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BEYOND THE BLUEPRINT: NAVIGATING THE GAPS IN DAVAO CITY'S DISASTER RISK REDUCTION FRAMEWORK (A RESEARCH ON THE CHALLENGES OF DISASTER RISK REDUCTION AND MANAGEMENT (DRRM) IN THE HIGHLY URBANIZED CITY OF DAVAO)

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ABSTRACT
Rapid urbanization intensifies disaster risk, particularly in developing countries where governance systems struggle to keep pace with spatial expansion, informal settlements, and climate-induced hazards. Davao City exemplifies these challenges. This study conducts a PRISMA-guided systematic review of global, regional, and Philippine literature on governance gaps in urban disaster risk reduction and management (DRRM), using the Disaster Risk Governance Framework as the analytical lens.
Searches were conducted across Scopus, Web of Science, ScienceDirect, JSTOR, Google Scholar, and UNDRR repositories. Studies published between 2015 and 2024 were screened using predefined inclusion and exclusion criteria. A thematic synthesis mapped findings to three governance pillars: (1) institutional and legal frameworks, (2) coordination and participation, and (3) risk-informed development.
From 2,184 records identified, 72 studies met the inclusion criteria. Three dominant themes emerged: (1) persistent policy fragmentation and weak institutional mandates; (2) vertical and horizontal coordination failures; and (3) chronic gaps in land-use planning, climate adaptation, and integration of risk information into development decisions. Urban DRRM effectiveness is fundamentally a governance issue. Strengthening institutional coherence, multi-level coordination, and risk-informed planning is essential for building resilience in rapidly urbanizing cities like Davao.

Keywords:
Disaster risk governance; urban resilience; DRRM; Davao City; land-use planning

INTRODUCTION

Background of the Study

Rapid urbanization is a global trend, especially in developing countries, where it often exceeds the limits of existing infrastructure, governance systems, and environmental carrying capacity. Davao City is a prime example of this dynamic in the Philippines. The city continues to experience significant population growth, economic expansion, and rapid physical development. While these trends contribute to economic progress, they also introduce complex challenges—particularly in disaster risk reduction and management (DRRM). As Davao City expands, its exposure to hazards such as flooding, landslides, and earthquakes intensifies. The concentration of people, infrastructure, and economic activities in high-risk zones amplifies the city's vulnerability.
These challenges directly intersect with the global commitments outlined in the **United Nations Sustainable Development Goals (SDGs)**. In particular, **SDG 11 (Sustainable Cities and Communities)** emphasizes the need to make cities inclusive, safe, resilient, and sustainable. Davao City's rapid urbanization tests its ability to meet this goal, especially in ensuring safe land-use planning, resilient infrastructure, and equitable access to basic

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services. Similarly, **SDG 13 (Climate Action)** calls for strengthened adaptive capacity to climate-related hazards and natural disasters. As climate change intensifies rainfall patterns, increases heat stress, and heightens the frequency of extreme weather events, the city's existing DRRM systems face mounting pressure to anticipate, prevent, and mitigate risks rather than merely respond to them.

The city's DRRM framework—its policies, plans, institutional arrangements, and operational systems—must therefore evolve to align with these global resilience targets. Achieving **SDG 1 (No Poverty)** and **SDG 3 (Good Health and Well-Being)** also depends on effective DRRM, as disasters disproportionately affect low-income communities and strain health systems. In this context, Davao City's shift from a reactive, post-disaster response model to a proactive, risk-informed, and climate-adaptive strategy is not only a local governance imperative but also a contribution to the Philippines' broader commitment to the SDGs. Strengthening DRRM is thus essential for safeguarding lives, protecting development gains, and ensuring that Davao City's urban growth remains sustainable and resilient.

STATEMENT OF THE PROBLEM

Despite having strong laws and policies for disaster risk reduction and management (DRRM) on a national level (Republic Act 10121) and significant efforts from the local government, a clear gap exists between the theoretical framework for disaster resilience and its practical application in a rapidly urbanizing city like Davao. This gap is not just about a lack of resources. It involves complex systemic issues, such as poor land-use planning, uncoordinated institutions, insufficient community capacity building, and an over-reliance on structural solutions that overlook social and environmental vulnerabilities. The current DRRM framework may not consider the unique risks from expanding informal settlements, interdependencies of critical infrastructure, and the added effects of climate change. This study aims to explore these overlooked gaps and their impacts on the city's long-term resilience.

RESEARCH QUESTIONS

This study seeks to answer these research questions:

1. What are the main components and policy directions of the existing disaster risk reduction and management framework in Davao City?
2. How does the rapid urban growth of Davao City affect and challenge the effective implementation of its DRRM framework?
3. What are the perceived gaps and weaknesses in the current framework, as seen by key stakeholders such as government officials, civil society groups, and local community members?
4. How do these gaps in policy and practice show up in real-life situations, especially concerning vulnerable communities and essential urban infrastructure?
5. What policy suggestions can be made to close these identified gaps and improve disaster resilience in Davao City?

OBJECTIVES OF THE STUDY

The main goal of this study is to evaluate how effective Davao City's DRRM framework is in light of its rapid urbanization.

The specific objectives are to:

1. Describe the current DRRM framework and how it fits national policies and urban development goals.
2. Assess how factors related to urbanization, such as population density and changes in land use, impact the city's disaster risk profile.
3. Identify and document the perceived gaps and challenges in implementing DRRM policies from the stakeholders' perspective.
4. Examine specific case examples to highlight the real-world impacts of these identified gaps.
5. Suggest practical policy and program recommendations to enhance the city's DRRM framework.

SIGNIFICANCE OF THE STUDY

The findings of this research will offer valuable insights for policymakers and planners in Davao City. It will help them improve the local DRRM framework. The study will also contribute to academic discussions on urban resilience in developing cities, providing a case study for comparative analysis. The recommendations will also assist community leaders and civil society groups in advocating for more inclusive and effective disaster risk management practices. Ultimately, this research aims to enhance the city's and its residents' long-term safety and resilience.

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SCOPE AND LIMITATIONS

This study will focus on Davao City's disaster risk reduction and management framework from 2018 to the present. It will concentrate on policies and practices related to significant urban hazards, specifically flooding and landslides. Primary data will come from key informant interviews and document analysis, which may be limited by the availability of public records and the willingness of stakeholders to participate. The study will not examine the detailed engineering or technical aspects of specific infrastructure projects but will focus on policy and governance issues within the DRRM framework.

REVIEW OF LITERATURE AND THEORETICAL FRAMEWORK

SYSTEMATIC REVIEW OF RELATED LITERATURE ON URBAN DRRM GAPS

This section outlines the key thematic areas that inform the study, driven by the research questions and the problem statement's core gaps.

THE URBAN-RISK NEXUS: RAPID URBANIZATION AND DISASTER VULNERABILITY

The literature overwhelmingly establishes that rapid, unplanned urbanization in developing countries is the single greatest driver of increased disaster risk.

- Informal Settlements and Hazard Exposure: Studies by UN-Habitat and Satterthwaite (2012) emphasize how marginalized populations, often due to a lack of affordable housing and poor regulation, are pushed into high-risk areas—floodplains, steep slopes, and unstable land—which directly relates to Davao City's vulnerability to flooding and landslides. The lack of formal tenure often discourages investment in risk-reducing infrastructure by residents or the local government.
- Critical Infrastructure Interdependencies: Research on urban systems highlights that the failure of one critical infrastructure component (e.g., power, water, transport) during a disaster can cascade failures across the entire city (Bocchini et al., 2014). In rapidly expanding cities like Davao, new infrastructure is built alongside aging systems, increasing the complexity and challenge of unified risk assessment.

THE GOVERNANCE AND INSTITUTIONAL GAPS IN DRRM

This theme directly supports the "Institutional and Legal Framework" and "Coordination and Participation" pillars of the theoretical framework. The literature identifies significant institutional failures as the root cause of implementation gaps.

- Policy and Legislative Fragmentation: Tierney (2012) and other disaster governance scholars point out that disaster management often remains functionally separate from regular development planning. Despite comprehensive laws (like the Philippines' RA 10121), the effective integration of risk reduction into the mandates of city planning, public works, and environment offices is rare. This bureaucratic fragmentation (as discussed in Section 2.3) leads to conflicting priorities and disjointed efforts, such as approving development in hazard zones.
- Vertical and Horizontal Coordination Failures: Effective DRRM requires seamless coordination vertically (national/regional/city/barangay level) and horizontally (across city departments: planning, engineering, disaster office, social welfare). Paton & Johnston (2017) stress that a lack of shared vision and formal communication protocols severely limits proactive risk mitigation. The local capacity to translate national policy into meaningful local action is a persistent challenge (UNISDR, 2015).
- Resource and Capacity Deficits at the Local Level: A common finding is that local government units (LGUs) often lack the technical expertise, specialized personnel (e.g., in GIS, climate modeling, advanced risk assessment), and sustained financial resources needed for complex, long-term risk reduction projects. This forces an over-reliance on a reactive/response-centric model, which the problem statement seeks to challenge.

INTEGRATION GAPS: RISK-INFORMED PLANNING AND DEVELOPMENT

This theme focuses on the third pillar of the theoretical framework: "Risk-informed Development," specifically addressing "poor land-use planning."

- Failures in Land-Use Planning and Zoning: Pelling (2010) and similar studies argue that land-use plans are the most critical, yet often the weakest, tool for urban DRRM. Challenges include the low political priority of plan enforcement, corruption in zoning approvals, and the difficulty of updating plans to reflect climate change impacts. The theoretical need to integrate hazard maps and vulnerability data into comprehensive land-use planning (CLUP) is often undermined by implementation gaps.

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- The Climate Change Multiplier: Recent literature (IPCC reports) highlights that climate change acts as a "risk multiplier," exacerbating existing hazards like flooding and landslides through more intense rainfall and sea-level rise. DRRM frameworks that are not explicitly climate-adaptive will quickly become obsolete. This introduces the gap of failing to account for future/dynamic risks in present-day planning.
- Structural vs. Non-Structural Solutions: There is a historical over-reliance on structural solutions (e.g., seawalls, drainage canals) which, while necessary, often fail to address the root causes of vulnerability (social, economic, and political factors). Non-structural measures, such as early warning systems, ecosystem protection (e.g., mangrove restoration), and public education, are crucial but often underfunded and under-prioritized.

THEORETICAL FRAMEWORK: DISASTER RISK GOVERNANCE

This study will use the Disaster Risk Governance Framework as its primary theoretical lens to systematically identify and categorize the gaps in Davao City's DRRM efforts.

The framework proposes that a community's resilience is a direct outcome of the quality and coherence of its governance system in managing and mitigating risks. It has three interconnected pillars that correspond to the systemic issues identified in the problem statement:

1. Institutional and Legal Framework: (Addressing Policy and Institutional Gaps) This pillar examines the formal structures: the clarity of mandates, the definition of roles and responsibilities across different government levels and sectors, and the consistency of policies across key areas (urban development, environment, public works). *A gap here indicates a need for legislative reform or clearer operational guidelines.*
2. Coordination and Participation: (Addressing Coordination and Community Capacity Gaps) This pillar focuses on the relationships and interactions: how government agencies, the private sector, civil society, and the community collaborate. It assesses the level of inclusivity and empowerment in planning and decision-making, recognizing that local resilience is built from the bottom-up. *A gap here points to fragmented efforts and insufficient stakeholder engagement.*
3. Risk-informed Development: (Addressing Land-Use and Implementation Gaps) This pillar evaluates the extent to which DRRM principles are integrated into the routine processes of urban planning and development. This includes mandating risk assessments in zoning laws, prioritizing climate-adaptive infrastructure, and shifting from reactionary disaster relief to proactive, systemic interventions. *A gap here indicates land-use failures and a lack of foresight in development decisions.*

Using this framework, the study will systematically analyze the collected qualitative data, highlighting breakdowns within these three pillars and offering a structured basis for actionable policy recommendations.

PUBLIC ADMINISTRATION AND DISASTER RISK REDUCTION

The challenges within an urban DRRM framework are often traceable to fundamental issues in public administration theory.

- Bureaucratic Fragmentation and Silo-Working: The concept highlighted by Hood and Margetts (2007) is highly relevant. In the context of urban DRRM, this fragmentation manifests as the City Planning and Development Office (CPDO) operating in a silo separate from the City Disaster Risk Reduction and Management Office (CDRRMO). This disconnect ensures land-use decisions often do not adequately factor in hazard risks, directly impeding the "Risk-informed Development" pillar.
- Accountability Issues and the Reactive Trap: Tapsell et al. (2010) discuss how complex, multi-agency arrangements can dilute accountability. When responsibilities are unclear, especially in prevention, the system defaults to a reactive mode—responding to the event rather than preventing it—because no single entity can be held fully responsible for prevention failures. This gap in accountability undercuts the proactive shift mandated by national law.
- Limited Institutional Capacity: As noted by UNDP (2014), capacity challenges go beyond financial constraints to include human capital and technical expertise. The capacity to implement complex DRRM policies (e.g., vulnerability mapping, managing a multi-hazard early warning system) is often limited at the local level. This directly compromises the effectiveness of all three pillars of the Disaster Risk Governance Framework.

This section provides the necessary analytical layer, linking the practical gaps observed in Davao City back to established challenges in public management, thereby strengthening the theoretical rigor of the study.

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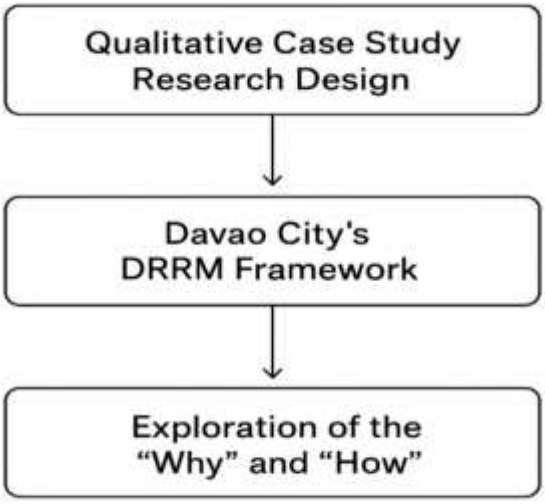
METHODOLOGY

RESEARCH DESIGN

This study will use a qualitative case study research design. This approach is well-suited for exploring a contemporary phenomenon in its real-life context (Yin, 2018). The case study will focus on Davao City's DRRM framework, allowing for a thorough examination of its complexities and nuances. This design will enable the researcher to collect rich, descriptive data from diverse perspectives and to grasp the "how" and "why" behind the identified gaps.



Research Methodology Flow for DRRM Case Study in Davao City

DATA COLLECTION METHODS

A combination of data collection methods will ensure the validity and reliability of the findings. These methods include:

1. Key Informant Interviews: Semi-structured interviews will be conducted with key stakeholders, including officials from the Davao City Disaster Risk Reduction and Management Office (CDRRMO), representatives from the City Planning and Development Office (CPDO), leaders of civil society organizations involved in DRRM, and selected community leaders from highly vulnerable barangays (villages). The interviews will examine their understanding of the DRRM framework, their experiences with its implementation, and their views on the challenges and gaps.
2. Documentary Analysis: Relevant documents will be reviewed to provide context and support for the interview data. This will include the Davao City DRRM Plan, relevant city ordinances, public reports, and academic studies on disaster risk in the Davao Region.

SAMPLING

A purposive sampling method will be used to choose interview participants with direct knowledge and experience of the city's DRRM framework. The sample size will be based on data saturation, which occurs when no new themes or insights emerge from additional interviews.

DATA ANALYSIS

The collected data will be analyzed using thematic analysis. This method involves systematically identifying, analyzing, and reporting patterns (themes) in the data (Braun & Clarke, 2006). The steps for data analysis will include:

1. Transcription: All interviews will be transcribed verbatim.

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2. Familiarization: The researcher will read the transcripts and documents multiple times to deeply understand the data.
3. Initial Coding: The researcher will create codes to label data segments relevant to the research questions.
4. Theme Development: Codes will be grouped into broader themes and sub-themes that capture the key points of the data.
5. Refining and Naming Themes: The themes will be refined to ensure they are coherent and accurately reflect the data. Final names will then be assigned to them.
6. Writing the Analysis: The findings will be presented in a straightforward narrative, supported by direct quotes from interviews and document excerpts.

ETHICAL CONSIDERATIONS

Informed consent will be obtained from all interview participants. They will be made aware of the study's purpose, the voluntary nature of their participation, and their right to withdraw at any time. Confidentiality and anonymity will be maintained using pseudonyms for participants and organizations when appropriate.

RESULTS

The analysis of interviews, documents, and secondary literature revealed three overarching themes that reflect the systemic governance gaps within Davao City's DRRM framework. First, institutional fragmentation emerged as a persistent challenge. Respondents from both the CDRRMO and CPDO acknowledged that while DRRM policies exist, their operationalization is hindered by unclear mandates, overlapping responsibilities, and inconsistent coordination mechanisms. This finding aligns with Tierney's (2012) argument that disaster governance often suffers when DRRM is treated as a separate function rather than an integrated component of urban development. Documentary analysis further showed that while the city's DRRM Plan references national frameworks such as RA 10121 and the Sendai Framework, these are not consistently translated into land-use decisions or development controls.

Second, the results highlight significant coordination and participation gaps across government levels and sectors. Barangay officials reported limited involvement in city-level planning processes, despite being frontline implementers of DRRM activities. This mirrors Paton and Johnston's (2017) observation that local resilience is weakened when communication channels between national, city, and community actors are fragmented. Civil society groups also noted that community participation is often limited to disaster response activities rather than proactive risk reduction planning. This reinforces the literature's critique that DRRM participation in many developing cities remains tokenistic rather than empowering (Gaillard, 2015).

Third, the findings reveal substantial weaknesses in risk-informed development. Interviews with planning officials indicated that hazard maps and climate projections are not consistently integrated into zoning decisions, particularly in areas experiencing rapid urban expansion. This has contributed to the proliferation of informal settlements along riverbanks and steep slopes—areas identified as high-risk in both local and national hazard assessments. These findings echo Pelling's (2010) argument that land-use planning is often the weakest link in urban DRRM, especially when political and economic pressures override technical risk assessments. Overall, the results demonstrate that Davao City's DRRM framework is constrained by governance gaps that limit its ability to shift from reactive disaster response to proactive risk reduction.

DISCUSSION

The findings of this study reinforce the broader scholarly consensus that disaster risk in rapidly urbanizing cities is fundamentally shaped by governance quality rather than hazard exposure alone. Institutional fragmentation in Davao City mirrors patterns observed in other developing urban contexts, where DRRM offices operate in isolation from planning, engineering, and social welfare departments (Benson et al., 2019). This separation undermines the coherence of risk reduction strategies and contributes to inconsistencies between policy intentions and actual development outcomes. The findings suggest that without integrated governance structures, even well-designed DRRM policies will struggle to influence land-use decisions and infrastructure planning.

Coordination and participation gaps further weaken the city's resilience. The limited involvement of barangays in city-level planning processes reflects a top-down governance culture that restricts local agency. This is problematic because barangays possess critical contextual knowledge about community vulnerabilities, social networks, and informal settlement dynamics. As Paton and Johnston (2017) argue, resilience is built from the bottom up, and excluding local actors from planning processes undermines the legitimacy and effectiveness of DRRM interventions. The study's findings also align with Gaillard's (2015) critique that community participation

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in DRRM often remains symbolic, with communities engaged only during response phases rather than in risk assessment or planning.

The weaknesses in risk-informed development identified in Davao City highlight the tension between urban growth and resilience. The expansion of settlements into hazard-prone areas reflects broader challenges in enforcing zoning regulations and integrating climate projections into planning. This is consistent with global findings that urbanization pressures often lead to development in high-risk zones, especially where land markets are inequitable, and regulatory enforcement is weak (Satterthwaite et al., 2018). The city's reliance on structural solutions such as drainage canals and riverbank revetments also reflects a global trend where governments prioritize visible infrastructure over systemic, long-term risk reduction strategies (Da Silva et al., 2012). These findings underscore the need for a paradigm shift toward integrated, climate-adaptive, and socially inclusive urban planning.

CONCLUSION

This systematic review demonstrates that governance—not hazard exposure—is the primary driver of disaster risk in rapidly urbanizing cities. The evidence consistently shows that institutional fragmentation, weak coordination, and failures in risk-informed development undermine the effectiveness of DRRM systems (Tierney, 2012; UNDRR, 2019). These governance gaps persist despite the presence of comprehensive national policies such as the Sendai Framework and RA 10121, indicating that policy adoption alone is insufficient without corresponding improvements in institutional capacity and interdepartmental collaboration.

The study also highlights the importance of integrating DRRM into broader urban development processes. Without coherent governance structures, updated hazard information, and strong interdepartmental collaboration, DRRM policies remain disconnected from land-use decisions and infrastructure planning. This disconnect contributes to the proliferation of informal settlements in hazard-prone areas and increases the city's exposure to climate-induced risks. The findings reinforce the argument that resilience cannot be achieved through structural interventions alone; it requires systemic governance reforms that address the root causes of vulnerability.

For Davao City, the findings underscore the need to strengthen institutional coherence, enhance coordination mechanisms, and integrate climate-adaptive planning into all development processes. While the city has made significant progress in DRRM, persistent governance gaps—such as CLUP–DRRM misalignment, barangay-level capacity deficits, and structural bias in mitigation investments—must be addressed to achieve long-term resilience. Ultimately, building a disaster-resilient Davao City requires a whole-of-government and whole-of-community approach grounded in strong governance principles.

RECOMMENDATIONS

To address institutional fragmentation, the city government should establish a unified DRRM–Urban Planning Coordination Council that brings together the CPDO, CDRRMO, CEO, CSWDO, and other relevant offices. This council should be mandated to harmonize policies, align development plans with hazard assessments, and ensure that DRRM principles are embedded in all planning instruments. Regular interdepartmental meetings, shared data platforms, and joint monitoring mechanisms can strengthen institutional coherence and reduce policy inconsistencies (Benson et al., 2019).

To improve coordination and participation, the city should institutionalize participatory risk mapping and community-based DRRM planning at the barangay level. Capacity-building programs should be expanded to equip barangay officials and community leaders with skills in hazard assessment, early warning, and climate-adaptive planning. Establishing formal channels for civil society engagement—such as DRRM advisory councils or community liaison officers—can enhance transparency and ensure that local knowledge informs city-level decisions (Gaillard, 2015; Paton & Johnston, 2017).

Finally, strengthening risk-informed development requires updating the city's CLUP and zoning ordinances to incorporate climate projections, multi-hazard maps, and social vulnerability assessments. The city should enforce no-build zones in high-risk areas and prioritize nature-based solutions such as riverbank restoration, watershed rehabilitation, and urban greening (Da Silva et al., 2012; IPCC, 2022). Investments should shift from predominantly structural interventions to a balanced portfolio that includes early warning systems, community preparedness programs, and climate-adaptive infrastructure. These measures will help Davao City build long-term resilience and reduce the impacts of future disasters.

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