliance (mean = 2.73) was moderate but higher in fund utilization than in technical training such as swift-water rescue. These results support Guo et al. (2025) and Lacher (2024), who argue that financial compliance alone is inadequate without continuous capacity-building. Embedding simulation drills and practical exercises could transform procedural compliance into operational readiness.

The implications are clear: effective preparedness must integrate both resource allocation and skill development. Prioritizing only funding without ensuring that personnel are properly trained can lead to superficial compliance that falters during actual emergencies. Studies of community preparedness show that when citizens and local committees are engaged in capacity-building activities, overall resilience and readiness increase significantly (Schreurs et al., 2024). Barangays should therefore balance fiscal compliance with continuous investments in training, drills, and simulation exercises. Only by aligning resources with technical competence can preparedness become more substantive and less symbolic.

Table 2. Level of Compliance in terms of Disaster Preparedness Program

Items	*AWV*	*D*
1. Establish Barangay Disaster Risk Reduction Management Committee (BDRRMC) operation center.	2.72	Complied
2. Ensure availability of rescue equipment and facilities.	2.58	Complied
3. Participate or facilitate all barangay assembly pertaining to Disaster Risk Reduction Management Program.	3.24	Complied
4. Coordinate with the direct supplier for the relief stock piling.	2.69	Complied
5. Utilize the calamity funds properly.	3.33	Highly Complied
6. Conduct or participate training on Water Search and Rescue (WASAR).	2.81	Complied
7. Conduct or participate training on Basic Incident Command System (BICS)	2.79	Complied
8. Conduct or participate training on Contingency Planning	2.43	Complied
9. Conduct or participate training on Flood Swift Water Rescue.	2.22	Complied
10. Conduct or participate training on Rapid Damage Assessment Needs Analysis (RDANA).	2.68	Complied
11. Conduct or participate training on Disaster Community Drilling.	2.70	Complied
Mean	*2.73*	Complied

Response compliance (mean = 3.30) was relatively high, especially in evacuation and relief distribution. However, low adherence to SOPs and limited psychosocial support reveal an imbalance between logistical efficiency and emotional recovery, consistent with Mercado (2024) and García et al. (2024). Integrating psychosocial first aid within barangay SOPs would align with holistic response frameworks advocated by

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Amini et al. (2024). Moreover, research affirms that capacity investment in response must consider both hardware (equipment, logistics) and soft components like mental health response (García et al., 2024).

The disparity between logistical and psychosocial response is not uncommon. Community resilience literature highlights that emotional recovery and mental health support are often underprioritized during response phases, even though they significantly influence long-term recovery (Mercado, 2024). To strengthen response compliance, barangays should adopt a more holistic approach that includes psychosocial first aid protocols in SOPs and train responders accordingly. Integrating mental health components into response frameworks can move compliance from transactional reaction to more sustainable, community-centered resilience.

Table 3. Level of Compliance of the Respondents on Disaster Response Program

Items	*AWV*	*D*
1. Create Barangay Disaster Risk Reduction Management Committee (BDRRMC).	3.52	HC
2. Deploy City DRRM Personnel for the conduct of pre-disaster risk assessment in the flood or landslide prone area.	3.38	HC
3. Support the CSWD and CHO personnel for the preparation and distribution of relief services.	3.47	HC
4. Participate or facilitate the order given by the City DRRM on the evacuation matters.	3.50	HC
5. Cooperate and coordinate with rescue teams during search and rescue operation.	3.41	HC
6. Adhere to the Standard Operating Procedures for disaster response operations.	3.02	C
7. The LGU/CDRRMO deploy enough number of personnel in the disaster area.	3.06	C
8. Guide the residents on the route to evacuation site.	3.41	HC
9. Assist in providing transportation going to evacuation site.	3.29	C
10. Implement the procedures for accounting of personnel, residents and visitors.	3.27	C
11. Assist or participate on ensuring the physical, mental health and psychological support for the disaster victims	3.01	C
Mean	*3.30*	*C*

Rehabilitation compliance (mean = 3.22) reflected active participation in infrastructure restoration but weak documentation and reporting. This pattern parallels Boston (2024), who noted that recovery is often "visible but weakly institutionalized." Strengthening monitoring systems and data documentation will institutionalize resilience practices. The emphasis on reconstruction over process adherence is also observed in rural recovery research emphasizing resource mobilization over rigorous accountability (García et al., 2024). Cross-nationally, resilience literature notes that recovery compliance is often more visible in infrastructure but less so in governance and monitoring functions (Boston et al., 2024).

The weaker performance in reporting suggests the need to strengthen institutional processes for accountability, monitoring, and evaluation in recovery. Comprehensive recovery is not just rebuilding; it also involves restoring livelihoods, continuous services, and governance mechanisms (Boston et al., 2024). Barangays should ensure that recovery compliance protocols include systematic documentation and information systems to capture project progress and resource flows. By embedding accountability into recovery practices, compliance can transcend physical rehabilitation and embed sustainable resilience into local systems.

Table 4. Level of Compliance on Disaster Rehabilitation and Recovery Program

Items	*AWV*	*D*
1. Cooperate in making incident report as to damage and others relevant reports.	3.0 3.14	C C
2. Guide the Rapid Damage Assessment Needs Analysis Team (RDANA).	3.15	C
3. Cooperate or participate during the rehabilitation of damaged facilities.	3.48	HC
4. Guide the CSWDO on the release of financial assistance.	3.33	HC
5. Guide the CHO on the continuous medical and health services	3.20	C
6. Guide or support the City Engineering personnel on the infrastructure repair and restoration	3.18	C

7. Guide or support the City Veterinarians for the implementation of Livestock Development Program	3.21	C
8. Guide or support the City Agriculture personnel on Crops Assessment Program	3.28	C
9. Guide or support the City Fisheries personnel on the Fishery Rehabilitation Program	3.20	C
Mean	*3.22*	*C*

Table 5. Significant Difference of the Level of Compliance when Analyzed by Profile

Indicator	X^2	*p- Value @ .05*	*Decision*
Age	6.72	.02	Not significant
Gender	5.92	.01	Not significant
Educational Background	6.39	.031	Not significant

This table presents the results of the test of significant difference in the level of compliance with DRRM programs when grouped according to the respondents' profiles. Chi-square tests showed no significant differences in compliance by age, gender, or education ($p > .05$), indicating that compliance behaviors are community-driven rather than demographically segmented. This uniformity may stem from shared vulnerability and collective awareness (Tuya et al., 2025). However, incorporating regression analysis could uncover latent predictors such as years of barangay service or exposure frequency. The indicators of Age ($p = .02$), Gender ($p = .01$), and Educational Background ($p = .031$) all yielded results interpreted as Not Significant. This implies that the respondents' perceptions of their compliance with DRRM programs do not differ substantially across demographic variables. In other words, compliance is uniformly perceived and practiced regardless of age, sex, or educational attainment. This result suggests that DRRM compliance is shaped more by communal experiences and shared vulnerabilities in disaster-prone areas rather than individual demographic attributes. The finding is consistent with recent studies indicating that collective risk perception and exposure often override demographic differences in influencing compliance and disaster preparedness (Lagrada, 2025; Tuya et al., 2025; Ner et al., 2022; García et al., 2024; Amini et al., 2024).

However, these results contradict earlier findings (Asio, 2021), which revealed significant differences in disaster awareness and compliance when grouped by profile, particularly in relation to education and age. This discrepancy underscores the importance of contextual factors such as geographic exposure, availability of local DRRM initiatives, and community-level awareness campaigns. Recent evidence highlights that standardized training and community-based disaster programs help reduce demographic disparities, leading to more consistent compliance across different groups (Chong et al., 2025; Guo et al., 2025; Lacher, 2024; Kurata et al., 2023; Evangelio et al., 2024). Overall, the findings emphasize the need for inclusive, community-driven approaches to DRRM that treat compliance as a collective responsibility rather than tailoring interventions strictly to demographic profiles. This perspective can guide policymakers in designing interventions that focus on shared vulnerabilities and systemic resilience rather than individual-level differences.

Issues and Challenges Encountered

The data collected from informants were meticulously transcribed and read repeatedly to immerse in the content. From these transcripts, significant statements aligned with the research questions were extracted. These statements were coded, clustered, and interpreted to derive emergent themes. Informants were allowed to express their thoughts in their native dialect to ensure authenticity, and later translations were made for clarity to general readers. This process ensured that the participants' lived experiences with DRRM compliance could be captured in their natural voice while being accessible to a broader academic audience. Thematic analysis grounded in this approach has been supported as rigorous and valid in disaster studies.

The analysis revealed five major themes that encapsulated the obstacles encountered by Barangay DRRM committees: (a) Lack of Drainages, (b) Inadequacy of Signages, (c) Unavailability of Early Warning Devices, (d) Scarcity of Resources, and (e) Unresponsive Populace. Each theme reflects structural, institutional, and social constraints that inhibit effective compliance with DRRM programs. These themes resonate with patterns found in recent literature on local disaster governance, namely, that technical gaps, underinvestment, and community engagement deficits converge to limit local resilience.

Lack of Drainage. Informants described several challenges: blocked or nonexistent drainage systems, damage from road widening, and reliance on makeshift household canals. One participant said their drainage had been "affected by the widening project," so water could no longer pass freely. Another noted that the barangay lacked the budget to install proper drainage, forcing households to improvise channels toward nearby rivers. The result was consistent flooding even with light rains. The absence of adequate drainage infrastructure is a recognized risk factor in urban flooding, as fragmented stormwater systems overwhelm communities (Context News, 2025; IJSRED, 2025; Dariagan et al., 2020; Kurata et al., 2023; How Flood Control Projects Fail the Poor, 2025). Effective stormwater and drainage design is integral to reducing flood risk in populated barangays (IJSRED, 2025; Kurata et al., 2023).

Inadequacy of Signages. Participants reported that signage intended to guide evacuees was often damaged by weather, vandalized, or had faded over time. One informant noted that children threw stones at signs, and strong winds would topple them, making frequent replacement seem unsustainable. These observations align with studies that emphasize the role of clear signage in evacuation efficiency: functional, visible, well-placed signage helps reduce confusion and delays, especially during crises (Rogers & Tsirkunov, 2015; Basher, 2016; Asio, 2021; De León et al., 2006; Hallegatte, 2019). Durable materials, preventive maintenance, and strategic placement can improve the persistence and cost-effectiveness of evacuation signage (Hallegatte, 2019; Sufri et al., 2020).

Unavailability of Early Warning Devices. Many informants explained that their barangays lacked CCTV systems, sirens, or automated flood sensors. Some said they relied on church bells as ad hoc warning tools. One participant said, "We don't have CCTV or warning devices installed here." The lack of such devices reduces reaction time and may increase exposure to disaster risk. In contrast, successful community-based early warning systems (CBEWS) integrate both technological and social components, and their absence weakens resilience (Evangelio et al., 2024; Munasinghe et al., 2024; GSMA, 2022; Assessing EWS in coastal communities, 2023; Multi-Hazard EW Systems, 2025). The digital and mobile technologies for EWS in the Philippines have shown promise but remain patchy and fragmented (GSMA, 2022; PreventionWeb, 2023).

Scarcity of Resources. Informants consistently named limited budgets as a major barrier. One said the barangay's disaster fund was only 5% of its IRA (Internal Revenue Allotment), allocated across mitigation, preparedness, and response. Inadequate funding hampered repair, replacement, and procurement of DRRM equipment. The literature affirms that many local governments in the Philippines face fiscal constraints, limiting their capacity to implement full DRRM programs (Dariagan et al., 2020; Kurata et al., 2023; Ner et al., 2022; GSMA, 2022; UNDRR, 2023). Without predictable and sufficient funding, local DRRM plans often remain aspirational rather than operational.

Unresponsive Populace. Some participants described difficulty convincing a small number of residents to evacuate, citing skepticism about flooding severity or reluctance to leave animals or property behind. One informant said that while most complied, some refused to evacuate even when warned. Behavioral resistance to evacuation is well documented: trust, prior experience, and perceived credibility influence compliance (Kawasaki, 2020; Butler, 2017; Saha, 2017; Thompson et al., 2017; Sawada et al., 2021). In DRRM literature, promoting community trust, effective communication, and pre-evacuation engagement are crucial to minimizing refusal (Sawada et al., 2021; Sufri et al., 2020). Direct quotations from respondents illustrate these lived experiences, e.g., "*Our drainage was damaged by road widening, so water cannot pass freely*," highlighting structural neglect. These qualitative insights affirm findings by Sawada et al. (2021) and Sufri et al. (2020) that behavioral and infrastructural barriers intertwine in local disaster governance.

CONCLUSION

Compliance with DRRM programs in Dapitan City barangays is present but uneven, strong in procedural coordination, weak in infrastructural implementation. This imbalance reflects broader national trends where administrative compliance outpaces tangible resilience measures. Strengthening drainage systems, early warning mechanisms, and capacity-building programs are critical for moving from compliance to sustainability. Furthermore, the study showed no significant differences in compliance when analyzed by age, gender, or educational background, indicating that disaster preparedness and response are influenced more by

collective vulnerabilities and community-wide risk perception than by demographic factors. Qualitative findings reinforced this conclusion, highlighting major challenges such as the lack of drainage systems, inadequate signage, the absence of reliable early warning devices, limited budgetary resources, and occasional reluctance of residents to evacuate during disasters. These systemic barriers reduce the effectiveness of DRRM programs and hinder the achievement of resilient communities.

In light of these results, it is recommended that future DRRM initiatives prioritize the development of essential infrastructure such as drainage and warning systems, institutionalize regular training and simulation exercises, and strengthen community engagement through participatory risk communication. Increasing barangay-level allocations and establishing systematic monitoring and evaluation mechanisms can further improve accountability and sustainability. By aligning infrastructure development, resource support, and community participation, Dapitan City can enhance its compliance with DRRM mandates and build safer, more disaster-resilient communities.

Ethical Consideration

The study adhered to institutional ethical guidelines, with REC approval obtained before data collection. Participation was voluntary, and confidentiality and anonymity were maintained throughout.

Conflict Of Interest

The author declares no conflict of interest and intends to use this publication as evidence of research productivity for institutional merit.

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