



INTEGRATION OF CLIMATE CHANGE RISK MANAGEMENT INTO CORPORATE STRATEGY: A CASE OF THE DISASTER MANAGEMENT AND MITIGATION UNIT (DMMU) IN ZAMBIA

Cleopatra Namushi Mayungo (Ms.)¹ and Taonaziso Chowa (Ph.D.)²

¹Graduate School of Business, University of Zambia, Lusaka, Zambia.

²Department of Mathematics, Statistics and Actuarial Science,
University of Zambia, Lusaka, Zambia.

*Corresponding Author's Email: mycleo04@gmail.com

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ABSTRACT: *Climate change is reshaping the global risk landscape, requiring proactive institutional responses that integrate climate risk management into corporate strategies. This study examines the extent to which Zambia's Disaster Management and Mitigation Unit (DMMU) has incorporated climate change risk into its strategic and operational frameworks. Using a mixed-methods design with 70 staff respondents and 7 key informants, it assessed current practices, alignment with international best practices, and institutional challenges. Findings indicate that while initiatives such as early warning systems and climate-responsive contingency plans exist, climate risk considerations are not systematically embedded in DMMU's corporate strategy. Key barriers include technical capacity gaps, financial constraints, policy fragmentation, and organizational resistance to innovation. The study concludes that strengthening technical expertise, securing dedicated climate financing, fostering policy coherence, and transforming organizational culture are essential to enhancing resilience and ensuring effective disaster management in the face of escalating climate risks.*

KEYWORDS: Climate change, Corporate strategy, Disaster, Risk management.



INTRODUCTION

The escalating impacts of climate change present formidable challenges to disaster management institutions across the globe. In recent decades, the frequency and intensity of extreme weather events such as floods, droughts, and cyclones have increased dramatically, amplifying vulnerabilities across ecosystems, infrastructure, and communities (Aitsi-Selmi *et al.*, 2016; UNDRR, 2019). These evolving risks necessitate a paradigm shift from reactive, event-driven responses towards proactive, risk-informed strategic planning that systematically embeds climate change considerations across all institutional levels. In the context of Zambia, the Disaster Management and Mitigation Unit (DMMU) serves as the principal institution mandated to coordinate national disaster risk management activities under the Office of the Vice President (OVP) (OVP Strategic Plan, 2024-2026).

Historically, DMMU has focused mainly on emergency preparedness and response, with limited attention to systemic climate risks (Kalaba *et al.*, 2018). Planning has mostly remained reactive, while being required to coordinate climate risk by the Disaster Management Act No. 13 of 2010 (DMMU, 2024). Nonetheless, Zambia's participation in the Pilot Program for Climate Resilience and the National Disaster Risk Management Framework (2017-2030) demonstrates a slow transition toward proactive resilience-building. Integration of early warning, funding, and climate shock readiness is further supported by DMMU's coordination of the Zambia Anticipatory Action Technical Working Group (Zambia Anticipatory Action Bulletin, 2023). El Niño has significantly affected the water, energy, food security, and agricultural sectors during the last three years. Since then, the government has improved disaster risk management through DMMU in an effort to lessen these effects and promote sustainable development (OVP Strategic Plan, 2024 - 2026).

However, the necessity for DMMU to specifically incorporate climate risk management into its corporate strategy has increased due to Zambia's increased susceptibility to climate-related hazards, including extended droughts, flash floods, and sharp temperature swings. In addition to strengthening institutional resilience, this integration is essential for coordinating national efforts with global frameworks such as the Paris Agreement, the Sendai Framework for Disaster Risk Reduction (2015-2030), and the Sustainable Development Goals (especially SDG 13), which all call for immediate action to mitigate the effects of climate change.

Despite a growing recognition of the necessity of integrating climate change risk management into governance structures, empirical examinations of how institutions like DMMU operationalize this integration remain limited. This study seeks to address this gap by exploring the current practices of climate risk integration at DMMU, assessing the degree of alignment with international standards, and identifying the institutional challenges that influence these integration efforts.



Purpose, Objectives and Organisation of the Paper

The purpose of this paper is to assess the integration of climate change risk management into corporate strategy with specific reference to the DMMU in Lusaka, Zambia. To achieve this objective, the study was guided by three research questions:

1. What climate change risk management practices has the DMMU adopted in its corporate strategy and operations?
2. How do the DMMU's climate change risk management strategies align with international best practices and corporate strategic frameworks?
3. What are the key challenges and institutional barriers that have affected the integration of climate change risk management into the DMMU's corporate strategy?

The first part of this paper provides an overview of how DMMU in Zambia has integrated climate change risk management into its corporate strategy. The second section reviews relevant literature on climate risk integration, international best practices, and institutional challenges in both developed and developing countries. The third outlines the study's methodology, while the fourth presents and analyzes the results using graphical statistics. The fifth section discusses the findings in relation to existing literature, followed by the last two sections, which offer conclusions and recommendations.

LITERATURE/THEORETICAL UNDERPINNING

Climate change is one of the most pressing global challenges of the 21st century, with significant impacts on ecosystems, economies, and communities. Environmental risks, including climate risks, have seen increased risk ratings and significance over the past few years, with the trend expected to become more prominent in the years to come (World Economic Forum 2023; 2024). The effects are evident in the rising frequency of droughts, floods, and erratic rainfall, which threaten food security and livelihoods, particularly in rural, agriculture-dependent areas (IPCC, 2014). Limited resilience to climate shocks further deepens poverty and vulnerability (World Bank, 2013).

Climate Change Risk Management in Developed Countries

Climate change risk management (CCRM) in developed countries is underpinned by strong regulatory frameworks, corporate policies, and market-based strategies. These countries have prioritized reducing greenhouse gas (GHG) emissions and enhancing resilience to climate impacts through both mitigation and adaptation strategies (IPCC, 2021; Hsu *et al.*, 2020).

A study by the World Economic Forum (2024) warned that climate risks could slash corporate earnings by up to 7% annually by 2035, with high-exposure sectors like energy and utilities being most vulnerable. Firms failing to decarbonize face transition risks with potential profit losses up to 50% by 2030. The key lesson is the financial imperative for integrating CCRM. However, the study's focus on financial dimensions overlooked environmental and social aspects.



Implementation of frameworks such as the Task Force on Climate-related Financial Disclosures (TCFD) has enabled U.S. corporations to improve resilience to climate-related financial shocks. TCFD's key strength lies in enhancing transparency and accountability (TCFD, 2021), but its voluntary nature limits enforcement and uptake across jurisdictions. Similarly, European companies aligned with the Corporate Sustainability Reporting Directive (CSRD) benefit from investor confidence and competitive advantage (European Commission, 2022). Yet, the cost of compliance remains burdensome for SMEs.

Public-private collaboration in Japan has fostered effective CCRM through government incentives and industry partnerships, promoting innovation and sustainability (Tanaka, 2019). However, voluntary schemes may fall short without complementary regulatory enforcement. The European Green Deal and U.S. Paris Agreement targets provide directional clarity for emission reductions (European Commission, 2021; U.S. EPA, 2021), yet long-term political uncertainty threatens consistent implementation.

Mitigation strategies have also centered on renewable energy transitions. Germany's Energiewende policy drove significant investment in wind and solar, reaching around 50% renewable electricity by 2021 (Agora Energiewende, 2019). The initiative underscores the importance of government leadership in clean energy but has been hindered by delays in phasing out coal. Additionally, market mechanisms like Sweden's carbon tax have successfully reduced emissions and spurred green innovation (Anderson & Di Maria, 2017), though equity concerns persist regarding their regressive economic impacts.

Overall, while developed countries illustrate a spectrum of successful CCRM practices, recurring gaps include inadequate integration of social dimensions, uneven policy enforcement, and financial burdens for smaller enterprises. These gaps highlight the need for holistic, inclusive, and enforceable frameworks for climate risk governance.

Climate Change Risk Management in Developing Countries

Developing countries, particularly in sub-Saharan Africa, are highly vulnerable to climate change due to their reliance on climate-sensitive sectors and limited adaptive capacities (IPCC, 2021). A major issue is deforestation, driven by agricultural expansion and logging, particularly in Brazil, Indonesia, Haiti, and the DRC, which exacerbates environmental degradation and limits adaptive capacity (Butler, 2020; Mastrotillo *et al.*, 2016). Despite existing anti-deforestation policies, weak enforcement due to economic and political constraints remains a critical gap.

Sustainable land management and reforestation initiatives, such as the African Union's Great Green Wall, have shown potential in restoring degraded land and reducing emissions (FAO, 2020; AU, 2020). However, progress is hindered by limited funding and coordination challenges. Renewable energy projects like Desertec highlight opportunities for clean energy transitions (Desertec Foundation, 2021), though substantial financial requirements limit implementation across many regions.

Climate-smart agriculture and disaster preparedness are gaining traction. For instance, Ethiopia's early warning systems and adoption of drought-resistant crops have enhanced resilience (FAO, 2021). However, limited access to technology and farmer education constrains scalability. South Africa's market-driven sustainability reporting has increased corporate commitment to climate strategies (Mukonza & Swart, 2021), and Kenya's Green



Economy Strategy demonstrates the value of public-private partnerships in strengthening adaptive capacity (Njuguna, 2021). Yet, the broader challenge lies in scaling these efforts amidst structural and resource limitations.

Climate Change Risk Management in Zambia

In Zambia, climate change poses serious risks due to the economy's reliance on rain-fed agriculture and hydropower. Events like the 2015-2016 El Niño caused severe droughts, drastically reducing maize yields and triggering food insecurity (Nhamo *et al.*, 2019; World Bank, 2020). The Ministry of Agriculture has supported climate-smart practices, such as drought-resistant seeds and water-efficient irrigation (Ministry of Agriculture, 2020), yet these efforts are constrained by weak infrastructure and limited financial resources (Zambian Ministry of Agriculture, 2023).

The National Adaptation Plan outlines strategic measures, including improved water management and resilient agriculture (Zambia Ministry of Green Economy and Environment, 2023). However, inadequate enforcement and funding remain major barriers. Zambia is also investing in renewable energy, especially solar, to reduce dependency on vulnerable hydroelectric sources like Kariba Dam, which has caused recurring power shortages due to rainfall variability (ZESCO, 2024; World Bank, 2023). While international funding (e.g., Green Climate Fund) has supported these transitions, financing gaps persist (Green Climate Fund, 2021).

A key lesson from Zambia is that while awareness of climate risks is increasing, the absence of strong enforcement mechanisms and corporate incentives weakens effective climate risk management (Chileshe, 2021). Strengthening institutional capacity and regulatory oversight is essential to enhance resilience and support sustainable economic development under changing climatic conditions.

Integration of Climate Change Risks into Corporate Strategy

The integration of climate change risks into corporate strategy is increasingly recognized as a strategic necessity within the trust of the mission, vision, and values and operationalized through clear articulation in the strategic plan, rather than a mere regulatory obligation. It enhances organizational resilience, fosters innovation, and secures long-term value creation (Brown, 2021). Effective corporate strategy involves embedding climate considerations into long-term planning to ensure sustainability and competitiveness (Smith and Jones, 2023). Brown (2021) emphasized that failing to integrate climate risks increases vulnerability to disruptions and market volatility, although his study focused primarily on large firms, limiting applicability to smaller enterprises.

Smith and Jones (2023) argued for aligning corporate objectives with sustainability goals, which enables firms to mitigate risks and capitalize on green economy opportunities. However, their work lacked practical insights into implementation barriers such as limited expertise and financial constraints. Miller and Lee (2022) highlighted the importance of regulatory frameworks such as the EU Corporate Sustainability Reporting Directive in compelling businesses to disclose climate-related risks, thereby enhancing transparency and accountability. Yet, compliance challenges persist, especially in regions with less stringent regulatory environments.



Eccles and Klimenko (2019) stressed that successful integration requires aligning objectives with climate goals and embedding risk management into operations. While their findings underscored the business case for climate action, they called for more empirical evidence demonstrating implementation. Scenario analysis, as advocated by the IEA (2021), helps organizations assess potential climate futures and prepare strategically, though it demands technical capacity often lacking in smaller firms.

The Science Based Targets initiative (SBTi, 2021) provides a framework for setting measurable emission reduction goals, promoting climate-resilient business models. However, adopting such frameworks is resource-intensive and may be challenging for organizations with limited capacity. Similarly, the TCFD (2017; 2021) promotes transparency in climate-related financial disclosures, enhancing stakeholder trust and access to capital. A major limitation, however, is the lack of standardized climate data, which impedes consistent risk assessment.

Deloitte (2022) reinforced this concern, noting that inconsistencies in climate risk quantification hinder integration with financial reporting. Despite growing awareness, many firms struggle to bridge climate considerations and financial planning due to data and reporting gaps. Collectively, the literature points to a growing consensus on the strategic value of climate risk integration but reveals ongoing related challenges.

Challenges and Barriers in Integrating Climate Change Risk Management into Corporate Strategy

Despite growing recognition of the strategic importance of integrating climate change risk management, organizations face several persistent challenges. A key barrier is the lack of standardized climate data and metrics. According to the Task Force on Climate-related Financial Disclosures (TCFD, 2017; 2021), inconsistent reporting standards hinder accurate risk assessment and transparency, particularly for smaller firms lacking resources to generate or interpret complex climate data. Although TCFD promotes better disclosure practices, it offers limited guidance for organizations with constrained capacity.

Uncertainty in climate models also complicates long-term decision-making. The IPCC (2021) highlights variability in projections due to data quality and emission scenarios, making it difficult for firms to precisely forecast climate impacts. This often leads to either over- or underestimation of risks. While scenario analysis can mitigate this, its utility is limited for organizations lacking access to expert modelling tools or sector-specific data.

Regulatory and policy uncertainty further adds complexity. Miller and Lee (2022) noted that varying climate policies across jurisdictions, such as the EU's Corporate Sustainability Reporting Directive, pose compliance burdens, especially for multinational firms and SMEs in developing countries. Their study emphasizes the need for flexible strategies, yet lacks targeted recommendations for smaller firms navigating evolving regulations.

Resource constraints present another critical barrier, particularly for SMEs. Eccles and Klimenko (2019) argue that while larger firms can absorb the costs of climate integration, smaller entities often lack the financial and technical capacity. Their research underscores the need for external support mechanisms such as public incentives or shared data platforms but does not fully explore non-financial constraints like limited expertise.



Organizational culture also plays a role. Brown (2021) identifies resistance to change and a focus on short-term profits as key impediments. Integrating climate risks often requires a shift in values and leadership commitment, which many firms lack. While Brown stresses the importance of fostering sustainability-oriented cultures, his study offers little empirical evidence or practical examples of successful transformation.

The DMMU had taken steps to assess climate and disaster risks in order to build resilience and improve preparedness among vulnerable communities (OVP Strategic Plan, 2024-2026). While positions have been established at the district level, their absence in other divisions limits coordination. The institution faces ongoing challenges such as inadequate funding, weak preparedness, limited data infrastructure, and the worsening impacts of climate change. These issues often force a shift from planned development activities to emergency response. The situation highlights the need for stronger institutional capacity at all levels, reliable funding, robust information systems, and a shift from reactive responses to proactive, risk-informed planning (OVP Strategic Plan, 2024-2026).

Overall, major barriers include inconsistent data, scientific uncertainty, fragmented regulatory landscapes, limited resources, and cultural inertia (World Bank, 2023). Overcoming these requires flexible strategies, investments in organizational capacity, regulatory clarity, and cultural change. However, there is a clear gap in practical, context-specific solutions especially for SMEs and firms in emerging economies, warranting further empirical research and case-driven evidence.

METHODOLOGY

The study employed a mixed-methods research design, combining both quantitative and qualitative approaches to obtain a comprehensive understanding of climate change risk management practices within DMMU. The DMMU of Zambia is located in Lusaka under the Office of the Vice-President, established as a central body to coordinate disaster responses and ensure effective disaster risk management across the country (GRZ, 2021).

Using purposive and stratified sampling, a sample of 70 staff members across various departments was selected, alongside 7 purposively chosen key informants who held strategic positions related to climate risk governance. Data collection involved the administration of structured questionnaires for the quantitative component and semi-structured interviews for the qualitative component. Ethical approval was obtained from relevant review boards, and all participants were informed of their rights, including the right to withdraw from the study at any point. Quantitative data were analyzed using SPSS Version 23 to produce descriptive statistics, while qualitative data were subjected to thematic analysis to extract recurring themes and patterns.



RESULTS/FINDINGS

This section presents findings on the integration of climate change risk management into corporate strategy within Zambia's Disaster Management and Mitigation Unit (DMMU). Drawing on data from questionnaires and interviews, the analysis focuses on climate risk management practices embedded in DMMU's strategic and operational frameworks, their alignment with international best practices, and the institutional barriers to effective integration. The results provide insight into current practices, institutional preparedness, and gaps in aligning climate risk management with strategic goals.

Current Practices in Climate Change Risk Integration

The findings revealed that the existing climate change risk management (CCRM) practices within the Disaster Management and Mitigation Unit (DMMU) indicated varying levels of policy development, implementation, and strategy review related to climate risk. The distribution of respondents' views on the existence of a formalized CCRM policy at DMMU indicates that, of the 70 respondents, 42.8% reported that a policy exists but is not fully implemented, while 28.3% indicated that the policy is both well-documented and implemented. The remaining proportions indicate the absence of policy, but with formal strategies (10%), while having no policy at all or not being sure of its existence had 5% of respondents apiece. These results suggest that while policy frameworks are in place, implementation remains inconsistent.

The popularity of various climate risk management practices currently employed by DMMU was quite spread, with disaster preparedness planning being identified by 22.2% of respondents as a core activity, followed by early warning systems (20.4%), vulnerability assessments (18.5%), and capacity-building initiatives (16.7%). Financial risk management and policy advocacy each accounted for 11.1% of responses. The distribution suggests that while core technical practices are prioritized, financial and advocacy strategies are less prominent, indicating potential areas for strengthening.

The frequency with which DMMU reviews and updates its climate risk strategies. A significant portion of respondents (42.8%) indicated that strategies are reviewed every 2–3 years, while 35.7% reported annual reviews. A small proportion of respondents either lacked information or indicated no regular review schedule, underscoring the need for more consistent and transparent strategic evaluations. Table 4.1 summarizes respondents' views on the effectiveness of DMMU's climate change risk management efforts. The majority (57.1%) rated the practices as effective, and 14.3% considered them very effective. However, 14.3% were neutral, and the remaining 14.3% was equally split as either ineffective or very ineffective. While the overall perception is positive, the presence of dissenting views points to gaps in implementation and calls for targeted improvements in strategy execution. These findings collectively suggest that while DMMU has made strides in institutionalizing climate risk management, greater consistency in implementation, strategy review, and inclusion of financial and advocacy tools is required to strengthen resilience and effectiveness.



Table 4.1: Effectiveness of DMMU's CCRM Practices in Addressing the Risks Posed by Climate Change in Zambia

Effectiveness of Practices	Frequency (n = 70)	Percentage (%)
Very Effective	10	14.29%
Effective	40	57.14%
Neutral	10	14.29%
Ineffective	5	7.14%
Very Ineffective	5	7.14%

Alignment with International Best Practices and Corporate Strategy

This subsection examines the extent to which the Disaster Management and Mitigation Unit (DMMU)'s climate change risk management strategies align with international best practices and corporate strategic models. The analysis is based on respondents' perceptions regarding strategic alignment and the institutional use of global frameworks. Table 4.2 presents findings on the perceived alignment of DMMU's climate change risk management strategies with international best practices. A total of 35.7% of respondents reported that the strategies are well aligned, while 21.4% considered them very well aligned. In contrast, 28.6% of respondents believed the strategies are poorly aligned or not aligned at all. These findings suggest that although progress has been made in aligning with global standards, further efforts are needed to fully integrate international frameworks such as the Paris Agreement on Climate Change and the Sendai Framework for Disaster Risk Reduction into DMMU's institutional planning.

Table 4.2: Alignment of DMMU's CCRM Strategies with International Best Practices

Alignment Rating	Frequency (n = 70)	Percentage (%)
Very Well Aligned	15	21.43%
Well Aligned	25	35.71%
Neutral	10	14.29%
Poorly Aligned	15	21.43%
Not Aligned at All	5	7.14%

The popularity of the specific international frameworks guiding DMMU's climate change risk management initiatives showed that the Paris Agreement was the most frequently used framework at 42.9%, followed by the Sendai Framework (35.7%). A smaller portion of respondents indicated use of the United Nations Sustainable Development Goals (SDGs), suggesting potential to expand the scope of DMMU's strategic alignment to include broader development and climate resilience goals.

Figure 4.1 illustrates the level of agreement among respondents regarding the integration of international best practices into DMMU's strategies. The largest group of respondents (n = 25) selected a neutral rating (score of 3), while 20 respondents agreed (score of 4) and 10

respondents strongly agreed (score of 5). Conversely, 15 respondents (combined for scores of 1 and 2) expressed disagreement. This distribution reflects a moderate level of satisfaction with DMMU's integration efforts while also highlighting divergent perceptions that warrant attention.

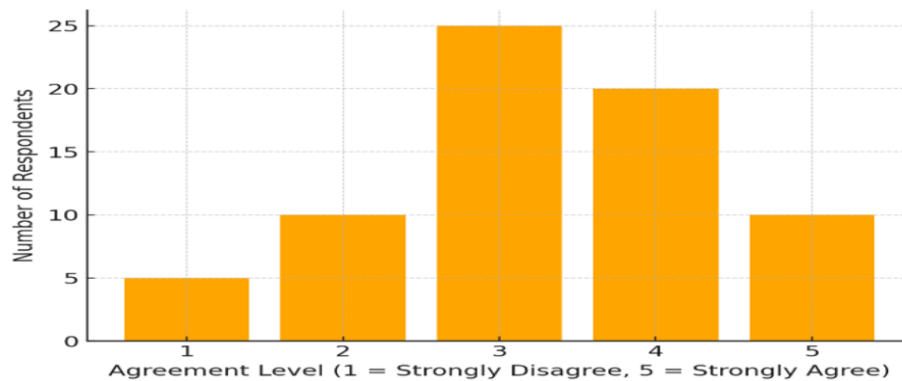


Figure 4.1: Agreement on DMMU Integrating International Best Practices

Figure 4.2 highlights the key barriers to alignment with international best practices. The most cited challenge was limited funding (25.8%), followed by a lack of skilled personnel (22.6%), policy and regulatory misalignment (19.4%), inadequate stakeholder collaboration (16.1%), and insufficient climate data and research (12.9%). A small portion of respondents (3.2%) mentioned other barriers. These findings indicate that institutional capacity constraints, both financial and human, as well as regulatory and data limitations, are the primary obstacles to achieving full strategic alignment.

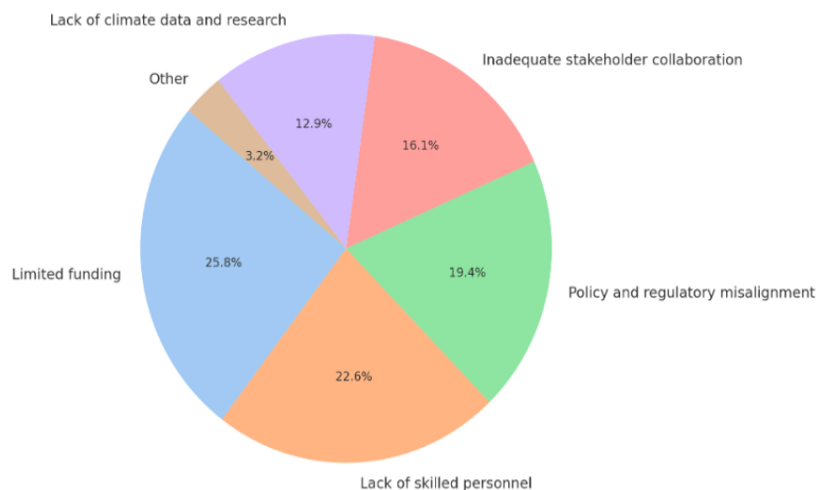


Figure 4.2: Gaps in Alignment with International Best Practices

Thus, while DMMU has taken notable steps toward aligning with global climate and disaster risk management frameworks, gaps remain in operationalizing these commitments. Addressing funding limitations, strengthening technical capacity, improving regulatory coherence, and investing in data systems are crucial for enhancing institutional alignment with international standards.



Challenges Faced by DMMU in Integrating CCRM MGT into its Corporate Strategy

This subsection synthesizes respondents' and key informants' perspectives on the principal obstacles hindering the integration of climate change risk management (CCRM) into DMMU's strategic framework. Table 4.4 below ranks the major barriers identified by staff survey respondents. The most frequently cited obstacle was insufficient funding and resources (57.1%), followed by limited technical capacity (42.9%) and lack of political will (28.6%). These findings echo common constraints in developing-country contexts, where financial and human resources are often stretched across competing priorities.

Table 4.4: Major Barriers Integrating CCRM Management into its Corporate Strategy

Barrier	Frequency (n = 70)	Percentage (%)
Lack of Funding/Resources	40	57.14%
Limited Technical Capacity	30	42.86%
Lack of Political Will	20	28.57%
Insufficient Stakeholder Collaboration	15	21.43%
Poor Data and Evidence for Decision-Making	10	14.29%

Table 4.5 presents key barriers to effective climate risk management in Zambia, as identified by informants. The most cited challenges included limited funding (50 respondents), lack of political will (30), bureaucratic inefficiencies (40), resistance to change (25), poor inter-agency coordination (35), and weak policy enforcement (45). These barriers reflect systemic issues such as delayed policy implementation and low prior.

Table 4.5: Top Challenges Identified by Informants

Barrier	Survey Responses	Informants' Explanation
Limited funding	40 respondents	Funding is often reactive (focused on disaster response) rather than proactive (investing in long-term climate resilience).
Lack of skilled personnel	35 respondents	There are too few specialists trained in international climate policies. Many staff are experienced in disaster response but not climate risk integration .
Policy and regulatory misalignment	30 respondents	Policies exist, but implementation is inconsistent due to political and institutional barriers .
Inadequate stakeholder collaboration	25 respondents	Collaboration with international agencies is limited , mainly due to bureaucratic restrictions .
Lack of climate data and research	20 respondents	No centralized climate risk database , making it hard to track long-term trends and integrate data-driven strategies.

Figure 4.6 illustrates respondents' perceptions of the severity of challenges affecting integration. A majority rated the challenges as severe, with 35 respondents assigning the highest score (5/5) and 30 rating them 4/5. Moderate (3/5), minor (2/5), and negligible (1/5) ratings were given by 20, 10, and 5 respondents, respectively. These findings suggest that most stakeholders view the challenges as significant barriers requiring urgent intervention.

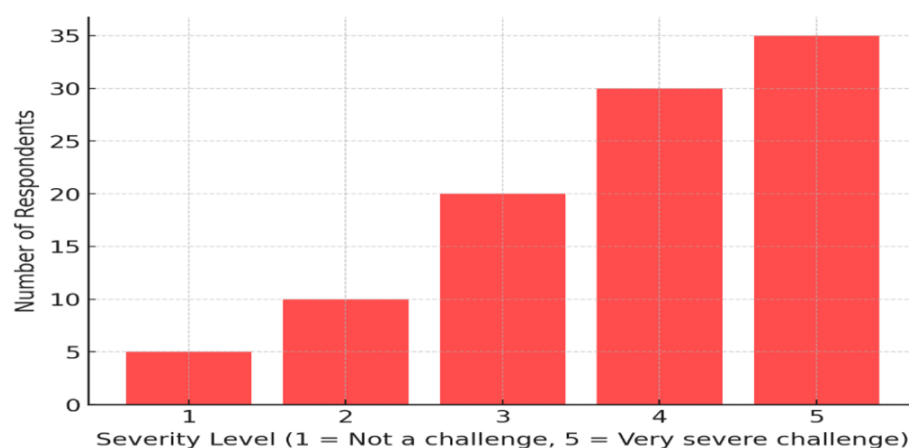
**Figure 4.6: Severity of Challenges Affecting Integration**

Figure 4.7 shows respondents' perceptions of DMMU's institutional capacity to integrate climate risk management. The largest group (30) gave a neutral rating (3/5), while 45 respondents rated capacity negatively (1/5 or 2/5), indicating widespread doubt about institutional readiness. Only 25 respondents rated capacity positively (4/5 or 5/5). These results suggest limited confidence in DMMU's capacity and highlight the need for institutional reforms.

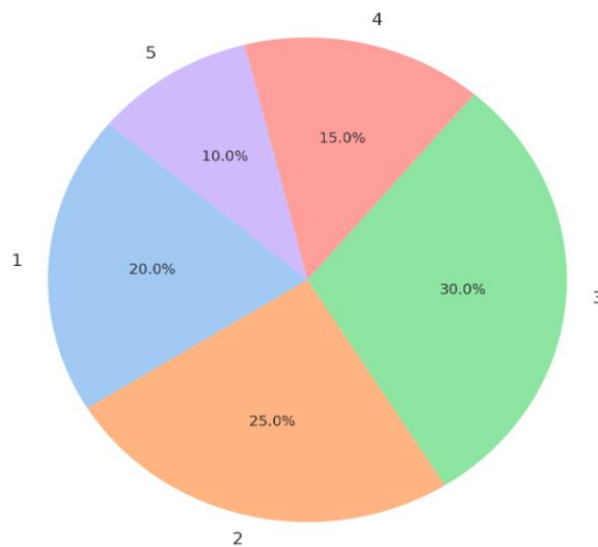


Figure 4.7: Institutional Capacity to Integrate CCRM

Table 4.6 lists respondents' top recommendations for improving integration. Increased funding (64.3%) and enhanced data collection (57.1%) emerged as the most critical strategies, followed by targeted capacity building (50.0%) and expanded public-private partnerships (42.9%).

Table 4.6: Recommendations to Improve the Integration of CCRM

Strategy	Frequency (n = 70)	Percentage (%)
Increased Funding for Climate Change	45	64.29%
Strengthening Data Collection and Research	40	57.14%
Capacity Building for Stakeholders	35	50.00%
Enhancing Public-Private Partnerships	30	42.86%
Improving Stakeholder Awareness and Engagement	25	35.71%

In brief, respondents and informants consistently pointed to resource limitations, technical capacity deficits, bureaucratic hurdles, and policy enforcement weaknesses as the primary barriers to embedding CCRM within DMMU's strategic planning. Addressing these challenges through targeted investments, streamlined processes, and strengthened partnerships would be essential to enhancing DMMU's resilience and alignment with international best practices.



DISCUSSION

The findings of this study are consistent with broader global literature on the challenges faced by disaster management agencies in integrating climate risk into governance structures, particularly in low- and middle-income countries (IFRC, 2021; UNDRR, 2019). The operational advances made by DMMU, such as the establishment of early warning systems and contingency plans sensitive to climate impacts, demonstrate positive steps toward building institutional resilience. Nevertheless, the absence of comprehensive strategic mainstreaming underscores a critical vulnerability that threatens the sustainability of these initiatives. Similar observations have been made by Simukanga *et al.* (2021) in their analysis of climate resilience among Zambian public institutions, which highlighted the critical role of technical expertise, coherent policy frameworks, and sustained political commitment.

Mbewe and Nchito (2020) further emphasize that building urban resilience in Zambia requires the integration of climate change adaptation measures into development planning processes at all levels. Strengthening technical capacities, as argued by Chisanga *et al.* (2019), is fundamental to enabling evidence-based decision-making that can anticipate and manage climate risks more effectively.

Financial mechanisms also require urgent attention. Phiri (2022) contends that dependence on ad hoc emergency funding undermines long-term resilience and calls for the establishment of dedicated climate adaptation financing models within public institutions. Furthermore, policy coherence must be prioritized. Aligning Zambia's Disaster Risk Management Policy, National Policy on Climate Change, and National Adaptation Plan would provide a coherent and integrated platform for action, reducing fragmentation and enhancing coordination across sectors (GRZ, 2016). Equally important is the transformation of organizational culture within DMMU. Institutionalizing a culture of anticipatory, risk-informed planning requires leadership commitment and the embedding of climate risk management into corporate performance frameworks, strategic planning cycles, and key performance indicators. This cultural shift is essential for repositioning DMMU as a climate-resilient institution capable of effectively navigating the evolving risk landscape in Zambia and beyond.

IMPLICATION TO RESEARCH AND PRACTICE

This study provides empirical evidence that enhances the theoretical understanding of integrating climate risk within public institutions in low-income settings. It highlights the vital relationships between technical knowledge, policy coherence, financial approaches, and organizational culture in building institutional resilience. For scholars, the findings indicate the need for comparative and longitudinal studies to investigate context-specific challenges and assess the enduring impacts of integration efforts, especially in relation to sustainable financing models.

For both practitioners and policymakers, the findings emphasize three key priorities: merging disaster risk management, climate change responses, and adaptation measures into a cohesive national framework; adopting proactive, risk-informed planning by enhancing capacity building and utilizing performance-driven climate metrics; and developing dedicated funding mechanisms to support adaptation strategies that go beyond mere reactive measures.



Addressing these challenges will not only enhance the operational effectiveness of the DMMU but also position Zambia as a leader in climate-resilient disaster management in the region.

CONCLUSION

The integration of climate change risk management into DMMU's corporate strategy is an urgent necessity in light of Zambia's increasing exposure to climate-related hazards. While significant operational advances have been made, major gaps persist at the strategic level, and these undermine the institution's overall resilience. Addressing technical, financial, policy, and organizational barriers is essential to embedding climate risk considerations fully and systematically into DMMU's corporate strategy. Ultimately, strengthening climate resilience within DMMU will not only enhance the institution's ability to manage disasters more effectively but will also contribute to national sustainable development goals and international climate commitments.

To strengthen DMMU's integration of climate risk management, respondents recommended four priority actions and noted three study limitations:

- ❖ **Secure Political Commitment:** Embed climate risk in national development plans, assign dedicated budgets, and establish clear accountability for DMMU's climate strategies.
- ❖ **Deepen Public-Private Partnerships:** Formalize co-financing and risk-sharing agreements to leverage private capital and expertise for resilient infrastructure and early-warning systems.
- ❖ **Enhance Data and Analysis:** Invest in real-time monitoring, GIS mapping, and climate modeling by partnering with universities and international research bodies to inform targeted interventions.
- ❖ **Prioritize Community-Led Adaptation:** Support local vulnerability assessments and small-grant pilots that harness indigenous knowledge, build ownership, and tailor solutions to specific contexts.

The primary limitation of this study is its reliance on self-reported perceptions from DMMU staff and informants, which may reflect individual biases rather than objective measures of performance. Additionally, focusing exclusively on DMMU restricts the applicability of findings to other agencies or sectors within Zambia's broader climate governance framework. Finally, the cross-sectional design, capturing data at a single point in 2025, provides only a snapshot of a rapidly evolving policy and operational environment, underscoring the need for longitudinal research to assess how integration efforts mature over time.



FUTURE RESEARCH

Future research on integrating climate change risk management into corporate strategies could explore its significance across different sectors such as agriculture, energy, and finance, aiming to identify best practices and specific obstacles encountered by each industry. In-depth research and regional evaluations, whether conducted within Zambia or throughout Africa, could illustrate the impact of economic and policy variations on corporate adaptation strategies. Analyzing government policies, global regulations, and emerging technologies such as big data, artificial intelligence, and geographic information systems may reveal innovative approaches that improve risk assessment and disaster readiness. Additional examinations of corporate governance, stakeholder involvement, and financial implications such as sustainable investments and green finance could shed light on the economic feasibility of climate strategies. Furthermore, exploring capacity-building efforts and employee development programs can assist in identifying effective practices that enhance corporate resilience and facilitate the integration of climate risk into strategic decision-making processes.

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