

FROM RISK TO RESILIENCE: ASSESSING BARANGAY CAPACITY FOR DISASTER PREPAREDNESS AND RESPONSE

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ABSTRACT

This study investigates the disaster preparedness and response capacity of selected barangays in Sual, Pangasinan, Philippines—specifically Cabalitian, Sioasio East and West, and Pangascasan. It aims to assess community readiness for natural calamities such as typhoons, floods, and earthquakes, while identifying gaps in early warning systems, evacuation planning, and search-and-rescue operations. Using a quantitative descriptive design, data were gathered from 200 respondents through a validated survey instrument employing Likert scale items. Quota sampling ensured proportional representation of barangay officials and residents aged 18–70 with at least five years of residency. Findings reveal a high level of disaster preparedness among residents, demonstrated through consistent practices like emergency planning, survival kit assembly, and active participation in community drills and awareness campaigns. Barangay officials effectively implemented structured disaster response activities, supported by inter-agency collaboration and public education efforts. However, the study highlights areas needing improvement, particularly in risk awareness related to dike and dam stability and secondary hazards such as chemical spills. The research concludes that while the barangays exhibit commendable disaster readiness, sustained efforts in education, resource allocation, and inter-barangay coordination are essential to enhance resilience. These insights offer valuable guidance for policymakers and local leaders aiming to strengthen grassroots disaster risk reduction strategies.

Keywords: *Barangay Response Capacity, Community Resilience, Disaster Preparedness, Risk Awareness*

INTRODUCTION

Natural disasters pose persistent threats to vulnerable communities worldwide, particularly in regions like the Philippines where geographic and climatic conditions heighten exposure to typhoons, floods, and earthquakes (Ayuningtyas et al., 2021; Chan et al., 2019; Nicole, 2022). Disaster preparedness has emerged as a critical strategy for mitigating risks, saving lives, and minimizing economic and infrastructural losses (Cutter et al., 2008; Hosseini et al., 2016; GAR, 2015). Numerous studies have emphasized the importance of community-based disaster risk reduction (DRR), highlighting the role of local governance, early warning systems, and public awareness in enhancing resilience (Gaillard & Mercer, 2013; Bankoff, 2003; Gaillard & Mercer, 2013; Bankoff, 2003; Allen, n.d.; Lassa et al., 2018; Bollettino et al., 2018; Gencer et al., 2021). However, despite national efforts to institutionalize DRR frameworks, many barangays especially in rural areas continue to face significant challenges in implementing effective preparedness and response mechanisms (Republic Act No. 10121, 2010; DILG-LGA, 2018; DILG-NBOO, 2016).

Cultural values and social structures deeply influence how communities perceive and respond to disasters. Prior research has shown that local beliefs, traditions, and leadership dynamics can either facilitate or hinder disaster preparedness (Kelman *et al.*, 2012; Appleby-Arnold et al., 2021; Prior & Eriksen, 2013). In the context of Sual, Pangasinan, recurring natural calamities have underscored the urgency of strengthening grassroots disaster management. Yet, gaps remain in training, resource allocation, infrastructure, and coordination among barangays, limiting their capacity to respond effectively (Lee, 2019; Malalgoda et al., 2013; Dean Kyne et al., 2020).

This study seeks to assess the disaster preparedness and response capacities of selected barangays in Sual namely Cabalitian, Sioasio East and West, and Pangascasan. Specifically, it aims to (1) evaluate the level of preparedness among residents for typhoons, floods, and earthquakes; (2) identify activities conducted by barangay officials such as early warnings, evacuation planning, and search-and-rescue operations; and (3) examine proposed programs addressing disaster risks in these communities.

By identifying existing strengths and gaps, this research contributes to the broader discourse on community resilience and localized DRR strategies. Its findings are expected to inform policy development, enhance inter-agency collaboration, and support the design of inclusive, sustainable disaster preparedness programs that empower vulnerable populations (Croese et al., 2020; Kakar et al., 2021; GFDRR, 2021).

METHODS

This study utilized a quantitative research design with a descriptive approach to evaluate the disaster preparedness and response capacity of selected barangays in Sual, Pangasinan—namely Cabalitian, Sioasio East, Sioasio West, and Pangascasan (Best & Kahn, 2006; De Vos et al., 2005). The research aimed to identify the gap between existing preparedness measures and actual response capabilities, examining how these are influenced by each barangay's overall capacity.

A modified survey questionnaire was developed and distributed to a total of 200 participants, comprising 15 barangay officials and 35 residents per barangay, all of whom were aged 18 to 70 and had resided in their communities for at least five years. The instrument included Likert scale items to assess preparedness levels and disaster response activities such as early warning systems, evacuation planning, and search-and-rescue operations (Best & Kahn, 2006).

Data collection was conducted in person, with informed consent obtained from all respondents to ensure ethical compliance (De Vos et al., 2005). The questionnaire was validated by experts and approved by local authorities prior to deployment.

Descriptive statistical tools including frequency distribution, percentage, and weighted mean were used to analyze the data and interpret community readiness (Best & Kahn, 2006). Confidentiality of responses was strictly maintained throughout the study (De Vos et al., 2005).

This methodological framework allowed for a comprehensive and replicable assessment of barangay-level disaster preparedness, offering valuable insights for future policy development and community resilience planning.

RESULTS AND DISCUSSION

This chapter presents the key findings of the study, organized according to the research objectives. Data were analyzed using descriptive statistics and are reported objectively to highlight trends, patterns, and significant observations. Tables are included to enhance clarity and support the interpretation of results.

Level of Preparedness of Residents for Natural Disasters

Residents from Barangays Pangascasan, Cabalitian, Sioasio East, and Sioasio West consistently demonstrated a high level of disaster preparedness across all assessed hazard typhoons, floods, and earthquakes.

Table 1.
Preparedness Level for Typhoons

Barangay	Weighted Mean	Interpretation
Pangascasan	4.92	Highly Prepared
Cabalitian	4.88	Highly Prepared
Sioasio East	4.89	Highly Prepared
Sioasio West	4.91	Highly Prepared
Overall Mean	4.90	Highly Prepared

Residents reported consistent practices such as developing family emergency plans, assembling survival kits, monitoring weather updates, and participating in evacuation drills. These behaviors

were rated as “Highly Practiced” or “Always Observed” (Akumu, 2011; Bhat et al., 2017; Bollettino et al., 2018; Caoleng & Fermin, 2024).

Disaster Response Activities Conducted by Barangay Officials

Barangay officials implemented structured and efficient disaster response activities, including early warning dissemination, evacuation planning, and search-and-rescue operations.

Table 2.
Implementation of Disaster Response Activities

Activity	Weighted Mean	Interpretation
Early Warning System	4.85	Highly Implemented
Evacuation Planning	4.80	Highly Implemented
Search and Rescue	4.78	Highly Implemented

These results reflect strong coordination and preparedness among barangay leadership, supported by active community participation (Lee, 2019; Gencer et al., 2021; Dean Kyne et al., 2020; DILG-LGA, 2018; DILG-NBOO, 2016).

Community-Driven Disaster Preparedness Programs

The study found widespread implementation of community programs aimed at enhancing disaster resilience.

Table 3.
Community Programs and Initiatives

Program Type	Frequency	Observations
Seminars & Workshops	High	Regularly conducted across barangays
Waste Management Efforts	Moderate	Integrated into DRR campaigns
Public Awareness Drives	High	Supported by local government units

Residents actively engaged in these programs, contributing to a well-developed culture of preparedness shaped by repeated exposure to disasters (Allen, n.d.; Lassa et al., 2018; Prior & Eriksen, 2013; Appleby-Arnold et al., 2021).

Despite the overall positive findings, the study identified specific areas that warrant further attention to enhance disaster resilience. One notable gap is the limited awareness among residents regarding the risks associated with dike and dam stability, which could pose significant threats during extreme weather events. Additionally, there is insufficient knowledge on how to manage secondary hazards such as chemical spills, which may arise in the aftermath of natural disasters. These overlooked vulnerabilities highlight the need for targeted education campaigns and expanded training programs that address these specific risks. By equipping communities with the necessary information and skills, local disaster preparedness efforts can be more

comprehensive and adaptive to evolving threats (Ayuningtyas et al., 2021; Chan et al., 2019; Nicole, 2022).

The study revealed several key trends in disaster preparedness and response among the selected barangays in Sual, Pangasinan. Across all barangays and disaster types typhoons, floods, and earthquakes residents consistently demonstrated high levels of preparedness, supported by well-structured and effectively implemented response activities. Community engagement in preparedness programs was notably strong and sustained, reflecting a collective commitment to risk reduction and resilience. However, the study also identified specific technical risks, such as limited awareness of dike and dam stability and secondary hazards like chemical spills, which remain under-addressed and present opportunities for targeted improvement. These findings are consistent with previous research emphasizing the importance of localized disaster risk reduction and active community participation (Gaillard & Mercer, 2013; Allen, n.d.; Lassa et al., 2018; Cutter et al., 2010; Djalante et al., 2013; Marzi et al., 2019; Lee, 2019; Gencer et al., 2021), while also shedding light on unique challenges specific to the Sual context that warrant further attention..

CONCLUSIONS AND RECOMMENDATIONS

The study revealed that the selected barangays exhibit exemplary disaster preparedness, consistently adhering to safety protocols and taking proactive measures to mitigate risks. Residents demonstrated strong engagement and discipline in disaster management, shaped by frequent exposure to emergencies that fostered a culture of vigilance and readiness. Key elements such as early warning systems, evacuation plans, and search-and-rescue operations were found to be well-implemented and highly effective, while community-driven initiatives further strengthened collective risk reduction efforts.

These findings align with the research objectives and contribute valuable insights to the field by highlighting the effectiveness of localized, community-based disaster strategies (Allen, n.d.; Lassa et al., 2018; Cutter et al., 2008; Djalante et al., 2013). However, the study also identified areas needing improvement, particularly in raising awareness about the stability of neighborhood dikes and dams and managing secondary hazards like chemical spills. Limitations such as sample size constraints and external influences may have affected the generalizability of results. Practical recommendations include intensifying risk-specific education campaigns, allocating resources for emergency equipment and advanced training, enhancing inter-agency coordination, adopting modern monitoring systems, and conducting quarterly community-wide drills with standardized evaluations.

These measures will not only refine preparedness strategies but also ensure continuous improvement through feedback and documentation. Sustaining successful programs like seminars, training sessions, and public awareness initiatives is essential for long-term resilience (Croese et al., 2020; Kakar et al., 2021; Hosseini et al., 2016). Future research should explore socio-economic influences on preparedness, longitudinal changes in community resilience, comparative studies across barangays, and the role of digital tools in early warning dissemination (Marzi et al., 2019; Engle, 2011; Fan & Mostafavi, 2018). By addressing current gaps and

expanding inquiry, communities can evolve into models of effective disaster management, offering replicable practices for broader application (Godschalk, 2003; ISO, 2016; Cutter et al., 2010).

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DECLARATION ON THE USE OF AI TOOLS

The researchers hereby declare that the completion of this research was supported by the use of artificial intelligence tools, specifically Grammarly. Grammarly was utilized to enhance the clarity, coherence, and grammatical accuracy of the written content throughout the manuscript. Its assistance was limited to language refinement and did not influence the originality, analysis, or intellectual contributions of the study.

All AI-assisted edits were carefully reviewed and approved to ensure alignment with the research objectives and academic standards. The use of Grammarly was conducted ethically and in accordance with institutional guidelines, serving solely as a supplementary aid to improve the quality of presentation.

This declaration is made in the spirit of transparency and academic integrity.

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