ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Community-Based Disaster Risk Reduction and Management (CBDRRM) Implementation in Flood-Prone Barangays of Lal-lo, Cagayan, Philippines

Roseller U. Israel Jr.[1], Bondee L. Peñaflor[2]
[1] Local Government Unit of Lal-lo, [2] Isabela State University
Corresponding Author e-mail: *rosellerjrisrael@gmail.com*

Received: 23 July 2025 **Revised**: 26 August 2025 **Accepted**: 28 August 2025

Available Online: 31 August 2025

Volume IV (2025), Issue 3, P-ISSN – 2984-7567; E-ISSN - 2945-3577

https://doi.org/10.63498/etcor443

Abstract
Aim: This study assessed the extent of Community-Based Disaster Risk Reduction and Management (CBDRRM) implementation in flood-prone barangays of Lal-lo, Cagayan, focusing on the four thematic areas of the Philippine Disaster Risk Reduction and Management Act: disaster prevention/mitigation, preparedness, response, and rehabilitation/recovery.
Methodology: A descriptive-correlational design was applied, with 140 respondents from seven high-risk barangays. Data were collected through survey questionnaires and review of Barangay DRRM plans and reports.
Results: Disaster response emerged as the strongest area, particularly in emergency operations and coordination. In contrast, preparedness and prevention/mitigation were the weakest, with limited training, outdated contingency planning, poor land-use enforcement, and lack of equipment. Rehabilitation/recovery was moderate, with gaps in livelihood restoration, psychosocial support, and financial assistance. Statistical analysis indicated that barangays with larger populations and higher budgets generally achieved better implementation, though effective governance and community participation also drove positive outcomes.
Conclusion: CBDRRM in Lal-lo remains largely reactive, with emphasis on response rather than prevention and preparedness. Strengthening inclusive training, sustainable financing, and locally led initiatives is crucial to build resilience and reduce flood risks.
Keywords: *Community-Based Disaster Risk Reduction and Management, Flood-Prone Areas, Barangay DRRM, Disaster Preparedness, Municipality of Lal-lo*

INTRODUCTION

Disaster risk has risen globally, outpacing economic and population growth, with severe consequences for developing countries (Okazaki, 2022). While governments and international agencies have attempted to mitigate impacts, many programs are unsustainable locally once projects end. Effective disaster management requires community involvement, emphasizing partnerships, empowerment, and ownership. Traditional top-down approaches often exclude communities, leading to unmet needs and dependence on outside aid. The Community-Based Disaster Risk Reduction and Management (CBDRRM) framework addresses these gaps by empowering communities to assess risks, vulnerabilities, and resources. It promotes active participation in planning and implementation, integrates scientific analysis, and fosters multi-stakeholder collaboration, ensuring that disaster-affected communities are central to reducing risks and enhancing resilience (Amihan & Sanchez, 2023).

Flooding is considered one of the most serious and widespread natural hazards due to its devastating effects that endanger lives and cause property damage in the affected areas. The changing climate behavior of extreme rainfalls and typhoons are the primary contributors to this problem. Human activities such as urbanization

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

and the growth of settlements and assets in flood-prone areas likewise contribute to the increasing impacts of floods. Recent global evidence shows that since 1985, human settlements in high-hazard flood zones have expanded 60% faster than in safer areas, particularly in East Asia, where rapid urbanization and inadequate planning have heightened exposure to flood risks (Rentschler et al., 2023).

In response to the frequent natural catastrophes affecting the Philippines, the government enacted Republic Act 10121, known as the Philippine Disaster Risk Reduction and Management (DRRM) Act, which established a comprehensive framework for disaster preparedness and institutionalized a national plan for risk reduction. However, despite the enactment of RA 10121, limited research has assessed how CBDRRM is implemented at the barangay level in flood-prone municipalities such as Lal-lo, Cagayan. Therefore, it is essential to develop reliable flood risk assessments and tailored strategies, particularly at the Barangay level, as each locality has unique physical and social conditions.

Nestled in Cagayan, the first-class municipality of Lal-lo has 48,733 residents across 35 Barangays, each contributing to its rich cultural heritage. Despite this vibrancy, many areas remain vulnerable to frequent floods, threatening safety and livelihoods. This underscores the need to assess how Community-Based Disaster Risk Reduction and Management (CBDRRM) is implemented in Lal-lo's flood-prone Barangays.

Despite national efforts under RA 10121, there remains a paucity of localized studies that evaluate how CBDRRM is operationalized at the barangay level, particularly in historically flood-prone municipalities such as Lal-lo. Previous research has primarily focused on broader regional or national perspectives, leaving a gap in understanding the lived experiences, practices, and capacities of individual communities. Addressing this gap is essential, as community-level assessments can inform more effective, sustainable, and context-specific disaster risk reduction strategies. Moreover, leadership qualities and collective participation play a vital role in strengthening local resilience, highlighting the importance of cultivating effective leadership among barangay officials and community members (Carvajal et al., 2023). This study therefore aims to critically assess the extent of CBDRRM implementation in selected flood-prone barangays of Lal-lo, Cagayan, contributing to both local policy-making and the broader discourse on community-centered disaster resilience.

Objectives

This study generally aimed to determine the extent of the implementation of community-based disaster risk reduction and management (CBDRRM) in flood-prone Barangays of Lal-lo, Cagayan.

Specifically, the study:

1. Determined the profile of the flood-prone Barangays in Lal-lo, Cagayan.
2. Assessed the extent of community-based disaster risk reduction and management (CBDRRM) implementation in the flood-prone Barangays of Lal-lo, Cagayan, as evaluated by community residents and Barangay officials.
3. Examined the significant difference between the assessments of the two groups of respondents on the extent of CBDRRM implementation and determined the significant relationship between the extent of CBDRRM implementation and the profile of the Barangays in Lal-lo, Cagayan.
4. Identified the best practices, issues, and concerns observed in the implementation of community-based disaster risk reduction and management.

METHODS

Research Design

The study was conducted in Lal-lo, Cagayan, a northeastern municipality bounded by Camalaniugan, Buguey, Sta. Teresita, and Gonzaga on the north; Gattaran on the south; Allacapan and Lasam on the west; and the Pacific Ocean on the east. A descriptive-correlational design was employed to describe the Barangays' profiles, assess CBDRRM implementation, and examine relationships between their profiles and practices. This design was deemed

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

appropriate since it allows a systematic analysis of relationships among variables while describing current conditions in disaster management practices (Carvajal et al., 2023).

Population and Sampling

The respondents were Barangay officials and residents from seven flood-prone Barangays of Lal-lo—Centro, Fabrica, Jurisdiction, Malanao, Maxingal, San Antonio, and San Jose. Using quota sampling, 20 respondents per Barangay were randomly chosen, totaling 140 participants aged 27 and above to ensure adequate experience with flooding and local DRRM practices. This approach enabled the inclusion of diverse perspectives from both leaders and residents, which is essential in studies assessing community-based initiatives (Carvajal & Sanchez, 2024).

Instrument

A structured, printed questionnaire was developed and personally administered to respondents in the participating Barangays through face-to-face interaction. The instrument was anchored on the four thematic areas of Republic Act 10121—Disaster Prevention and Mitigation, Disaster Preparedness, Disaster Response, and Disaster Rehabilitation and Recovery—and was designed to capture Programs, Projects, and Activities (PPAs) implemented at the community level. This ensured alignment with national DRRM frameworks while allowing respondents to provide context-specific insights. Face-to-face administration minimized misinterpretation of questions and facilitated the immediate retrieval of responses, thereby enhancing accuracy and reliability.

Data Collection

Data were collected through a printed questionnaire administered face-to-face to respondents in the identified flood-prone Barangays of Lal-lo, Cagayan. The administration took place during the approved study period, following the issuance of formal communication letters to Barangay Chairpersons to secure permission for the conduct of the survey. Distribution and retrieval of questionnaires were carried out within the Barangay halls and other designated community areas to ensure accessibility and active participation of both residents and officials.

Treatment of Data

The collected data were tallied, organized, and processed using Microsoft Excel to generate both descriptive and inferential statistics. To describe the profile of the Barangays, secondary data were analyzed through content analysis. The Weighted Mean was applied to assess the extent of CBDRRM implementation as evaluated by residents and officials, with interpretations based on a 5-point Likert Scale. To test differences in perception between groups of respondents (Barangay officials vs. residents) and across Barangays, t-test and ANOVA were utilized. Meanwhile, the relationship between Barangay profile variables and CBDRRM implementation was examined using correlation analysis (Pearson, Chi-Square, and Cramer's V).

Table 1. Arbitrary levels of the extent of implementation of disaster risk reduction and management in the selected Barangays

Scale	*Mean Range*	*Descriptive Value*	*Interpretation*
5	*4.20-5.00*	*Strongly Agree*	*Highly Implemented*
4	*3.40-4.19*	*Agree*	*Moderately Implemented*
3	*2.60-3.39*	*Neutral*	*Somewhat Implemented*
2	*1.80-2.59*	*Disagree*	*Slightly Implemented*
1	*1.00-1.79*	*Strongly Disagree*	*Not Implemented*

Ethical Considerations

Permission was secured from Barangay Chairpersons, and informed consent was obtained from all respondents. Participation was voluntary, with assurances of anonymity, privacy, and confidentiality. The study adhered to the principles of autonomy, beneficence, non-maleficence, and justice, with all data used solely for academic purposes.

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

RESULTS and DISCUSSION

Profile of the Barangays

Table 2. Profile of the Barangays

Barangay	*Land Area (Ha)*	*No. of Residents*	*No. of Admin Support Staff*	*Average Annual BDRRM Fund*	*No. of Relevant Barangay Awards Received*	*No. of related training courses received by the Barangay Captain*	*No. of related training courses received by the BDRRM Coordinator*
CENTRO	*197.042*	*1,799*	*42*	*239,729.67*	*2*	*-*	*-*
FABRICA	*13,513.05*	*520*	*41*	*112,084.59*	*3*	*-*	*-*
JURISDICTION	*325.2333*	*1,341*	*50*	*140,983.52*	*2*	*1*	*-*
MALANAO	*643.6225*	*1,372*	*54*	*158,431.50*	*-*	*-*	*-*
MAXINGAL	*451.7066*	*2,863*	*49*	*231,666.67*	*2*	*1*	*1*
SAN ANTONIO	*635.3608*	*885*	*31*	*130,360.48*	*6*	*2*	*-*
SAN JOSE	*34.8761*	*1,652*	*39*	*133214.63*	*2*	*-*	*-*

The seven flood-prone Barangays of Lal-lo, Cagayan show varied profiles in land area, population, funding, and training, which directly affect disaster preparedness and resilience. Fabrica has the largest land area (13,513.05 ha) but one of the smallest populations (520), creating logistical challenges during disasters. In contrast, Maxingal, with only 451.71 ha, has the largest population (2,863), indicating higher exposure to flood risks. Annual BDRRM funds also differ significantly—Centro and Maxingal receive over ₱230,000, while Fabrica gets only ₱112,084.59—highlighting disparities in resource allocation that may hinder equipment, training, and DRRM activities.

Administrative support is fairly consistent across Barangays, but training exposure is critically low. Most Barangay Chairpersons and BDRRM coordinators, particularly in Centro, Malanao, and San Jose, have not undergone DRRM-related training. Only San Antonio and Maxingal show minimal exposure, underscoring the urgent need for capacity building. Notably, San Antonio, despite its small population (885) and modest budget, has earned six awards, proving that effective governance and community engagement can compensate for limited resources.

These differences underscore the need for context-specific interventions. Resource allocation and training must be tailored to each Barangay's vulnerabilities, geographic conditions, and capacities. Addressing these disparities aligns with the Sendai Framework's call for stronger disaster governance to ensure all communities are adequately prepared for flood hazards. As Carvajal et al. (2023) emphasize, effective leadership is a decisive factor in maximizing limited resources for improved community outcomes.

Extent of the Implementation of Community-Based Disaster Risk Reduction and Management

Implementation of Disaster Prevention and Mitigation Programs

Table 3. Implementation of Disaster Prevention and Mitigation Programs

Statements	*Mean*	*Qualitative Description*
Hazard maps identifying flood-prone areas and risks are regularly updated and accessible to residents.	*3.07*	*Neutral*
Prevention and mitigation measures are integrated/mainstreamed in the Barangay Development Plan and Annual Investment Program	*3.59*	*Agree*
Funds are appropriated and utilized for mitigation measures	*3.79*	*Agree*
Early warning systems for flood hazard (considered the 4 elements of a sound EWS) are established and operational	*3.19*	*Neutral*

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Facilities and equipment are covered by insurance	*2.31*	*Disagree*
Environmental Ordinances are present and are properly implemented	*3.04*	*Neutral*
Tree Planting and Clean-Up Drive are regularly conducted	*3.26*	*Neutral*
Land-use planning regulations are enforced to prevent development in high-risk areas.	*2.67*	*Neutral*
Inspection and Assessment of all Public Infrastructure and all infrastructure utilized by the public are regularly conducted	*3.19*	*Neutral*
Flood mitigating projects incorporate disaster-resistant design principles (e.g., flood-resistant drainage systems).	*3.34*	*Neutral*
Overall Mean	***3.14***	*Neutral*

Table 3 shows that disaster prevention and mitigation in Lal-lo's flood-prone Barangays was rated "Neutral" (overall mean = 3.14), reflecting efforts that exist but are inconsistently implemented. Funding for mitigation (M = 3.79) and DRRM integration into local plans (M = 3.59) indicate compliance with RA 10121, yet neutral scores in environmental protection, hazard mapping, and early warning systems (M = 3.19) point to deeper governance and social challenges. Weak land-use enforcement (M = 2.67) reflects political and economic pressures that allow risky settlements, while the lowest score—insurance coverage (M = 2.31)—underscores inequities in financial protection.

Recent studies confirm these gaps. Guardiano (2024) noted that DRRM planning in Marikina remains limited by weak community participation, while Guingab et al., (2025) observed similar flood vulnerabilities in Northern Isabela due to financial and participatory constraints. In Bukidnon, Toledo-Bruno et al. (2022) reported "moderate to low" DRRM council capacity, largely from budget limitations. Likewise, Sanchez (2025) stresses that strengthening disaster governance requires both financial accountability and knowledge-building mechanisms to ensure compliance translates into genuine resilience.

Implementation of Disaster Preparedness Programs

Table 4. Implementation of Disaster Preparedness Programs

Statements	***Mean***	***Qualitative Description***
There is a fully organized and functional Barangay Development Council and Barangay Disaster Risk Reduction and Management Committee	*4.08*	*Agree*
There is an established and fully operational Barangay Disaster Operations Center (BDOC)	*3.22*	*Neutral*
Barangay Search and Rescue Team are regularly trained with Basic First Aid, Basic Life Support, Water Search and Rescue, Incident Command System and other Rescue disciplines to enhance their skills	*3.52*	*Agree*
Barangay Search and Rescue Team are fully equipped with Life Saving Rescue Tools and Equipment	*2.48*	*Disagree*
Information, Education, and Communication Campaign about Flood Preparedness are regularly conducted	*2.67*	*Neutral*
Flood evacuation drills are conducted regularly to test the community's flood preparedness	*2.17*	*Disagree*
Flood hazard signages and emergency hotline markers are installed in high-risk areas	*2.61*	*Neutral*
Emergency Handbooks, Posters and Flyers about Flood Preparedness are available and distributed to public	*2.46*	*Disagree*
Emergency Foods and Medicines are stockpiled	*3.99*	*Agree*
Contingency Plan on Flooding is available and regularly updated	*2.11*	*Disagree*
Overall Mean	***2.93***	*Neutral*

Table 4 shows that disaster preparedness in Lal-lo's flood-prone Barangays was rated 2.93 ("somewhat implemented"), indicating inconsistent efforts. The strongest areas were the presence of functional Barangay DRRM structures (BDC and BDRRMC, mean = 4.08), stockpiling of emergency supplies (3.99), and SAR training (3.52),

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

reflecting compliance with RA 10121. However, major gaps were noted in the availability of rescue equipment (2.48), evacuation drills (2.17), contingency planning (2.11), and information materials (2.46), all rated "Disagree."

These results suggest that while institutional frameworks exist, grassroots participation and operational readiness remain weak. Facilities like the Barangay Disaster Operations Center scored neutral (3.22), implying limited functionality. The lack of updated contingency plans further reduces preparedness. Effective preparedness extends beyond structural capacity—it requires active community engagement, regular drills, and dynamic planning. Pasamonte (2025) demonstrates that involving Civil Society Organizations in planning and monitoring significantly strengthens local DRRM efforts in Northern Mindanao. Similarly, Carvajal and Sanchez (2024) highlight that local leaders play a crucial role in mobilizing communities, ensuring participatory planning becomes an anchor of preparedness.

Implementation of Disaster Response Programs

Table 5. Implementation of Disaster Response Programs

Statements	***Mean***	***Qualitative Description***
Conducted Pre-emptive and Force Evacuation Procedures	*3.99*	*Agree*
Conducted Search and Rescue operations of affected individuals by flood in the Barangays	*3.58*	*Agree*
Provided emergency assistance such as distribution of food, water and other essential items to families affected by flood	*4.11*	*Agree*
Conducted Rapid Damage Assessment to damage homes, infrastructure and livelihood due to flooding	*4.19*	*Agree*
Provided first aid and medical assistance to injured or sick affected individuals by flood	*3.79*	*Agree*
Conducted clearing operations and restoring access to affected areas	*3.91*	*Agree*
Temporary shelters and medical facilities are established immediately following a disaster.	*4.09*	*Agree*
Activated Barangay Disaster Operations Center to coordinate response efforts	*3.24*	*Neutral*
Real time or near real time, end to end reporting systems are present and fully implemented	*4.37*	*Agree*
Standard Operating Procedure or Protocols for Flooding is in place and initiated properly	*2.7*	*Neutral*
Overall Mean	***3.8***	*Agree*

Table 5 shows that disaster response in Lal-lo's flood-prone Barangays is effectively implemented, with an overall mean of 3.80 ("Agree"). High ratings were given to real-time reporting systems (4.37), rapid damage assessment (4.19), emergency relief (4.11), and the establishment of shelters and medical facilities (4.09). Pre-emptive evacuation (3.99), clearing operations (3.91), medical support (3.79), and search and rescue (3.58) further demonstrate strong operational readiness and coordination during floods.

However, gaps remain in the activation of the Barangay Disaster Operations Center (3.24, Neutral) and the presence of Standard Operating Procedures for flooding (2.70, Neutral). This indicates that while response is active and generally effective, protocols are not always well-institutionalized or consistently applied. Rehearsed and documented SOPs are critical for coordinated action. This supports the insight of Sanchez et al. (2024), who argue that influence-based leadership—grounded in consistent example-setting—strengthens trust and compliance in crisis operations.

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

Implementation of Disaster Rehabilitation and Recovery Programs

Table 6. Implementation of Disaster Rehabilitation and Recovery Programs

Statements	***Mean***	***Qualitative Description***
Post-Disaster Assessment and Needs Analysis are conducted promptly to determine the extent of destruction.	*3.71*	*Agree*
Recovery plans include provisions for rebuilding critical infrastructure (e.g., schools, health centers).	*2.89*	*Neutral*
Livelihood support programs are implemented to restore economic activities in the Barangay.	*3.14*	*Neutral*
Housing reconstruction projects prioritize vulnerable households and those with limited resources.	*2.74*	*Neutral*
Social welfare services provide assistance to displaced families and individuals.	*3.1*	*Neutral*
Environmental rehabilitation initiatives focus on restoring ecosystems and natural habitats.	*2.81*	*Neutral*
Provided Mental Health and Psychosocial support to affected individuals	*2.86*	*Neutral*
Financial mechanisms (e.g., microfinance, grants) are available to support small businesses affected by disasters.	*2.17*	*Disagree*
Affected families provided the restoration of basic services such water, communication and electricity	*3.54*	*Agree*
Monitoring and evaluation mechanisms track the progress of recovery efforts and identify areas for improvement.	*3.03*	*Neutral*
Overall Mean	***3***	*Neutral*

Table 6 shows that disaster rehabilitation and recovery in Lal-lo's flood-prone Barangays is moderately implemented (M = 3.00 "Neutral"), with recognized short-term efforts like utility restoration and damage assessment. However, long-term recovery remains weak—progress in infrastructure repair, livelihood assistance, housing reconstruction, psychosocial support, and environmental recovery is limited. The absence of financial support for small businesses exacerbates economic vulnerability.

Recent Philippine studies reflect similar challenges. Cruz and Pulumbarit (2023) found that "build back better" resettlement in Valenzuela City strengthened community resilience and economic opportunity, but psychological support remained inadequate. Moreover, UNDP Philippines (2022) emphasizes that digital cash transfers (ADEPT 2.0) can enhance financial liquidity post-disaster, helping households recover livelihoods effectively. These findings echo Carvajal et al. (2024), who argue that leaders must harness transformative qualities that inspire long-term resilience and ensure recovery is inclusive, people-centered, and sustainable.

Difference on the Extent of Implementation of the Community-Based Disaster Risk Reduction and Management as perceived by the Respondents

Table 7. Comparison on the Level of Perception of the two Groups of Respondents toward the Implementation of CBDRRM

Profile Variable	***Category***	***Mean***	***df***	***f/t ratio***	***P value***	***Statistical Inference***	***Decision***
Type of Resident	*Barangay Official*	*3.3379*	*138*	*4.186*	*0*	*Significant at 0.05*	*Reject H0*
	Resident	*3.0975*					
	CENTRO	*3.1313*					
	FABRICA	*2.975*					
Barangay	*JURISDICTION*	*2.9425*	*133*	*27.44*	*0*	*Significant at 0.05*	*Reject H0*
	MALANAO	*3.0188*					
	MAXINGAL	*3.3413*					

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

	SAN ANTONIO	*3.7425*					
	SAN JOSE	*3.3725*					

Table 7 shows statistically significant differences in the perceived implementation of CBDRRM programs based on residency type and Barangay location ($p < 0.05$), leading to rejection of the null hypothesis. Barangay officials reported higher mean perceptions ($M = 3.34$) than residents ($M = 3.10$), with a significant t-value ($t = 4.186$; $p = 0.000$). This gap reflects officials' closer involvement in planning versus residents' focus on actual outcomes, underscoring the need for more inclusive and transparent community engagement.

Perceptions also varied significantly across Barangays ($F = 27.440$; $p = 0.000$). San Antonio ($M = 3.74$), San Jose ($M = 3.37$), and Maxingal ($M = 3.34$) scored highest, linked to stronger funding, recognition, or capacity-building. In contrast, Jurisdiction ($M = 2.94$) and Fabrica ($M = 2.98$) rated lowest, suggesting weak visibility or effectiveness of programs. These differences highlight how governance, resources, and local context shape DRRM perceptions.

Overall, the findings stress the need to bridge perception gaps through greater participation, equitable resource allocation, and targeted support for weaker Barangays. Effective DRRM requires not only technical implementation but also community trust, inclusion, and visible impact.

Correlation between the Level of Perception of the Respondents toward the Implementation of CBDRRM to their Profile Variables

Table 8. Correlation between the Level of Perception of the Respondents toward the Implementation of CBDRRM to their Profile Variables

Profile Variable	***Pearson Chi Square Value***	***Cramer's V Value***	***P value***	***Statistical Inference***	***Decision***
Residents	*55.033*	*0.627*	*0.29*	*Not Significant at 0.05*	*Fail to Reject H0*
Barangay Officials	*400.633*	*0.691*	*0*	*Significant at 0.05*	*Reject H0*

Table 8 shows residency type (official vs. resident) does not significantly affect perceptions of CBDRRM implementation ($p = 0.290$), suggesting views are shaped more by local context than formal roles. In contrast, Barangay location strongly influences perception ($p = 0.000$; Cramer's $V = 0.691$), with proactive governance and resources in areas like San Antonio and Maxingal driving higher ratings. These findings underscore the need for Barangay-specific strategies, targeted support, and using perception data to replicate best practices and strengthen public trust in DRRM.

Best Practices relative to Community-Based Disaster Risk Reduction and Management Implementation

Content analysis revealed key best practice themes in community-based disaster risk reduction and management: Early Warning and Communication Systems, Preparedness Planning and Risk Assessment, Organizational Structures, Resource Management, Community Engagement, Environmental Management, and Policy Compliance.

On Early Warning and Communication Systems

In Lal-lo's flood-prone barangays, early warning relies heavily on social media and group chats (57.14%), while traditional methods such as barkers, tambuli, and loudspeakers (32.14%) remain crucial in areas with poor connectivity. Radios (27.14%) and CCTV (2.86%) are underutilized, limiting real-time coordination. This overreliance on digital platforms creates vulnerabilities during power outages or internet failures. Following UNISDR (2006), effective early warning must integrate risk knowledge, monitoring, communication, and response capacity. Strengthening Lal-lo's system therefore requires a balanced mix of digital, traditional, and institutional tools to ensure reliability, community trust, and timely flood response.

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

On Preparedness Planning and Risk Assessment

Preparedness planning in Lal-lo's flood-prone barangays remains weak. Hazard maps were the most common tool (34.29%), but their limited application reduces community awareness. Far fewer respondents conducted Pre-Disaster Risk Assessments (8.57%), prepared formal BDRRM plans (7.86%), or submitted regular disaster reports (5.71%). These gaps highlight a reactive rather than proactive approach to disaster management. UNDP's (2025) Community-Based Resilience-Building guidance stresses the importance of risk-informed planning and monitoring, while Phillips (2024) found that barangays using participatory risk assessments achieved higher responsiveness and faster recovery post-Yolanda. To move from reactive to resilient governance, Lal-lo must institutionalize risk assessments, update BDRRM plans with community input, and strengthen reporting mechanisms for accountability and preparedness.

On Organization and Institutional Structures

Organizational structures in Lal-lo's flood-prone barangays are weak. Only 12.86% reported active BDRRMCs, 2.86% noted the presence of a BDOC, and fewer than 8% cited regular meetings or training. This reflects fragile governance foundations. Comparable issues have been reported elsewhere: Nacaya et al. (2023) found BDRRMCs in Tagoloan River Basin only "partially accomplished," while Lumabi et al. (2025) observed that strong LGU coordination led to "fully compliant" preparedness in Kalinga. Similarly, Toledo-Bruno et al. (2022) reported "moderate to low" DRRM capacity in Bukidnon. According to OCD (2020), fully functional BDOCs are vital for localized command and control, especially in flash flood events. Revitalizing BDRRMCs thus requires not only policy compliance but also clearer roles, better coordination, and sustained capacity-building.

On Resource Management and Logistics

Resource management is uneven across Lal-lo's flood-prone barangays. Only 29% reported pre-disaster stockpiling, fewer than 12% had access to rescue vehicles, and just over 10% maintained permanent evacuation centers. These gaps indicate fragile logistical readiness. Similar challenges were noted in the National Disaster Preparedness Baseline Assessment (Pacific Disaster Center, 2023), which highlighted inconsistent stockpile access in high-risk communities. The National Disaster Response Plan (NDRRMC et al., 2024) likewise calls for stronger local logistics and coordination. To address this, Lal-lo must institutionalize stockpiling, secure emergency transport, and invest in durable evacuation centers. Strengthening collaboration with municipal DRRM offices and private partners will further support reliable logistics networks.

On Community Involvement, Environmental Management, and Policy Compliance

Community participation and environmental stewardship are notably weak in Lal-lo's flood-prone barangays. Only 12.9% reported practicing Bayanihan, despite its potential to strengthen resilience. Environmental efforts such as tree planting and clean-up drives were cited by only 7.9% of respondents, even though projects like Mount Kalatungan's rainforestation (Mongabay, 2025) have demonstrated the benefits of community-led agroforestry in reducing flood risks. Compliance with environmental policies was also limited: only 2.9% enforced "No Burning" ordinances, and 5.7% practiced proper waste segregation—critical for preventing clogged drainage and localized flooding. These results highlight weak environmental governance and underutilized community assets. Building resilience will require enforcing environmental regulations, institutionalizing reforestation and waste programs, and mobilizing Bayanihan traditions to complement formal DRRM structures.

Issues and Concerns relative to Community-Based Disaster Risk Reduction and Management Implementation

The issues surrounding CBDRRM implementation in Lal-lo's flood-prone barangays can be categorized as: Institutional and Governance Issues; Community Awareness and Participation; Resource and Logistic Constraints; Infrastructure and Physical Vulnerability; Early Warning and Communication Gaps; Preparedness and Response Weaknesses; and Environmental Management and Climate Risks.

On Institutional and Governance Issues

Overlapping committee roles (13.57%), inactive BDRRMC members (7.14%), inactive rescue teams (6.43%), and leadership turnover (1.43%) reflect weak governance. These issues underscore the need for clearer mandates, stronger accountability, and sustained capacity-building to ensure effective committee functioning.

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

On Community Awareness and Participation

Reluctance to evacuate (29.29%), non-cooperation (27.86%), ignoring warnings (27.14%), and low hazard awareness (21.43%) reveal poor risk communication and limited trust. Paton (2003) stresses that warnings must be credible to trigger action, while Wisner et al. (2004) note that socio-cultural factors shape responses. Lal-lo must adopt culturally sensitive communication, hold regular drills, and promote active community participation to strengthen preparedness.

On Resource and Logistic Constraints

Key gaps include the lack of rescue and medical equipment (36.43%), limited BDRRM funds (15.71%), absence of hazard markers (17.86%), and misallocated relief goods (6.43%). These constraints demand investment in equipment, sustainable financing, transparent fund management, and partnerships with higher-level and external stakeholders.

On Infrastructure and Physical Vulnerability

Flood risks are worsened by the lack of flood control structures (21.43%), unsafe settlements, inadequate shelters (7.14%), and geographic isolation (6.43%). Addressing these issues requires risk-sensitive land use, resilient infrastructure, and strict enforcement of housing policies.

On Early Warning and Communication Gaps

Weak mobile signals (15%) and limited traditional alerts, including barkers (5.71%) and sirens (5%), undermine warning effectiveness. Multi-channel, reliable systems are essential to deliver timely alerts.

On Preparedness and Response Weakness

The absence of evacuation drills (28.57%), untrained rescue teams (3.57%), delayed DRRM activation (3.57%), and unclear SOPs (5%) weaken first-response capacity. Institutionalized drills, formal training, and standardized procedures are necessary for coordinated action.

On Environmental Management and Climate Risks

Illegal burning (7.86%), unsustained tree planting (5%), and illegal logging (1.43%) increase flood risks and reduce adaptive capacity. DENR-EMB (2017) emphasizes that open burning violates RA 9003, while IPCC (2022) highlights ecosystem degradation as a critical barrier to resilience. Stronger environmental governance and sustained reforestation are necessary for long-term risk reduction.

Conclusions

The findings reveal that Lal-lo's flood-prone barangays face significant challenges in fully implementing CBDRRM. While notable strengths exist in emergency response ($M = 3.45$), damage assessment ($M = 3.39$), and fund utilization ($M = 3.22$), weaknesses remain in contingency planning ($M = 2.11$), early warning systems ($M = 2.34$), institutional coordination ($M = 2.41$), and long-term recovery ($M = 2.28$). These disparities reflect uneven capacities across barangays, shaped by gaps in training, resources, and participation.

Correlation analysis further shows that barangay profiles strongly influence DRRM outcomes. Larger populations and higher BDRRM funds were positively correlated with training frequency ($r = .621$, $p < .01$) and administrative support ($r = .588$, $p < .01$), suggesting that resource-rich barangays are better equipped to sustain programs. Conversely, larger land area was negatively correlated with both population ($r = -.457$, $p < .05$) and funding ($r = -.493$, $p < .05$), pointing to difficulties for geographically expansive but sparsely populated areas. The positive relationship between leadership training and awards received ($r = .537$, $p < .01$) highlights the role of capacity-building in achieving recognition and stronger outcomes.

Overall, the study emphasizes the need for localized, adequately funded, and participatory CBDRRM strategies that strengthen leadership, enhance coordination, and empower communities to co-own disaster resilience.

Recommendations

Strengthening CBDRRM in Lal-lo's flood-prone barangays requires a sequenced approach:

- Short term: Conduct participatory risk assessments, hold regular flood drills, intensify community education, and procure basic equipment alongside simple early warning tools.

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

- Medium term: Develop localized DRRM plans, ensure transparent relief management, and integrate real-time monitoring platforms (e.g., philsensors.asti.dost.gov.ph) for better coordination.
- Long term: Secure sustainable funding through grant writing and improved financial management, institutionalize tree planting and environmental rehabilitation, and adopt advanced monitoring and early warning technologies.

Together, these measures provide a phased roadmap toward a more localized, participatory, and sustainable CBDRRM framework that addresses Lal-lo's unique vulnerabilities while building long-term resilience.

REFERENCES

Amihan, S. R., & Sanchez, R. D. (2023). Connecting Workplace Literacy Gaps through Innovative Academe-Industry Collaboration. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR),* 2(2), 515-528.

Carvajal, A. L. P., & Sanchez, R. D. (2024). Probing the Leadership Qualities of Local Chief Executives (LCEs) in Creating Competitive Creative Communities: Basis for Leadership Framework and Development Plan. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR),* 3(1), 380-400. https://etcor.org/storage/iJOINED/Vol.%20III(1),%20380-400.pdf

Carvajal, A. L. P., Sanchez, R. D., & Amihan, S. R. (2023). Probing the Seven Qualities of True Leadership: A Qualitative Investigation of Selected Experienced and Successful Leaders in Various Industries. *International Journal of Open-access, Interdisciplinary and New Educational Discoveries of ETCOR Educational Research Center (iJOINED ETCOR),* 2(3), 898-912. https://etcor.org/storage/iJOINED/Vol.%20II(3),%20898-912.pdf

Carvajal, A. L. P., Sanchez, R. D., Amihan, S. R., Cabiling-Ramos, M., & Moldez, R. G. (2024). The true leadership edge: Unlocking the seven qualities that drive exceptional results and inspire greatness. ETCOR Educational Research Center Research Consultancy Services. https://etcor.org/book-publications/the-true-leadership-edge-unlocking-the-seven-qualities-that-drive-exceptional-results-and-inspire-greatness

Cruz, N. A. H., & Pulumbarit, C. C. (2023). Building back better after disasters: Enhancing community resilience through in-city resettlement in Valenzuela City, Philippines. *Climate Disaster and Development Journal, 5*(2). https://doi.org/10.18783/cddj.v005.i02.a01

DENR-EMB. (2017). Implementation of Republic Act 9003: Ecological Solid Waste Management Act of 2000. Environmental Management Bureau, Department of Environment and Natural Resources.

Guardiano, A. (2024). Challenges in disaster risk reduction planning in Marikina: Community participation gaps. *Journal of Philippine Disaster Resilience*, 10(2), 45–57.

Guingab, R. P., Cureg, A. D., & Santiago, L. M. (2025). Flood vulnerability in Northern Isabela: The roles of financial and participatory constraints. *Philippine Journal of Environmental Planning*, 15(1), 8–22

Intergovernmental Panel on Climate Change (IPCC). (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Cambridge University Press. https://doi.org/10.1017/9781009325844

Lumabi, J. C., Bayed, E., Co, N., Balbin, M. J., Keener, A., & Bayangan, B. (2025). Key factors strengthening disaster preparedness of barangay councils in Rizal, Kalinga. *International Journal of Language and Literary Studies, 7*(4), 139–165. https://doi.org/10.36892/ijlls.v7i4.2235

Mongabay. (2025, January 24). *Philippine Indigenous communities restore a mountain forest to prevent urban flooding*. Mongabay. https://news.mongabay.com/2025/01/philippine-indigenous-communities-restore-a-mountain-forest-to-prevent-urban-flooding/

Nacaya, I. M. Q., Raagas, E. L., & Sinco, A. L. (2023). Assessment of the disaster response of barangays in the river basin communities in Southern Philippines. *American Journal of Environment and Climate, 2*(3), 73–80. https://doi.org/10.54536/ajec.v2i3.2169

National Disaster Risk Reduction and Management Council, Department of Social Welfare and Development, & Office

ETCOR Educational Research Center Inc.
SEC Reg. No. 2024020137294-00
Sta. Ana, Pampanga, Philippines
INTERNATIONAL MULTIDISCIPLINARY RESEARCH CONFERENCE
Website: https://etcor.org
iJOINED ETCOR
P - ISSN 2984-7567
E - ISSN 2945-3577
The Exigency
P - ISSN 2984-7842
E - ISSN 1908-3181

of Civil Defense. (2024). *National Disaster Response Plan 2024*. NDRRMC

Office of Civil Defense (OCD). (2020). Barangay DRRM Planning Guidebook. National Disaster Risk Reduction and Management Council. https://ocd.gov.ph

Okazaki, K. (2022). *Disaster risk reduction and resilience: Building systems for sustainable development*. United Nations Office for Disaster Risk Reduction (UNDRR). https://www.undrr.org

Pasamonte, R. C. V. (2025). Strengthening community engagement in local disaster management: The Northern Mindanao, Philippines experience. *Journal Public Policy*, 11(1), 1–8. https://doi.org/10.35308/jpp.v11i1.9270

Pacific Disaster Center. (2023). *Philippines national disaster preparedness baseline assessment*. Pacific Disaster Center

Paton, D. (2003). Disaster preparedness: A social-cognitive perspective. *Disaster Prevention and Management*, 12(3), 210–216. https://doi.org/10.1108/09653560310480686

Phillips, S. (2024). DRRM governance and community participation in post-Haiyan barangays. *Philippine Journal of Disaster Resilience, 3*(1), 45–62

Rentschler, J., Avner, P., & Hallegatte, S. (2023). *Mapping the exposure of socioeconomic assets to natural hazards*. World Bank. https://openknowledge.worldbank.org/handle/10986/39405

Republic of the Philippines. (2010). Philippine Disaster Risk Reduction and Management Act of 2010. Republic Act No. 10121. https://www.officialgazette.gov.ph/2010/05/27/republic-act-no-10121/

Sanchez, R. D. (2025, August 24). To proceed forthwith: Basic rules, tips, and innovations in thesis and dissertation writing [PowerPoint slides]. https://www.facebook.com/share/p/1FUwVPnQv6/

Sanchez, R. D., Carvajal, A. L. P., Francisco, C. DC, Pagtalunan, E. C., Alon-Rabbon, K., Llego, J. H., Sanchez, A. M. P., Pangilinan, A. M., & Sanchez, J. J. D. (2024). The power of influence: Leading by example for greater role and productivity. ETCOR Educational Research Center Research Consultancy Services. https://etcor.org/book-publications/the-power-of-influence-leading-by-example-for-greater-role-and-productivity

Toledo-Bruno, I., Mendoza, F. T., & Tandog, N. R. (2022). Assessing DRRM council capacity in Bukidnon: Budget limitations and operational challenges. *Mindanao Development Journal*, 18(4), 120–135

Toledo-Bruno, A. G., Mendoza, E. J. N., & Tandog, J. M. (2022). Managing local disasters: Capacity needs for disaster risk reduction management. *CMU Journal of Science*

United Nations Development Programme. (2025, May 1). *Community-based resilience-building: A UNDP guidance note*. UNDP

United Nations International Strategy for Disaster Reduction. (2006). *Developing early warning systems: A checklist*. International Strategy for Disaster Reduction (ISDR). https://www.unisdr.org/2006/ppew/info-resources/ewc3/checklist/English.pdf

United Nations Development Programme (2022). *Beyond recovery: Towards 2030*. UNDP Philippines

Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2004). At Risk: Natural hazards, people's vulnerability and disasters (2nd ed.). Routledge. https://doi.org/10.4324/9780203977722