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Building Resilient Communities: Disaster Preparedness and Risk Reduction Measures of Barangays in San Jacinto, Masbate

Jome B. Cabiles
Osmeña Colleges, Masbate City, Philippines
jomecabiles4@gmail.com

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ABSTRACT

This study evaluated the disaster preparedness and risk reduction measures of the 21 barangays of San Jacinto, Masbate and developed an evidence-based Barangay Resilience Roadmap. A sequential explanatory mixed-methods design was employed. One authorized disaster-risk-reduction key informant from each barangay was purposively selected, giving 21 respondents composed of Barangay Captains, BDRRM focal persons, and officials directly involved in local preparedness. Quantitative data were gathered through a validated 40-item, four-point survey covering planning, capacity, implementation, and financial resources; qualitative data were obtained through semi-structured interviews. Frequency, percentage, weighted mean, composite mean, ranking, thematic analysis, and data triangulation were used. The multi-response profile showed overlapping upland, coastal, and inland characteristics, while typhoon, flood, earthquake, and storm surge were the leading hazards. Overall preparedness was Implemented (M = 3.25). Planning was Highly Implemented (M = 3.52), whereas implementation (M = 3.24), financial resources (M = 3.20), and capacity (M = 3.05) were Implemented. Strengths included updated lists of vulnerable residents, hazard maps, full allocation of the mandatory 5% LDRRM fund, and accessible quick-response funds. Major gaps involved weak mutual-aid agreements, limited motorized rescue assets, inadequate resilient evacuation facilities, insufficient house-to-house communication, and the absence of equipment insurance. Qualitative findings generated four themes: operational readiness versus material capacity, bureaucratic and fiscal rigidity, socio-behavioral barriers to evacuation, and the need for redundant communication and alerting. The findings indicate a compliance-capability gap: strong administrative preparation is not yet matched by field-level assets and last-mile community reach. The proposed roadmap prioritizes site-specific planning, resilient infrastructure, asset protection, flexible emergency procurement, livelihood-sensitive evacuation, analog communication redundancy, and localized drills.

Keywords: *disaster preparedness, disaster risk reduction, barangay resilience, community-based DRRM, early warning systems, San Jacinto*

INTRODUCTION

Disaster preparedness is a foundational responsibility of local government because hazards become disasters when exposed communities lack the capacity, resources, and systems needed to anticipate and manage their effects. Climate-related extremes, compound flooding, tropical cyclones, and other hazards increasingly challenge public infrastructure, livelihoods, and community well-being (Ebi et al., 2021; Lai et al., 2021). For island and coastal municipalities, the need for proactive risk reduction is especially urgent because geographic isolation can delay external assistance and disrupt communication, transport, and supply chains.

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The Philippine Disaster Risk Reduction and Management Act of 2010, or Republic Act No. 10121, institutionalized a decentralized and community-oriented system of disaster governance. It requires local government units to organize disaster-risk-reduction structures, prepare plans, maintain early-warning and response mechanisms, and allocate at least five percent of estimated regular-source revenues to the Local Disaster Risk Reduction and Management Fund. These mandates are consistent with the Sendai Framework for Disaster Risk Reduction 2015–2030, which emphasizes understanding risk, strengthening governance, investing in resilience, and improving preparedness for effective response (Republic Act No. 10121, 2010; United Nations, 2015).

Barangays are the first governmental units expected to translate these policies into life-saving action. Their readiness depends not only on written plans but also on trained personnel, rescue equipment, resilient evacuation sites, reliable communication, financial flexibility, and public participation. Studies of Philippine barangay disaster councils have shown that formal compliance can coexist with shortages in funding, specialized equipment, training, and community engagement (Cuya-Antonio & Antonio, 2017; Rodriguez-Lirios & Donato, 2023). Such conditions create a gap between what institutions are required to do and what they can actually perform during a crisis.

San Jacinto is an island municipality at the northern end of Ticao Island in Masbate. Its 21 barangays include coastal, inland, and upland environments exposed to typhoons, floods, storm surges, earthquakes, and localized landslide risks. These overlapping conditions make uniform preparedness strategies inadequate. A coastal barangay may require marine rescue capacity and storm-surge evacuation, while an upland or inland community may require slope monitoring, clearing equipment, alternative routes, and flood-control measures. Context-sensitive indicators are therefore necessary to distinguish administrative compliance from actual capability (Beccari, 2016; Ivčević, 2020).

This study assessed the demographic and hazard profile of the barangays, measured the level of preparedness in planning, capacity, implementation, and financial resources, identified implementation challenges experienced by local officials, and formulated a Barangay Resilience Roadmap. By integrating quantitative readiness scores with the lived experiences of frontline officials, the study sought to provide a localized basis for moving San Jacinto from reactive recovery and paper-based compliance toward operational, community-centered resilience.

Literature Review

Community-Based Disaster Risk Reduction and Local Governance

Community-Based Disaster Risk Reduction (CBDRR) treats residents, local organizations, and grassroots officials as active partners in identifying hazards, analyzing vulnerability, designing interventions, and sustaining preparedness. This approach is particularly appropriate in small-island settings because local knowledge of terrain, safe routes, weather signs, vulnerable households, and livelihood patterns can improve the relevance of official plans. Abarquez and Murshed (2004) and Shaw (2013) emphasized that community participation strengthens ownership, trust, and long-term sustainability when local initiatives are formally integrated into government systems.

Philippine studies similarly show that effective local preparedness requires functional BDRRMCs, clear responsibilities, periodic assessment, and meaningful participation. Cuya-Antonio and Antonio (2017) demonstrated the value of performance standards in evaluating barangay disaster committees, while Abenir et al. (2022) found that small-island resilience is influenced by leadership, partnerships, funding, and the inclusion of vulnerable groups. These findings support a localized assessment that considers both institutional arrangements and the practical capacity of barangays to protect residents.

Decentralization can increase responsiveness, but it may also transfer responsibilities without equivalent fiscal or technical capacity. Distor (2025) described this imbalance in Philippine disaster governance, where local units may possess administrative and political authority but remain constrained by uneven financial resources. Thus, local preparedness should be assessed as an interaction among policy, resources, organizational capability, and community action rather than as the mere presence of required documents.

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Early Warning, Risk Communication, and Evacuation Behavior

Early-warning systems are effective only when hazard information is detected, translated, communicated, trusted, and acted upon. Choo (2009) distinguished detection accuracy from decision sensitivity, while Garcia and Fearnley (2012) showed that warning failures often occur in the links connecting scientific information, institutional decisions, and public response. People-centered systems therefore require multiple communication channels, defined accountability, locally understandable messages, and mechanisms that reach remote or disconnected households (Šakić Trogrlić et al., 2022).

Risk perception also shapes whether residents follow warnings. Twigg (2003) argued that people evaluate hazard messages within the realities of livelihood, property, family responsibility, and previous experience. A resident who refuses evacuation to protect livestock or avoid an unsafe shelter may be responding to perceived economic and social costs rather than simply lacking awareness. The Theory of Planned Behavior further explains that protective action depends on attitudes, social expectations, and perceived behavioral control—the belief that one has the resources and ability to act (Ajzen, 1991).

Effective communication must consequently combine technical systems with social trust and redundancy. Lumbroso et al. (2016) identified persistent gaps in data quality, risk communication, and community participation across hazard-prone settings. Zhang et al. (2021) likewise stressed that appropriate warning messages and public awareness are essential to the performance of earthquake early-warning systems. In geographically isolated barangays, high-powered sirens, analog radios, sitio-level messengers, and house-to-house communication can provide vital backups when commercial networks fail.

Operational Capacity, Infrastructure, and Financial Sustainability

Preparedness requires a balance between human and physical capacity. Trained responders cannot perform safely without boats, vehicles, personal protective equipment, lighting, first-aid supplies, clearing tools, and resilient evacuation centers. Layson and Legayada-Layson (2025) reported high vulnerability and low coping capacity in selected Masbate barangays, demonstrating how socioeconomic conditions and incomplete DRRM programming can weaken local resilience. Rodriguez-Lirios and Donato (2023) similarly identified limited funds, insufficient training support, and shortages of essential equipment as recurring constraints among BDRRMC members.

Financial readiness extends beyond statutory allocation. Disaster funding must be available before emergencies, flexible enough for rapid use, and sustainable across prevention, response, recovery, asset maintenance, and livelihood restoration. Mechler et al. (2016) emphasized the connection between disaster-risk management and fiscal resilience, while Titko and Ristvej (2020) found that preparedness is influenced by risk awareness, previous experience, and household economic capacity. A barangay may therefore be compliant with fund-allocation rules yet remain vulnerable if expensive equipment is uninsured or if procurement procedures discourage timely action.

Composite indicators are useful for summarizing preparedness, but their validity depends on locally relevant variables and transparent interpretation. Beccari (2016) found that many disaster indices emphasize social and environmental characteristics while giving limited attention to direct mitigation and preparedness actions. The OECD (2008) likewise recommended careful construction and interpretation of composite measures. For this reason, the present study used four distinct pillars and complemented quantitative scores with qualitative evidence explaining why particular gaps persisted.

Theoretical and Conceptual Foundations

The study integrated three perspectives. CBDRR explained why local knowledge, community participation, and barangay-level capacity are central to resilience. Institutional Theory explained how BDRRMC structures and practices may be shaped by coercive legal requirements, normative professional standards, and imitation of accepted organizational models (DiMaggio & Powell, 1983). This lens is useful for distinguishing practices adopted mainly for legitimacy and compliance from those that are operationally adapted to local hazards.

The Theory of Planned Behavior explained the behavioral dimension of preparedness. Positive attitudes and strong social expectations may support action, but low perceived behavioral control—caused by insufficient

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equipment, inaccessible shelters, weak communication, or fear of audit sanctions—can prevent officials and residents from acting even when they recognize the risk (Ajzen, 1991). Together, these perspectives suggest that effective preparedness emerges from the interaction of institutional mandates, community capacity, and the practical intention and ability to act.

The conceptual framework organized these factors through an Input–Process–Output model. Inputs included the barangay hazard profile, preparedness indicators, and implementation challenges. The process combined statistical assessment, interviews, thematic analysis, and triangulation. The output consisted of evidence-based findings and the Barangay Resilience Roadmap, with a feedback loop that allows future implementation results to refine planning, resource allocation, and community engagement.

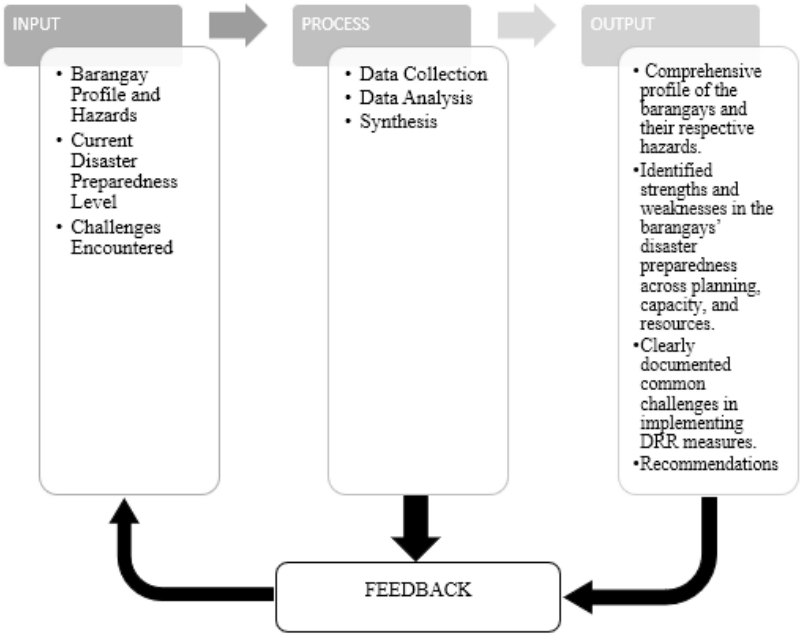

Figure 1. *Conceptual framework of the study*

METHODS

Research Design

The study used a sequential explanatory mixed-methods design. The quantitative phase described the hazard profile and measured disaster preparedness through a standardized survey. The qualitative phase then explored the experiences of barangay officials to explain the operational, institutional, behavioral, and communication factors underlying the numerical results. The two strands were integrated during interpretation and the development of the Barangay Resilience Roadmap.

Research Locale

The research was conducted in the 21 barangays of San Jacinto, Masbate, an island municipality located at the northern end of Ticao Island. The locale includes coastal, inland, upland, and overlapping geographic conditions. Its communities are exposed to typhoons, floods, storm surges, earthquakes, and localized slope-related hazards. The barangays were selected because they constitute the frontline governmental units responsible for local preparedness and initial emergency response.

Participants and Sampling Technique

Purposive sampling was used to select one authorized disaster-risk-reduction key informant from each barangay, yielding 21 participants. Respondents were Barangay Captains, BDRRM focal persons, or other officials directly involved in planning, fund management, warning dissemination, evacuation, and response. Their

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legal authority, technical knowledge, and firsthand experience made them information-rich participants for both the survey and the qualitative interviews.

Research Instrument

A researcher-developed instrument had two components. The quantitative component contained a barangay profile matrix and a 40-item preparedness scale covering planning, capacity, implementation, and financial resources, with 10 indicators per pillar. Responses used a four-point scale: 3.26–4.00, Highly Implemented; 2.51–3.25, Implemented; 1.76–2.50, Poorly Implemented; and 1.00–1.75, Not Implemented. The qualitative component was a semi-structured interview guide examining institutional, financial, logistical, communication, and community-behavior challenges.

Content and face validity were established through review by disaster-risk, local-governance, and research specialists and through pilot testing with local officials. The source study also used test–retest procedures for response consistency and inter-rater protocols for the coding of qualitative data. Revisions were incorporated to improve clarity, cultural relevance, and alignment with the research objectives.

Data Gathering Procedure

After the proposal and institutional requirements were completed, permission was secured from the Municipal Disaster Risk Reduction and Management Office and the participating barangays. The researcher coordinated with local officials, administered the survey, and conducted face-to-face semi-structured interviews. With permission, responses were recorded and supported by field notes. Completed instruments were checked, organized, encoded, and prepared for quantitative and qualitative analysis.

Data Analysis

Frequency counts and percentages described the multi-response topographic and hazard profile. Weighted means, composite means, and ranks measured the implementation of the four preparedness pillars. Interview recordings were transcribed and coded through thematic analysis. Related codes were clustered into recurring themes, and representative statements were examined to explain quantitative gaps. Data triangulation integrated the two strands and supported the formulation of the roadmap.

Ethical Considerations

Participants received information about the purpose, procedures, voluntary nature, and possible use of the study. Informed consent was obtained before survey and interview participation. Respondents could decline questions or withdraw without penalty. Identifying information was excluded from the report, and responses were presented in aggregate or through coded labels. Audio files, transcripts, and survey data were handled confidentially and used only for academic purposes.

RESULTS AND DISCUSSION

Barangay Topographic and Hazard Profile

Table 1. *Multi-response topographic and primary-hazard profile*

Profile Type	Category	Frequency	Percentage	Rank
Topography	Upland	14	37	1
Topography	Coastal	12	32	2
Topography	Inland	12	32	2
Primary hazard	Typhoon	22	38	1
Primary hazard	Flood	18	31	2
Primary hazard	Earthquake	10	17	3
Primary hazard	Storm surge	8	14	4

The frequencies exceeded the 21 barangays because topographic and hazard categories were treated as multiple responses: a barangay could include more than one terrain type and face more than one primary hazard. Upland characteristics were most frequently reported (f = 14), while coastal and inland characteristics were each

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reported 12 times. Across the multi-hazard profile, typhoons were most frequent (f = 22, 38%), followed by floods (f = 18, 31%), earthquakes (f = 10, 17%), and storm surges (f = 8, 14%).

The results confirm that San Jacinto requires an all-hazard and site-specific approach. The overlapping counts reflect compound vulnerability rather than a classification error alone: the same typhoon may produce wind damage, inland flooding, slope failure, and storm-surge exposure. This supports the use of localized and dynamic indicators rather than uniform municipal assumptions (Beccari, 2016; Ebi et al., 2021). It also justifies separate evacuation, warning, mobility, and infrastructure protocols for coastal, inland, and upland zones.

Planning: Policy and Strategy

Table 2. *Preparedness in planning, policy, and strategy*

Indicator	Mean	Rank	Interpretation
Updated list of vulnerable populations	3.95	1	Highly Implemented
Updated hazard map per sitio	3.86	2	Highly Implemented
Clear BDRRMC structure and assigned roles	3.81	3	Highly Implemented
Written and approved three-year BDRRM Plan	3.76	4	Highly Implemented
Pre-emptive evacuation protocols and ordinances	3.67	5	Highly Implemented
Climate-change adaptation in the investment plan	3.62	6	Highly Implemented
Contingency plan for strongest-typhoon scenarios	3.52	7	Highly Implemented
Risk profile with historical damage data	3.43	8	Highly Implemented
Regular BDRRMC meetings	3.24	9	Implemented
Formal mutual-aid agreements	2.38	10	Poorly Implemented
Composite mean	3.52		Highly Implemented

Planning was the strongest pillar (M = 3.52, Highly Implemented). Updated lists of vulnerable residents (M = 3.95), hazard maps (M = 3.86), and defined BDRRMC roles (M = 3.81) indicate strong administrative preparation. The mandated plan, evacuation protocols, and climate-change adaptation measures were also well established. These results are consistent with evidence that structured policy frameworks and defined organizational responsibilities positively influence institutional readiness (Efendy et al., 2022).

Formal mutual-aid agreements received the lowest rating (M = 2.38, Poorly Implemented). This gap is important in an island municipality because a severely affected barangay may require boats, personnel, supplies, or shelter support from neighboring communities. Planning should therefore extend beyond internally compliant documents to pre-arranged inter-barangay and external partnerships. Institutional preparedness must remain dynamic and responsive to actual local risk rather than functioning as a static compliance exercise (Ivčević, 2020).

Capacity: Human and Physical Resources

Table 3. *Preparedness in human and physical capacity*

Indicator	Mean	Rank	Interpretation
Safe alternative routes for transport and logistics	3.52	1	Highly Implemented
Trained first responders or SAR volunteers	3.48	2	Highly Implemented
Emergency food, hygiene, and water stockpiles	3.33	3	Highly Implemented
Trauma kits, first-aid bags, and BLS equipment	3.29	4	Highly Implemented
Functional communication tools	3.14	5	Implemented
Tools for clearing operations	2.90	6	Implemented
Hazard-resilient permanent evacuation center	2.81	7	Implemented
PPE for all BDRRMC members	2.80	8	Implemented
Generators, solar lamps, and heavy-duty lighting	2.67	9	Implemented
Functional motorized rescue boats or vehicles	2.52	10	Implemented
Composite mean	3.05		Implemented

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Capacity received the lowest pillar score (M = 3.05, Implemented). Alternative routes (M = 3.52) and trained responders (M = 3.48) were major strengths, indicating that barangays possessed valuable human capital and basic logistical knowledge. Nevertheless, motorized rescue assets (M = 2.52), emergency lighting (M = 2.67), PPE (M = 2.80), and permanent hazard-resilient evacuation centers (M = 2.81) remained the weakest areas.

The result exposes a practical divide between trained personnel and the equipment needed to use their skills safely. Similar Philippine studies have reported that resource shortages, insufficient equipment, and limited funding can undermine otherwise functional local DRRM organizations (Layson & Legayada-Layson, 2025; Rodriguez-Lirios & Donato, 2023). For San Jacinto, the most urgent capability investments are motorized marine and land mobility, resilient shelters, independent lighting and power, protective equipment, and routine maintenance of physical assets.

Implementation: Action and Community Awareness

Table 4. *Preparedness in implementation, action, and awareness*

Indicator	Mean	Rank	Interpretation
Documentation of incidents and response actions	3.71	1	Highly Implemented
Color-coded warning signals understood by residents	3.62	2	Highly Implemented
Active and accessible disaster operations center	3.48	3	Highly Implemented
Basic Life Support training for volunteers	3.38	4	Highly Implemented
Community-wide multi-hazard drills	3.37	5	Highly Implemented
Hazard signs and evacuation-route markers	3.24	6	Implemented
24/7 early-warning system	3.19	7	Implemented
Post-disaster needs-assessment training	3.14	8	Implemented
Drainage and riverbank maintenance	2.71	9	Implemented
House-to-house preparedness dissemination	2.62	10	Implemented
Composite mean	3.24		Implemented

Implementation was rated Implemented (M = 3.24). Incident documentation (M = 3.71), color-coded warnings (M = 3.62), operations centers (M = 3.48), and community drills (M = 3.37) demonstrate functional command and response routines. However, house-to-house dissemination (M = 2.62), drainage maintenance (M = 2.71), and 24/7 warning-system functionality (M = 3.19) indicate weaker last-mile and preventive action.

The results illustrate that warning infrastructure cannot be evaluated only by whether signals exist. The crucial issue is whether messages reach remote households, remain available when cellular networks fail, and are understood by residents. Garcia and Fearnley (2012) and Šakić Trogrlić et al. (2022) identified communication linkages and people-centered response as central to effective warning systems. The low score for house-to-house dissemination suggests a need to formalize sitio-level warning chains and community participation consistent with CBDRR principles (Shaw, 2013).

Financial Resources: Budget and Sustainability

Table 5. *Preparedness in financial resources and sustainability*

Indicator	Mean	Rank	Interpretation
Full allocation of the mandatory 5% LDRRM Fund	4.00	1	Highly Implemented
Accessible Quick Response Fund	3.86	2	Highly Implemented
Trust fund for unspent LDRRMF	3.81	3	Highly Implemented
Transparency in reporting fund utilization	3.32	4	Highly Implemented
Funds for pre-disaster mitigation versus relief	3.33	5	Highly Implemented
Timely liquidation following COA rules	3.24	6	Implemented
Funding for responder capacity building	3.14	7	Implemented
Maintenance budget for early-warning systems	2.95	8	Implemented
Support for livelihood-resilience programs	2.76	9	Implemented
Insurance for rescue equipment and vehicles	1.57	10	Not Implemented
Composite mean	3.20		Implemented

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Financial resources were Implemented (M = 3.20). The full 5% LDRRM allocation (M = 4.00), accessible Quick Response Fund (M = 3.86), and accumulated trust fund (M = 3.81) demonstrate high statutory compliance and short-term liquidity. In contrast, equipment and vehicle insurance was Not Implemented (M = 1.57), while livelihood resilience (M = 2.76) and early-warning maintenance (M = 2.95) received lower ratings.

This pattern shows that financial readiness is concentrated on allocation and immediate spending rather than long-term asset preservation. Mechler et al. (2016) emphasized that fiscal resilience requires forward-looking risk management, not only post-disaster liquidity. In San Jacinto, uninsured rescue assets could be lost in the same event for which they are needed. The funding framework should therefore include equipment insurance, scheduled maintenance, repair reserves, livelihood protection, and legally clarified emergency-procurement procedures.

Overall Level of Disaster Preparedness

Table 6. *Summary of preparedness across the four pillars*

Preparedness Pillar	Mean	Interpretation	Rank
Planning: Policy and Strategy	3.52	Highly Implemented	1
Implementation: Action and Awareness	3.24	Implemented	2
Financial Resources: Budget and Sustainability	3.20	Implemented	3
Capacity: Human and Physical Resources	3.05	Implemented	4
Overall composite mean	3.25	Implemented	

The overall composite mean of 3.25 indicates that disaster preparedness was Implemented. The descending pattern from planning (3.52) to implementation (3.24), financial resources (3.20), and capacity (3.05) demonstrates a compliance-capability gap. San Jacinto possessed the institutional foundation for preparedness, but the field-level systems required to operationalize that foundation were less developed.

The finding supports the view that preparedness must be judged through operational outcomes rather than documentation alone. Standard plans and budgets are necessary, but they do not guarantee safe rescue, dignified evacuation, reliable warning, or sustained recovery. Composite indicators are most useful when interpreted alongside the resources and behaviors that produce the score (Beccari, 2016; OECD, 2008).

Qualitative Challenges Experienced by Barangay Officials

Table 7. *Themes explaining implementation challenges*

Theme	Consolidated Evidence	Interpretive Meaning
Operational readiness versus material capacity	Officials described detailed plans and trained responders but insufficient motorized boats, generators, vehicles, and specialized rescue equipment.	Strong administrative and human capacity was constrained by weak physical mobility and infrastructure.
Bureaucratic and fiscal rigidity	Respondents reported hesitation in emergency spending because of procurement documentation, audit risk, and the absence of an asset-protection fund.	Compliance requirements sometimes delayed rapid purchasing and discouraged flexible action.
Socio-behavioral barriers to evacuation	Residents reportedly remained in high-risk homes to protect livestock, crops, and property or because available shelters lacked privacy, sanitation, and comfort.	Evacuation refusal reflected livelihood concerns, risk perception, and shelter quality.
Redundant communication and alerting	Officials noted that cellular and digital systems could fail during typhoons and that remote sitios needed sirens, analog radios, and trusted local messengers.	Early warning required independent backup channels and a formal last-mile chain of communication.

The four themes explain why strong plans did not consistently produce strong operational capacity. The material-capacity theme confirms that trained responders may still be unable to reach isolated residents safely. Bureaucratic rigidity shows how perceived audit and procurement risks can lower officials' perceived behavioral control, even when their attitudes toward preparedness are positive (Ajzen, 1991). Institutional requirements may

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therefore encourage legitimacy and documentation while inadvertently discouraging rapid adaptation (DiMaggio & Powell, 1983).

Evacuation resistance was rooted in livelihood and dignity concerns. This finding is consistent with Twigg's (2003) argument that warning response is filtered through daily socioeconomic realities. Residents are more likely to comply when evacuation plans protect animals and property, shelters provide acceptable living conditions, and communication comes from trusted local actors. Finally, the communication theme confirms that digital platforms require analog and human backups to remain functional during total power or signal failure (Garcia & Fearnley, 2012; Zhang et al., 2021).

CONCLUSION

The 21 barangays of San Jacinto operated within a complex multi-hazard environment in which coastal, inland, and upland conditions frequently overlapped. Overall disaster preparedness was Implemented. Planning was the most developed pillar, supported by hazard maps, vulnerable-population lists, organizational structures, and statutory plans. Implementation and financial resources were functional but uneven, while capacity was the weakest pillar because trained personnel and basic plans were not matched by sufficient motorized rescue assets, resilient shelters, independent power, protective equipment, and clearing tools.

The study concludes that San Jacinto has achieved substantial administrative and fiscal compliance but has not fully converted this compliance into frontline capability. The principal barriers were physical-resource shortages, weak mutual-aid arrangements, audit- and procurement-related hesitation, livelihood-driven evacuation refusal, substandard shelter conditions, and communication systems vulnerable to signal failure. The study contributes a localized explanation of the compliance-capability gap and shows that resilience requires simultaneous improvement in institutions, assets, behavior, and last-mile communication.

Recommendation

The municipality and its barangays should implement the Barangay Resilience Roadmap as a coordinated, multi-year program. Priority should be given to local hazard mapping, resilient evacuation infrastructure, motorized rescue mobility, equipment insurance and repair, legally clarified emergency procurement, livelihood-sensitive evacuation, redundant communication, and site-specific drills. Progress should be monitored through annual preparedness audits that distinguish documentary compliance from operational functionality.

Table 8. *Proposed Barangay Resilience Roadmap*

Priority Area	Key Actions	Responsible Units	Expected Indicator
Site-specific risk mapping	Update coastal, inland, upland, and overlapping hazard maps; identify vulnerable residents, alternative routes, and evacuation triggers.	MDRRMO, BDRRMCs, municipal planning and engineering offices	Annual maps and barangay-specific contingency protocols
Resilient evacuation and rescue mobility	Develop dedicated solar-powered evacuation centers and procure motorized rescue vessels or appropriate land vehicles.	Mayor, municipal engineer, MDRRMO, budget office	Functional blackout-resilient shelters and tested mobility assets
Asset protection and maintenance	Create an insurance, repair, and preventive-maintenance mechanism for rescue equipment, vehicles, radios, and generators.	Municipal treasurer, MDRRMO, COA liaison, barangays	Insured assets, maintenance logs, and rapid repair funding
Flexible emergency procurement	Prepare legally reviewed simplified procedures, pre-qualified suppliers, and emergency purchase documentation before hazard season.	Sangguniang Bayan, BAC, legal office, mayor	Reduced purchasing delays and documented audit compliance
Livelihood-sensitive evacuation	Establish secure livestock holding areas, property patrols, privacy and sanitation standards, and family-sensitive shelter management.	Agriculture office, PNP, barangays, social-welfare office	Higher evacuation compliance and safer shelter conditions

Redundant warning network	Combine high-powered sirens, analog two-way radios, backup batteries, and sitio-level messenger chains.	MDRRMO, communications specialists, BDRRMCs, sitio leaders	Warning coverage maintained during cellular and power failure
Localized drills and mutual aid	Conduct semiannual coastal, flood, landslide, earthquake, and nighttime simulations and formalize inter-barangay resource-sharing agreements.	BDRRMCs, schools, MDRRMO, neighboring barangays	Measured drill performance and signed mutual-aid protocols

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