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Assessment of the 5% disaster risk reduction and management fund utilization in the Province of Albay

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Abstract

Aim: This study assessed the utilization of the 5% Disaster Risk Reduction and Management (DRRM) fund in the Province of Albay from 2020 to 2023, focusing on expenditure patterns, risk-based allocation, and disaster-linked spending. It further aimed to develop a DRRM investment model that informs governance, public policy, and disaster risk financing at the local level.

Methodology: A mixed-methods convergent design was employed, involving selected cities in Albay to capture geographic and hazard exposure variation. Quantitative data were collected through survey questionnaires and content analysis of fiscal records, while qualitative insights were obtained through key informant interviews.

Results: Findings revealed a consistent tendency toward reactive expenditures, particularly during high-impact events such as the COVID-19 pandemic. Institutional constraints, procedural rigidities, and political incentives reinforced this pattern. Variations in spending behavior were influenced by hazard exposure, institutional capacity, and fiscal resources, with higher-capacity local government units demonstrating relatively greater investment in proactive measures.

Conclusion: Despite policy mandates promoting proactive disaster risk reduction, local fiscal behavior remains predominantly reactive due to structural and institutional limitations. The proposed DRRM investment model provides a framework for risk-informed and performance-based budgeting, supporting governance reform, institutional strengthening, and more effective disaster risk financing. These findings contribute to evidence-based policymaking and the advancement of adaptive disaster governance systems.

Keywords: *disaster governance, DRRM, local public finance, fiscal behavior, proactive and reactive spending, institutional capacity, public policy, Philippines*

INTRODUCTION

The increasing frequency and intensity of disasters continue to pose significant challenges to governments, particularly in strengthening resilience and minimizing socio-economic losses. These trends are largely driven by climate change and environmental pressures, which exacerbate hazard exposure and vulnerability. Asia accounts for a substantial share of global disaster events, with the majority classified as natural hazards, making it the most disaster-prone region worldwide (Cvetković et al., 2024). Within this context, the Philippines remains highly vulnerable due to its geographic location along the Pacific Ring of Fire and the Typhoon Belt, consistently ranking first (Frege et al., 2025) in the World Risk Index since 2022.

Globally, disaster governance has shifted toward resilience-oriented frameworks, emphasizing proactive risk reduction, preparedness, and adaptive capacity. The Sendai Framework for Disaster Risk Reduction and the Sustainable Development Goals highlight the importance of integrating risk-sensitive planning, climate adaptation, and institutional strengthening into development. These frameworks underscore the role of institutional, financial, and adaptive capacities as critical determinants of resilience outcomes.

Translating these global commitments into national policy, the Philippine Disaster Risk Reduction and Management Act of 2010, or Republic Act No. 10121 (2010), institutionalized a comprehensive disaster risk reduction and management (DRRM) system grounded in decentralization. A key fiscal provision of this framework is the

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mandate requiring every Local Government Unit (LGU) to allocate at least five percent (5%) of its estimated revenue from regular sources to the Local Disaster Risk Reduction and Management Fund (LDRRMF). This fund, further subdivided into a 70-30 allocation, serves as the fiscal mechanism through which global ideals of prevention and preparedness are translated into concrete, locally driven action. While the thirty percent allocation of the LDRRMF is solely intended for quick response funds, the remaining seventy percent is generally intended for prevention, mitigation, and preparedness measures.

This study contributes to both local and international discourse on disaster risk governance by examining how institutional, fiscal, and hazard exposure factors influence the fiscal behavior of LGUs in managing their LDRRMF, allowing for a deeper understanding of the challenges and opportunities facing local resilience building in the Philippines. Furthermore, by introducing a framework to distinguish between proactive and reactive expenditures, the study provides a model that can be applied in other local contexts, allowing researchers and practitioners to evaluate disaster-related fiscal performance systematically. In essence, this study broadens the empirical base for understanding how local fiscal governance contributes to resilience-building, positioning fiscal management as a central dimension of disaster preparedness and public sector accountability.

Review of Related Literature and Studies

Government spending priorities and policy development have direct links to how DRRM fiscal behavior is being shaped. For instance, a lack of policy incentivizing long-term investments for building resilient communities can arguably result in significant funding challenges, particularly in developing countries within the Association of Southeast Asian (ASEAN) region (Causevic et al., 2021). Thus, climate change adaptation projects are evident but progress slowly because they are implemented on a minimal scale. In East Asia, DRR projects may be sustainable over time (Ishiwatari & Sasaki, 2022), in contrast to findings from the ASEAN region. Other regions experience institutional constraints that would result in a reactive bias towards DRRM. In the Southern African Development Community Region, the majority of revenues generated from local taxation were allotted for housing, water, and sanitation (Coetzee et al., 2023). Meanwhile, Bangladesh's disaster policy-making process are informed by past experiences (Choudhury & Haque, 2024), suggesting a learning and adaptive approach towards DRRM. At the national level, existing studies on the Philippines largely focused on governance structures or macro-level disaster impacts, with limited empirical examination of LDRRMF utilization. Oversight reports indicate persistent issues such as underspending and inconsistent fund allocation across LGUs (Commission on Audit [COA], 2024). Therefore, DRRM should be approached holistically. Molnar-Tanaka (2025) outlined a policy checklist that aligns with the Sendai Framework's priorities for action. A key finding to the study is that most ASEAN countries demonstrate inadequacies in institutional and financial capacity to cope with the demands of a constantly changing environment.

Several critical gaps remain in the literature on local DRRM financing. Empirically, existing studies provide limited municipality-level evidence on how LGUs allocate and utilize the LDRRMF in relation to institutional capacity, fiscal conditions, and hazard exposure. Most research has focused either on national policy frameworks, macro-level fiscal impacts, or qualitative accounts of disaster governance, leaving insufficient understanding of local fiscal behavior in practice. Methodologically, prior studies largely rely on single-method approaches, limiting the integration of quantitative fiscal analysis with institutional and governance perspectives (Domingo & Manejar, 2021). Contextually, comparative analyses of hazard-prone yet fiscally diverse local settings remain scarce, particularly within decentralized governance systems such as the Philippines. Moreover, despite the increasing emphasis on proactive disaster governance under the Sendai Framework and Republic Act No. 10121 (2010), there is still no established DRRM investment model calibrated to the fiscal and institutional realities of Philippine LGUs. Addressing these gaps requires an integrative framework that combines fiscal analysis, institutional assessment, and behavioral perspectives to explain variations in DRRM expenditure patterns. By examining LDRRMF utilization at the municipal level in Albay, this study contributes empirical evidence on how local fiscal behavior aligns with or diverges from policy and global DRRM frameworks advocating proactive disaster risk reduction.

Theoretical Framework

By linking spending behavior with hazard exposure, institutional capacity, and political-administrative factors, this study provides an in-depth look at how disaster-prone LGUs in Albay use their mandated DRRM funds; grounded on political economy (Bevir, 2007), institutional (March & Olsen, 1984; Oppenheimer, 2012), and organizational learning (Argyris & Schön, 1978; Donaldson, 2001) theories. Taken together, these theoretical perspectives suggest that LGU fiscal behavior in DRRM emerges from the interaction of political incentives, institutional constraints, contextual disaster risk conditions, and adaptive learning processes; manifestations of broader governance dynamics within decentralized disaster risk management systems. Political considerations shape

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expenditure priorities, institutional capacity determines the feasibility of implementation, hazard exposure creates environmental pressures for action, and organizational learning influences how LGUs adjust fiscal strategies over time. This integrated perspective provides the theoretical basis for analyzing how LGUs allocate disaster funds and whether such allocations align with the proactive governance principles promoted by the Sendai Framework and Republic Act No. 10121 (2010).

Conceptual Framework

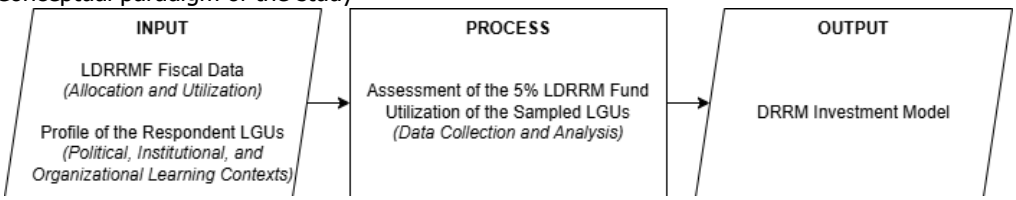
The conceptual framework illustrates the relationships between fiscal behavior, institutional conditions, and disaster risk characteristics in shaping the development of a DRRM investment model. The framework assumes that LGUs' utilization of the Local Disaster Risk Reduction and Management Fund (LDRRMF) is influenced not only by available fiscal resources, but also by institutional and contextual factors that determine whether expenditures are oriented toward proactive or reactive disaster governance.

The inputs of the framework consist of two major components. The first component includes fiscal variables derived from LGU financial records, particularly LDRRMF allocation levels, utilization rates, and the distribution of proactive and reactive expenditures. These variables operationalize fiscal behavior and reflect how LGUs prioritize prevention, preparedness, response, recovery, and rehabilitation activities. The second component includes contextual and institutional variables, namely institutional capacity, financial capacity, learning and adaptive capacity, hazard exposure, and vulnerability. These factors represent the governance and risk environment within which fiscal decisions are made. Stronger institutional and adaptive capacities are assumed to encourage more proactive investments, while higher hazard exposure, vulnerability, and fiscal constraints may reinforce reactive expenditure tendencies.

The process component integrates quantitative and qualitative approaches to examine the interaction of these variables. Fiscal and institutional data are collected through documentary analysis, survey questionnaires, and key informant interviews. Descriptive analysis is used to identify expenditure patterns and utilization trends, while thematic analysis contextualizes the political, administrative, and organizational factors influencing fiscal decisions. The integration of these methods enables the study to explain not only how DRRM funds are allocated, but also why certain expenditure behaviors emerge under varying institutional and hazard conditions.

The output of the framework is the proposed DRRM investment model. The model is intended to provide an evidence-based framework for assessing how LGUs can align DRRM investments with institutional capacity, fiscal conditions, and disaster risk exposure. Ultimately, the framework positions fiscal behavior as both a governance outcome and a mechanism through which local resilience and adaptive disaster governance are strengthened.

Figure 1. Conceptual paradigm of the study



Statement of the Problem

While the policy framework emphasizes proactive disaster risk reduction, existing evidence suggests that LGU spending behavior often remains reactive, driven by immediate disaster events, institutional constraints, and political considerations. Variations in fiscal capacity, hazard exposure, and institutional readiness further contribute to inconsistent utilization of DRRM funds across local governments. Despite the importance of these factors, there is limited empirical research examining how LGUs allocate and utilize the LDRRMF, particularly in relation to proactive and reactive expenditures, risk-based decision-making, and disaster event responsiveness. In disaster-prone provinces such as Albay, where hazard exposure is high and institutional commitment to DRRM is significant, understanding fiscal behavior is essential for improving governance outcomes. However, there is a lack of integrated analysis linking fiscal allocation patterns, institutional capacity, and adaptive governance mechanisms. Moreover, no established investment model currently guides LGUs in aligning DRRM spending with risk profiles and governance capacities. Given these gaps, this study examines the utilization of the 5 percent LDRRMF among selected LGUs in Albay, with the aim of generating evidence that can inform policy reform, strengthen institutional capacity, and support more effective and accountable disaster risk governance.

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Research Objectives

General Objective:

To assess the utilization of the 5 percent LDRRMF among LGUs in the province of Albay and to analyze the factors influencing their fiscal behavior in disaster risk governance.

Specific Objectives:

1. To examine the allocation and utilization of the 5 percent LDRRMF in the cities of Tabaco and Legazpi in terms of:
   a. LDRRMF allocation;
   b. LDRRMF utilization;
   c. Proactive expenditures (prevention, mitigation, and preparedness);
   d. Reactive expenditures (response and recovery);
2. To analyze spending patterns according to the degree of risk;
3. To compare LDRRMF expenditures corresponding to disaster events;
4. To develop a DRRM investment model for the province of Albay.

Research Questions:

1. How do LGUs allocate and utilize the 5 percent LDRRMF?
2. How do spending patterns vary according to the degree of disaster risk?
3. How do LGUs utilize their LDRRMF in response to specific disaster events?
4. What DRRM investment model can be developed to support risk-informed and effective disaster governance?

METHODOLOGY

Research Design

The study adopted Creswell and Plano Clark's (2018) mixed-methods convergent design framework to analyze the LGU's fiscal data, capacity profiles, and recurring qualitative themes in the context of DRRM. Quantitative and qualitative data were synthesized and integrated to provide a comprehensive interpretation and theory-confirming results and discussion.

Population and Sampling

The study sample consisted of 2 city LGUs (n = 2) in the province of Albay: Tabaco City and Legazpi City, each with their local disaster risk reduction and management office (LDRRMO) heads as the key informant and respondents of the study. This choice is justified on both statutory and empirical grounds: the LDRRMO is the designated unit responsible for planning, coordinating, implementing, and monitoring local DRRM programs, including preparation, utilization, and reporting of the LDRRMF, making its head as the institutional focal point for technical and operational matters of disaster finance and program delivery.

Instruments

This study used multiple research instruments. Firstly, a Likert-scale survey questionnaire adapted from the UNDRR Disaster Resilience Scorecard for Cities (2017), and its supplementary Quick Risk Estimation (QRE) tool (2023) was used to obtain the profile of the sampled LGUs. This research instrument consisted of five sections, assessing the institutional capacity, learning and adaptive, financial capacity, hazard exposure, and vulnerability of the sampled LGUs, using a five-point scale (5 – high, 4 – moderately high, 3 – adequate/moderate, 2 – moderately low, and 1 – low). Secondly, this study employed a researcher-developed content analysis guide as a complementary research instrument to systematically extract fiscal data from official LGU records. Specifically, the guide was used to: (1) collect and organize DRRM fiscal data by DRRM thematic areas and unutilized balances from LDRRMOs covering years 2020 to 2023; and (2) simplify data collection. Lastly, this study employed a researcher-developed key informant interview guide to extract qualitative findings that verify quantitative findings. This seven-part interview aimed to contextualize the observed spending patterns and to understand the behavioral, administrative, and political rationales behind LGUs' utilization of the LDRRMF, in alignment with the study's objectives. These research

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instruments underwent expert review and pilot testing with non-sample LDRRMO heads, who possess the requisite technical knowledge of DRRM operations and fund management. Their feedback was used to refine the clarity, contextual relevance, and operational alignment of the survey indicators. Following the incorporation of these expert recommendations, the finalized instruments were prepared and administered during the formal data-gathering phase.

Data Collection

Data were collected between December 2025 and January 2026 through proper coordination and engagement with Tabaco City and Legazpi City. Content analysis guides and survey questionnaires were administered on-site to the LDRRMOs of the selected LGUs, followed by the conduct of key informant interviews to supplement and contextualize the quantitative findings. Data collection focused on obtaining information regarding LDRRMF allocation and utilization, institutional capacity, learning and adaptive capacity, and local disaster risk conditions. In total, two sets of survey administrations and key informant interviews were completed during the data gathering process.

Treatment of Data

Quantitative data obtained from the survey questionnaires and content analysis guides were analyzed in Microsoft Excel using descriptive statistical methods. The statistical results were treated as follows:

a. Interquartile Range (IQR). This measure of statistical spread was used to interpret the variability of the typical amount spent or unspent by LGUs. Correspondingly, Q_1 and Q_3 were used to interpret the lower and upper boundary of the middle fifty percent (25^{th} and 75^{th} percentile) of the typical amount, respectively.

b. Index Value. Index values were used to determine the rating for institutional (I_{IC}), financial (I_{FC}), learning and adaptive (I_{LA}) capacities, as well as hazard exposure (I_{HE}) and vulnerability (I_V) levels of the studied LGUs. In a five-point scoring system, the index value corresponds to the following verbal interpretation:

Range	Verbal Interpretation
4.01 to 5.00	High
3.01 to 4.00	Moderately High
2.01 to 3.00	Adequate/Moderate
1.01 to 2.00	Moderately Low
0 to 1.00	Low

Meanwhile, qualitative data, obtained through key informant interviews, were manually analyzed using Braun and Clarke's (2006) thematic analysis model. Using the Microsoft Excel application, thematic analysis involved (1) familiarizing with the data, (2) codifying initial data, (3) identifying individual themes, (4) identifying main themes, (5) grouping themes according to relevance, and (6) generating the report. Qualitative insights were integrated into the discussion of results to triangulate findings, clarify, and strengthen the interpretation of fiscal behavior under varying capacity and risk conditions.

Ethical Considerations

In the conduct of this study, the researcher adhered to the following ethical protocols:

Proper Coordination. Transmittal letters were sent to the sampled LGUs. Data gathering only commenced upon the approval of the local chief executive.

Voluntary Participation. The researcher gathered data only upon the voluntary participation of the informants and key personnel involved. Even with the approval of the local chief executive, the researcher did not proceed to gather data from informants who had no desire to participate voluntarily in the study.

Informed Consent. Key informants were provided with informed consent forms and were briefed with regards to the purpose and intent of the study, and the procedures to be undertaken during the actual data gathering phase. Informants were assured of confidentiality and that the information provided would be used solely for academic purposes.

Confidentiality. This study omitted and redacted any personal identifiers that would compromise the privacy of the informants.

Academic Integrity. References and citations were used to recognize authors and previous scholars that led toward the development and enhancement of this study.

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RESULTS AND DISCUSSION

Prior to the presentation of results, several methodological considerations must be acknowledged to contextualize interpretation and delimit inference:

First, although the study design initially intended representation across the three congressional districts of Albay, only Tabaco City and Legazpi City participated in the full data collection phase. The absence of participation from the remaining eligible city constrains the breadth of district-level representation and limits the robustness of province-wide generalizations. Consequently, findings should be interpreted as analytically comparative between participating cities rather than statistically representative of all city-level LGUs within Albay. Second, the UNDRR-based survey instruments used to derive indices of institutional capacity, learning and adaptive capacity, financial capacity, hazard exposure, and vulnerability were administered at a single point in time. Therefore, the resulting index values reflect a cross-sectional assessment rather than a longitudinal measurement. In the absence of year-to-year data, the study is unable to empirically trace temporal shifts in resilience characteristics or model causal dynamics between institutional change and fiscal behavior. Instead, the indices serve as structured approximations of prevailing LGU conditions during the study period (2020 to 2023), functioning as contextual (time invariant) variables against which fiscal allocation and utilization patterns are interpreted. Third, while fiscal data were systematically collected for both participating LGUs, disaster impact data, specifically affected population per historical disaster event during the study period, were not uniformly available. Only Legazpi City maintained complete and accessible records of affected population figures. To preserve analytical consistency and avoid asymmetrical comparisons, variables involving the affected population were excluded from comparative statistical analysis. Taken together, these constraints frame the scope of inference for the results that follow. The analysis emphasizes internal consistency, comparative interpretation, and theoretical alignment with the study's conceptual framework, rather than statistical generalization or longitudinal causal modeling. Within these parameters, the findings provide evidence-based insights into DRRM fiscal behavior at the city level under conditions of fiscal decentralization and multi-hazard exposure.

A key limitation of this study lies in the small number of participating LGUs (n = 2), which constrains the generalizability of the findings. While the selected LGUs provide context-specific insights into disaster risk reduction and management (DRRM) fund utilization in a hazard-prone province, the observed fiscal behavior patterns may not fully represent the diversity of institutional, fiscal, and risk conditions across other LGUs in the Philippines. Consequently, the results should be interpreted as indicative rather than conclusive, reflecting localized governance dynamics rather than generalizable national trends. Nonetheless, the study provides valuable exploratory evidence that contributes to understanding the interaction between institutional capacity, hazard exposure, and fiscal decision-making in disaster governance.

1. Allocation and Utilization of the Five Percent LDRRMF

Quantitative findings reveal that Legazpi City demonstrated higher average allocation and utilization compared to Tabaco City. Unutilized balances were present in both LGUs, but proportionally higher in Tabaco City, where unspent funds accounted for 37 to 70 percent of annual allocations, compared to 10 to 43 percent in Legazpi City. This finding is consistent with prior literature indicating that LGUs exposed to recurrent hazard pressures tend to increase DRRM spending intensity (Hochrainer-Stigler et al., 2024). However, high unutilized balances, particularly in Tabaco City, also indicate institutional or administrative constraints, consistent with national audit observations (COA, 2024).

Both LGUs allocated a substantial portion of their utilized funds to prevention, mitigation, and preparedness. Legazpi City devoted approximately 23 to 34 percent of total allocation to prevention and mitigation and 24 to 27 percent to preparedness. Tabaco City allocated 9 to 14 percent and 12 to 17 percent, respectively. Qualitative findings reinforce this pattern. Key informants from both LGUs articulated a proactive-oriented allocation philosophy grounded in risk reduction logic. Investments in hazard mapping, early warning systems, relocation planning, and information campaigns reflect alignment with priority 3 of the Sendai Framework. This proactive orientation also reflects compliance with the 70-30 allocation rule under Republic Act No. 10121 (2010), suggesting strategic prioritization of proactive measures over reactive recovery expenditures. Institutionalized planning mechanisms such as the LDRRM plan appear to anchor fiscal behavior toward anticipatory investment, consistent with Institutional Theory. Furthermore, the expressed belief that proactive investments reduce long-term costs is aligned with Ishiwatari & Sasaki (2022), who demonstrated that preventive investments lower fiscal burdens in post-disaster phases.

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Table 1. Annual 5% LDRRMF Allocation of the Cities of Legazpi and Tabaco from Year 2020 to 2023

LGU	Annual 5% LDRRMF Allocation (in million Philippine pesos)				Average Annual Allocation
	2020	2021	2022	2023	
Legazpi City	62.39	64.51	79.44	70.59	69.23
Tabaco City	34.13	36.52	48.74	42.53	40.48

Table 2. Annual 5% LDRRMF Utilization of the Cities of Legazpi and Tabaco from Year 2020 to 2023

LGU	Annual 5% LDRRMF Utilization (in million Philippine pesos)				Average Annual Utilization
	2020	2021	2022	2023	
Legazpi City	62.39	55.04	50.11	40.71	52.06
Tabaco City	22.08	11.90	9.73	26.72	17.61

Table 3. Typical Expenditures, by DRRM Thematic Areas, and Unutilized Balances from Year 2020 to 2023

LGU	Description	Statistical Data (amount in million Philippine pesos)		
		Q_1	Q_3	IQR
Legazpi City	Prevention and Mitigation	15.98	23.73	7.75
	Preparedness	16.49	18.62	2.13
	Response	2.15	24.40	22.25
	Recovery and Rehabilitation	-	-	-
	Unutilized Balance	7.10	29.47	22.36
Tabaco City	Prevention and Mitigation	3.52	5.50	1.98
	Preparedness	4.66	6.81	2.15
	Response	3.77	7.42	3.65
	Recovery and Rehabilitation	0.25	2.06	1.82
	Unutilized Balance	14.87	28.22	13.35

A notable divergence emerged in response expenditures. Legazpi City exhibited high variability in response spending, with an IQR of Php 22.25 million, suggesting large fluctuations depending on disaster events. In contrast, Tabaco City showed more stable response spending (IQR of Php 3.65 million). Qualitative evidence indicates that in Tabaco City, allocation decisions are closely aligned with the vision of the local chief executive, suggesting stronger executive mediation. In Legazpi City, allocation decisions were described as more deliberative within the LDRRMC structure. Nevertheless, the data do not indicate systematic over-prioritization of response at the expense of prevention. Instead, response variability appears event-driven, consistent with Contingency Theory.

Despite proactive intent, qualitative findings highlight administrative bottlenecks. In terms of delays, Legazpi City highlighted the untimely reporting of implementing offices, while Tabaco City highlighted bureaucratic process-induced delays. Both stressed the limited personnel complement with security of tenure which may reduce operational effectiveness. Tabaco City further cited procurement and reprogramming constraints, which trigger audit observation memorandums. These constraints align with Institutional Theory, where formal rules shape behavior, sometimes generating rigidity. They also reinforce findings from Domingo and Manejar (2021), who observed that compliance-heavy systems can slow DRRM implementation. High unutilized balances, therefore, are not solely indicative of reactive bias but may reflect procedural frictions. Institutional capacity mediates the translation of fiscal resources into proactive outcomes. Strong planning orientation may coexist with operational bottlenecks.

2. Spending Patterns According to the Degree of Risk

Quantitative results indicate that Legazpi City achieved a higher average LDRRMF utilization rate (76.52 percent) compared to Tabaco City (45.01 percent) for years 2020 to 2023. The median utilization of Legazpi City (76.52 percent) and its relatively narrow interquartile range suggest consistent fund absorption. In contrast, Tabaco City exhibited lower and more variable utilization, with a median of 47.71 percent. These differences must be interpreted alongside hazard exposure and vulnerability indices. Legazpi City registered higher I_{HE} (3.63) and I_V (3.19) compared to Tabaco City (3.31 and 2.81, respectively). The higher risk profile of Legazpi City corresponds with greater fiscal activation of its LDRRMF, which aligns with Contingency Theory. However, higher utilization does not automatically equate to proactive behavior. In 2020, Legazpi City allocated 74.65 percent of expenditures to reactive measures, reflecting immediate disaster response demands during the Coronavirus (COVID-19) pandemic and major

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typhoon events. Yet from 2021 onward, Legazpi City progressively shifted toward proactive investments, culminating in 100 percent proactive allocation by 2023. This transition suggests organizational learning consistent with Argyris and Schön's (1978) double-loop learning, wherein institutional adjustments are made following crisis experience. In contrast, Tabaco City demonstrated relatively stable proactive spending from 2021 to 2023, with proactive shares ranging from 60.82 to 66.90 percent. Although overall utilization remained lower, its proactive-to-reactive median distribution (62.21 percent proactive) reflects proactive fiscal orientation. This pattern is notable given Tabaco City's comparatively lower hazard exposure, suggesting that proactive behavior may not be solely risk-induced but institutionally mediated.

Table 4. Capacity Profiles, Hazard Exposure, and Vulnerability Levels of the Cities of Legazpi and Tabaco

Index	Legazpi City		Tabaco City	
	Score	Remarks	Score	Remarks
Institutional Capacity (I_{IC})	4.07	High	4.50	High
Learning and Adaptive Capacity (I_{LA})	3.80	Moderately High	4.20	High
Financial Capacity (I_{FC})	3.63	Moderately High	5.00	High
Hazard Exposure (I_{HE})	3.63	Moderately High	3.31	Moderately High
Vulnerability (I_V)	3.19	Moderately High	2.81	Moderate

Qualitative findings reinforce the quantitative trends. Both LGUs rely on formal risk assessment tools, including Climate and Disaster Risk Assessments (CDRA), hazard maps, and historical disaster data, to guide program, project, and activity (PPA) identification. This demonstrates operational alignment with Priority 1 of the Sendai Framework, which emphasizes understanding disaster risk as the basis for investment decisions. Key informants described how mapped exposure directly influenced expenditures, such as relocation site development in volcanic hazard zones and flood mitigation infrastructure in frequently inundated barangays. Importantly, both LGUs distinguish between hazard frequency and hazard impact. Flooding, due to recurrence, drives continuous mitigation investment. Pandemic risk, though less frequent, triggered significant fiscal realignment because of systemic socio-economic disruption. This reflects a multidimensional interpretation of "degree of risk," incorporating exposure, vulnerability, and potential loss magnitude, rather than simple hazard occurrence. This differentiation illustrates rational fiscal adaptation within institutional constraints. Fiscal behavior is not purely reactive but calibrated according to anticipated socio-economic consequences, consistent with Rational Choice Theory.

The comparative analysis becomes more nuanced when institutional and financial capacity indices are considered. Both LGUs exhibit high institutional capacity. However, Tabaco City attained the maximum I_{FC} (5.00) and higher I_{LA} (4.20) than Legazpi City (3.63; 3.80, respectively). Despite lower utilization, Tabaco City's stable proactive orientation may reflect strong financial confidence and adaptive governance structures. Conversely, Legazpi City's initially reactive pattern in 2020, despite substantial institutional capacity, suggests that extreme hazard context can temporarily override proactive planning. This finding provides evidence for institutional mediation, wherein strong governance structures enable transition toward anticipatory investment once immediate shocks subside. It also aligns with literature indicating that higher fiscal autonomy and stable revenue streams improve disaster preparedness investment (Capuno et al., 2024; Hochrainer-Stigler et al., 2024).

The progressive shift toward proactive allocation in both cities reflects broader alignment with the Sendai Framework and Sustainable Development Goals 11 and 13. Proactive spending on mitigation and preparedness reduces long-term losses and fiscal volatility, consistent with Ishiwatari and Sasaki (2022), who emphasize that prevention-oriented investment yields long-term economic benefits. However, the decline in overall utilization rates in both LGUs after 2020 raises questions regarding absorptive capacity and administrative bottlenecks, consistent with observations from COA reports. Lower utilization, even with proactive intent, may weaken resilience outcomes if planned investments are not fully implemented. Altogether, the results indicate that degree of risk influences spending patterns through a dynamic interaction of hazard exposure, institutional capacity, financial resources, and adaptive learning.

3. LDRRM Fund Utilization Corresponding to Disaster Events

The analysis of LDRRMF utilization corresponding to disaster events reveals a nuanced interaction between institutional intent, fiscal structure, and emergent hazard realities. Although the quantitative examination of historical disaster events was excluded due to data asymmetry, the qualitative findings provide substantive insight into how LGUs operationalize disaster-related expenditures within the constraints of Republic Act No. 10121 (2010) and its

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implementing guidelines. Across both participating LGUs, disaster response expenditures were heavily concentrated on relief distribution, food packs, evacuation logistics, and medical supplies. Key informant 1 identified food packs as the largest component of response spending, while key informant 2 emphasized relief goods and evacuation-related logistics as the primary expenditures under the response thematic area. This convergence indicates a patterned fiscal behavior wherein actual disaster events trigger operational mobilization centered on consumable goods and short-term humanitarian assistance. This pattern reflects fiscal orientation under conditions of immediate hazard impact. Despite a proactive utilization philosophy grounded in risk assessment and council-approved annual investment plans, the activation of disaster events redirects fiscal flows toward visible, high-demand response activities. This finding is consistent with political economic theory perspectives, which suggest that disaster response expenditures generate immediate political and social visibility. In disaster contexts, tangible outputs such as relief distribution produce rapid community recognition, thereby reinforcing reactive spending tendencies. However, the predominance of consumable goods raises concerns regarding the balance envisioned under the Sendai Framework, which prioritizes investment in prevention and mitigation. As Ishiwatari and Sasaki (2022) argue, overemphasis on response may undermine long-term fiscal efficiency, since proactive measures yield higher resilience dividends relative to repetitive post-disaster expenditures.

The COVID-19 pandemic functioned as an unprecedented fiscal stressor for both LGUs. Funds originally programmed for prevention, mitigation, and preparedness were realigned toward pandemic control and emergency operations. Both respondents reported that the 5 percent LDRRMF was insufficient to sustain prolonged pandemic-related expenditures. Consequently, augmentation from savings, other local funds, and external financing mechanisms became necessary. This finding highlights structural limitations within the 70-30 allocation scheme mandated by Republic Act No. 10121 (2010). The Quick Response Fund, fixed at 30 percent of the LDRRMF, is designed for sudden-onset events. However, the protracted and compound nature of the pandemic exceeded the absorptive capacity of this reserve. The experience demonstrates that compound crises differ fundamentally from episodic hazards such as typhoons or earthquakes. Unlike discrete events, the pandemic required sustained operational financing, continuous procurement, and repeated health interventions over multiple fiscal years. The LGUs' behavior was not merely reactive by choice, but constrained by the structural rigidity of the funding formula and the magnitude of the crisis, aligning with Contingency Theory. The fixed 5 percent allocation, although adequate under normal hazard cycles, proved insufficient under prolonged systemic stress. The pandemic therefore exposed the limits of statutory earmarking when confronted with compound risk environments.

Both LGUs engaged in reprogramming and cross-fund augmentation following major disaster events (Key informants 1 and 2). Unused or trust funds were reallocated subject to council approval, and additional financing was sought from development funds or other local sources. These practices indicate the presence of adaptive fiscal mechanisms within institutional boundaries, aligning aligns with Institutional Theory. Reprogramming is not discretionary improvisation but a rule-bound adjustment. The necessity of an LDRRMC approval reflects procedural accountability and ensures alignment with public financial management standards. From an adaptive governance perspective, such reprogramming represents single-loop learning, as defined by Argyris and Schön (1978). While this demonstrates institutional responsiveness, it also suggests limited structural reform. The persistence of the 5 percent framework despite pandemic-induced strain indicates incremental rather than transformative adaptation. These patterns of spending that correspond to disaster events are consistent with existing literature highlighting the global tension between proactive resilience investment and reactive humanitarian spending (Ishiwatari & Sasaki, 2022; Panwar et al., 2022). They also empirically support that fiscal capacity, hazard context, and institutional governance jointly shape fiscal outcomes.

Conclusion

This study is subject to limitations related to its sample size, as it draws on data from only two LGUs. This constraint limits the extent to which the findings can be generalized across broader governance contexts. The conclusions and proposed DRRM investment model should therefore be interpreted within the scope of the selected cases, serving as a conceptual and empirical foundation for future studies involving larger and more diverse LGU samples. Expanding the sample size in subsequent research would enhance the robustness, comparability, and policy applicability of findings in disaster risk governance.

The findings of this study demonstrate that disaster risk financing at the local government level in Albay is shaped by the interaction of statutory mandates, institutional capacity, hazard exposure, and governance incentives. While compliance with the 5 percent LDRRMF allocation framework is evident, variations in utilization patterns reveal persistent structural and administrative constraints that influence fiscal behavior. The predominance of reactive

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expenditures, particularly during high-impact events, underscores the challenges of translating policy mandates into proactive disaster risk reduction practices.

This study contributes to governance and public policy scholarship by providing empirical evidence on how decentralized fiscal systems operate within disaster governance frameworks. It highlights the role of institutional capacity and adaptive learning in shaping fiscal outcomes and demonstrates the importance of aligning resource allocation with risk-informed planning. The proposed DRRM investment model offers a conceptual and operational contribution to public administration by linking fiscal responsiveness with disaster risk levels.

These findings have important implications for institutional reform and policy development, particularly in strengthening local government capacity, improving fiscal flexibility, and enhancing coordination across governance levels. By situating local fiscal behavior within broader governance frameworks, the study advances understanding of how resilience-oriented policies may be operationalized in disaster-prone contexts.

Recommendations

1. LGUs may adopt the proposed DRRM investment model as a decision-support tool to align disaster risk financing with hazard exposure, institutional capacity, and fiscal responsiveness.
2. National government agencies, particularly those involved in disaster risk governance and public finance, may consider revisiting the fixed 70–30 allocation framework to introduce greater flexibility in responding to compound and prolonged disasters.
3. Policymakers may strengthen institutional capacity-building programs for LGUs, focusing on financial management, planning systems, and adaptive governance mechanisms to improve fund utilization efficiency.
4. Government institutions may enhance intergovernmental coordination mechanisms to support high-risk LGUs with limited fiscal responsiveness through technical assistance, shared resources, and co-financing arrangements.
5. Development organizations and international partners may support the integration of risk-informed budgeting practices into local development planning through capacity-building initiatives and policy advisory programs.
6. Future researchers may expand the study by incorporating longitudinal data and a broader set of LGUs to further examine causal relationships between institutional capacity and fiscal behavior.

The Proposed DRRM Investment Model

This study proposes an operational DRRM Decision-Making Model, which synthesizes the determinants of disaster risk and fiscal responsiveness into a structured framework that guides LGUs in formulating appropriate DRRM investment strategies. It provides a systematic process through which LGUs can assess their conditions, determine their typological classification, and align their DRRM investments with their risk profile and institutional capacities. The decision-making process begins with the identification of the LGU typology, which is determined by two principal dimensions: disaster risk level and fiscal responsiveness. The disaster risk level is assessed through an analysis of I_{HE} and I_V, which together describe the extent to which communities are susceptible to potential disaster impacts. Fiscal responsiveness, on the other hand, is evaluated based on I_{IC}, I_{LA}, and I_{FC}. The results of these assessments (by averaging the interrelated indices) are subsequently plotted along the two dimensions, disaster risk level and fiscal responsiveness, forming an x-y typological framework. This positioning allows each LGU to determine its corresponding LGU type, which serves as the basis for identifying appropriate DRRM investment strategies. The corresponding DRRM investment strategies, shown in Table 5, may be integrated into the LGU's investment planning processes. These strategies may be operationalized through either annual programs or multi-year investment plans, depending on the scale and complexity of the proposed interventions. For LGUs that require additional support, intergovernmental coordination becomes an essential component of the planning process. In such cases, LGUs are expected to engage with relevant provincial and national government agencies to facilitate potential fund augmentation, technical assistance, or collaborative implementation of long-term PPAs.

Policy Implications of the Proposed DRRM Investment Model

The proposed DRRM investment model offers a structured, policy-relevant framework for enhancing local disaster governance by aligning investment decisions with disaster risk conditions and fiscal responsiveness. It advances a risk-informed and capacity-sensitive approach, enabling LGUs to allocate resources more efficiently based on variations in hazard exposure, institutional capacity, and financial constraints. This typological classification

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supports targeted interventions and minimizes inefficiencies associated with uniform allocation mechanisms. It further highlights the need for stronger intergovernmental coordination, particularly for high-risk LGUs with limited local capacity, where national and provincial support becomes critical for implementing large-scale or long-term interventions. Additionally, the model promotes the integration of DRRM investments into broader local development and fiscal planning processes, ensuring that risk reduction strategies are embedded within annual budgets and multi-year plans. It also emphasizes the institutionalization of monitoring, evaluation, and adaptive learning mechanisms to support evidence-based decision-making and continuous policy adjustment. Overall, the model contributes to both disaster governance and public finance literature by linking risk assessment, fiscal responsiveness, and investment planning within a unified framework. It provides a practical mechanism for optimizing limited public resources while strengthening local resilience through adaptive and collaborative governance.

Figure 2. LGU Disaster Risk Level vs Fiscal Responsivenes Plot Graph

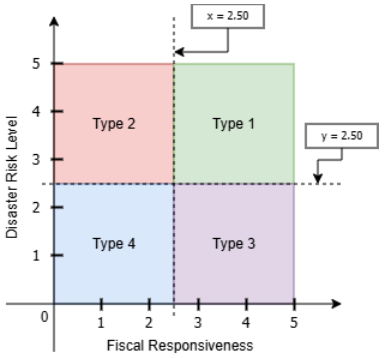

Table 5. DRRM Investment Strategy Matrix

Disaster Risk Level	Fiscal Responsiveness	DRRM Strategy Type	Strategic Orientation
High	High	Type 1	Proactive risk reduction
Moderately High	Moderately Low	Type 2	Reactive-dominant spending
Moderately Low	Moderately High	Type 3	Prevention-oriented development and support capacity
Low	Low	Type 4	Minimal DRRM investment

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