

Analyzing the Utilization of the Constituency Development Fund (CDF) for Building Climate Resilience in Vulnerable Communities: A Case of Sinazongwe District, Southern Province

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Abstract

The present study analyzed the utilization of the CDF for climate resilience projects in vulnerable communities of Sinazongwe District, Southern Province. It was observed that vulnerable communities in Sinazongwe continue to experience water scarcity, reduced agricultural output, and livelihood insecurity, despite the availability of expanded CDF resources meant to address these climate stresses. The study adopted a descriptive case study design with a mixed-methods approach, and sampled 120 respondents using both random and non-random (purposive or non-probability) sampling procedures. The study then employed the semi-structured questionnaires to community members/beneficiaries, to gather quantitative data; as well as the conduction of interviews using the semi-structured interview guide on the CDF committee members, WDCs, and government officials, to gather in-depth qualitative insights; and FGD held with community groups to understand collective perceptions, and challenges. The findings revealed that major CDF-funded climate resilience interventions included borehole drilling and rehabilitation, irrigation projects, conservation farming, tree planting, and water supply systems. Water-related projects were identified as the most significant interventions because they improved access to water, household food security, irrigation activities, and community coping capacity during drought periods. The study further established that community participation mainly occurred through community meetings and Ward Development Committees, although participation remained largely consultative rather than fully empowering. The findings also revealed that political influence, inadequate funding, delayed disbursement of funds, limited technical expertise, weak monitoring systems, and poor integration of DRR affected effectiveness and sustainability of climate resilience interventions. The study concluded that CDF has significant potential to support local climate resilience and livelihood improvement through decentralized financing. However, climate resilience interventions remained inadequate relative to increasing climate-related risks affecting vulnerable communities in Sinazongwe District. The study recommends increased climate-focused funding under CDF, stronger integration of Disaster Risk Reduction into local development planning, improved community participation, strengthened governance and accountability systems, enhanced technical capacity, and greater investment in early warning systems, environmental conservation, and sustainable livelihood diversification.

Keywords: climate-resilience projects, Constituency Development Fund (CDF), Disaster Risk Reduction, decentralization, utilization, vulnerable communities, Sinazongwe District.

1. INTRODUCTION

Climate change has emerged as one of the most pressing development challenges globally. Worldwide, rising greenhouse-gas emissions have led to increasing global mean temperatures, shifting weather patterns, and more frequent and intense climate extremes including; droughts, floods, heat-waves, and storms. These changes threaten ecosystems, water security, agriculture, energy systems, and human livelihoods. The climate hazards, potentially damaging physical events resulting from climatic processes, often translate into disasters when they exceed the coping capacity of communities. A disaster, therefore, is not merely the occurrence of a hazard but the interaction between hazards and vulnerability. According to the Intergovernmental Panel on Climate Change (IPCC, 2023), developing countries account for over 90% of global disaster-related losses, with rural and marginalized communities carrying the greatest burden due to limited adaptive capacity and high dependence on climate-sensitive livelihoods.

Climate resilience refers to the ability of communities to anticipate, prepare for, respond to, and recover from climate-related shocks while maintaining essential functions (IPCC, 2022). The United Nations Framework Convention on Climate Change emphasizes that building resilience requires integrating climate adaptation into development planning and strengthening local institutions. Resilience is therefore not just about surviving disasters but about improving livelihoods and reducing long-term vulnerability. However, across the world, climate-resilience interventions face long-standing challenges related to inadequate financing, weak institutional capacity, and limited community ownership. The United Nations Development Program (UNDP, 2020) notes that most local governments lack predictable funding streams for adaptation initiatives, leading to stalled or incomplete projects. In most countries, climate-resilience funding is often characterized by short project cycles, heavy donor conditions, and fragmented budgeting that rarely aligns with long-term needs (IPCC, 2022; OECD, 2021).

It is also important to distinguish between Disaster Risk Reduction (DRR) and disaster management/response: Disaster Risk Reduction (Proactive Approach) focuses on preventing or minimizing disaster impacts before they occur through preparedness, mitigation, and adaptation strategies. Whereas, Disaster Response (Reactive Approach) focuses on emergency actions taken after a disaster occurs, such as relief aid, food distribution, and temporary shelter. In many developing countries, including Zambia, more emphasis has traditionally been placed on disaster response rather than DRR. The United Nations Development Program argues that this reactive approach is costly and unsustainable, as it does not address underlying vulnerabilities. Shifting from response to DRR is essential for sustainable development, particularly in climate-vulnerable districts (OECD, 2021).

In the Southern Africa region, climate variability has already produced severe droughts and recurrent water scarcity, while some areas face risks of flooding during unpredictable rainfall events (SADC Climate Services Centre, 2023). These phenomena undermine food security, exacerbate poverty, and destabilize vulnerable communities. Adaptation requires not only national policies but also effective local-level interventions, community-based resilience building, and climate-smart infrastructure and services (IPCC, 2023). Besides, within sub-Saharan Africa, climate-resilience projects face acute constraints due to limited local revenue generation, heavy reliance on national transfers, and frequent delays in fund disbursement (AfDB, 2022).

Locally, climate change continues to pose significant threats to socio-economic and environmental stability in Zambia, with rural communities experiencing the greatest levels of vulnerability due to their heavy dependence on rain-fed agriculture, limited livelihood diversification, and inadequate access to climate-resilient infrastructure. Sinazongwe District in Southern Province is among the regions most

affected by recurrent droughts, erratic rainfall patterns, livestock diseases, and increasing soil degradation. These climate-related hazards have resulted in reduced crop yields, food insecurity, water shortages, and weakened household resilience, thereby reinforcing cycles of poverty and vulnerability. In response, the Constituency Development Fund (CDF) has become a key decentralized financing tool intended to support locally identified climate-adaptive interventions. Since 2022, the Government of the Republic of Zambia has substantially increased CDF allocations from K25.7 million in 2022 to an estimated K36.1 million in 2025, while national CDF budget allocations rose from K4.4 billion in 2023 to a projected K5.6 billion in 2025 (MLGRD, 2024; Auditor General’s Office, 2025). These expansions aim to strengthen local development, improve service delivery, and support climate resilience.

The Revised CDF Guidelines (2022–2024) further reinforce this agenda by mandating community-driven development and aligning with national disaster risk reduction (DRR) frameworks that require at least 2-5% of local financing to support climate-related disaster preparedness, mitigation, and adaptation activities (GRZ, 2022). Under these provisions, constituencies are mandated to prioritize projects such as water harvesting systems, irrigation development, soil conservation interventions, afforestation projects, climate-smart agriculture, and community emergency preparedness initiatives. This framework positions CDF as a potentially transformative tool for strengthening local adaptive capacity in climate-vulnerable districts like Sinazongwe. Through CDF, communities can invest in water infrastructure (such as boreholes, water reticulation, or solar-powered pumps), small-scale irrigation schemes, climate-smart agriculture, community drainage or flood mitigation, sanitation, disaster preparedness, and other DRR/CCA (climate change adaptation) interventions. Given the recurring droughts, water scarcity, and shifting weather patterns, such investments can significantly reduce vulnerability, improve water security, enhance food security, and build adaptive capacity, especially for poor, rural, and marginalized households (Mulenga & Chileshe, 2023). CDF’s inclusivity mandate (including women, youth, disabled, and vulnerable groups) aligns well with equitable resilience building.

However, despite these provisions, it remains uncertain whether increased CDF allocations have resulted in effective climate-resilience outcomes on the ground. Reports highlight progress in infrastructure projects, yet evidence is limited regarding whether interventions are climate-responsive, community-informed, or impact in reducing vulnerability (MLGRD, 2024). According to the statistics by Sinazongwe District Council from 2022-2025 reviewed low utilization and implementation of climate-resilience projects as shown in table 1 below:

Year	Total Allocation Per Constituency (K)	Allocation to Community Projects (Including Disaster 5%) (K)	Outcome/Results			Percentage (%)
			Total Amount Utilised (K)	Percentage (%)	Amount Allocated Direct to Climate-Resilience Projects (K)	
2022	25,739,910.92	14,671,749.22	12,193,884.00	83.1	1,806,738.00	14.8
2023	28,313,902.01	16,138,924.15	15,351,977.88	95.1	1,580,000.00	10.3
2024	30,6135,641.96	17,462,315.92	17,270,881.78	98.9	2,310,000.00	13.4
2025	36,058,828.63	18,684,677.92	17,966,737.97	96.2	3,444,700.00	19.2

Total	367,934,381.51	66,957,667.21	62,783,481.63	93.8	9,141,438	14.6
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Table 1

Between 2022 and 2025, Sinazongwe Town Council was disbursed with a total of K367.9 million in Constituency Development Fund (CDF). Of this amount, 66.9 million was allocated for community projects including 5% disaster component, and 62.8 million was spent on community projects, while 9.1 million was exclusively spent climate resilient projects. 93.8% versus 14.6% split indicates a strong preference for hardware community projects over climate resilience. While community projects drive immediate service delivery, the 14.6% allocation to resilience is below the 15 to 20% benchmarks observed in other districts facing similar climate shocks.

Sinazongwe is classified as a drought and flood prone under the Eighth National Development Plan (8NDP). The low resilience funding of 9.1 million limits capacity for climate adaptation, borehole rehabilitation, early warning systems, disaster risk reduction and food security interventions. This creates a risk that gains from community projects may be reversed by climate events over time.

Therefore, Sinazongwe District frequently affected by drought, livestock losses, and food insecurity, provided a critical context for analyzing the effectiveness of CDF-funded resilience initiatives, community participation, and implementation challenges.

1.1 Problem Statement

Climate change is increasingly exacerbating vulnerability and undermining livelihoods in Zambia, particularly in drought-prone regions such as Southern Province. According to the Intergovernmental Panel on Climate Change (2022), climate variability has intensified the frequency of extreme weather events, including droughts and erratic rainfall, which directly affect agriculture-dependent communities. Sinazongwe District, located in Agro-ecological Region I, is among the most climate-vulnerable districts in Zambia. The district is characterized by low and highly variable rainfall (approximately 700 mm annually), prolonged dry seasons, and frequent droughts. Evidence shows that the district has a greater than 70% probability of experiencing drought, making it one of the most at-risk areas in the country. Rainfall in the district is not only low but also erratic, with frequent dry spells lasting up to three weeks during the growing season, leading to poor agricultural yields and food insecurity (IPCC, 2022).

Recent climate events further demonstrate the severity of the problem. The 2023/2024 drought, described as one of the worst in over 40 years affecting 84 of 116 districts, resulted in crop losses exceeding 50% nationally, with Southern Province experiencing rainfall deficits of more than 50% below normal. Reports from the Zambia Statistics Agency and the Disaster Management and Mitigation Unit indicate that over 6 million people in Zambia were affected by drought in 2024 drought, particularly in Southern, Western, and parts of Lusaka Province (ZIPAR, 2024). This prompted the Government of the Republic of Zambia (GRZ) as at 29th February, 2024 to declare the country’s drought a national disaster and emergency; thereby highlighting the severity of climate shocks (DMMU, 2024). In addition to agricultural impacts, declining water levels in Lake Kariba, an important livelihood source for fishing communities, have further worsened vulnerability. Reduced inflows due to drought have led to significant drops in water levels, affecting fisheries and hydropower generation. This has cascading effects on household incomes, food security, and energy supply, highlighting the multi-sectoral nature of climate risks (DMMU, 2024). In this context, droughts and climate-related disasters are not isolated events, they are increasingly the norm. For communities in districts such as Sinazongwe, climate resilience is not optional but essential for survival and sustainable development. Therefore, the Constituency Development Fund (CDF) has been

identified as a potential mechanism to finance local climate resilience projects, such as water reticulation systems, irrigation schemes, and disaster preparedness interventions. To enhance local resilience, the Government of the Republic of Zambia (GRZ) revised the Constituency Development Fund (CDF) in 2022, expanding its budget from K1.6 million (before 2021) to K25.7 million in 2022, then to K28.3 million in 2023, and further to K30.6 million in 2024, with additional upward adjustments projected for 2025. The revised CDF Guidelines (GRZ, 2022) stipulate that 2%–5% of the fund must support Disaster Risk Reduction (DRR) and climate-related interventions, including water harvesting projects, irrigation schemes, early-warning systems, reforestation, sustainable agriculture, and climate-proof infrastructure. These guidelines emphasize community participation, environmental assessments, inclusive planning, and transparent procurement procedures before project approval and funding.

In Sinazongwe District, CDF has been actively utilized to implement community development projects. Between 2022 and 2024, a total of 57 CDF projects were implemented, and by 2025, 45 additional projects were completed and handed over. These projects have largely focused on the construction of health posts, school facilities, roads, and other community infrastructure aimed at improving service delivery. According to Auditor General's Report (2023), although some CDF committees approved small-scale irrigation, dams, and boreholes (such as 17 solar-powered mechanized water schemes and village-level water reticulation projects, with amounts ranging from K90, 000 to K276, 570 per project), many projects either stand at procurement, are constructed below standard, or fail due to poor maintenance (DMMU 2024; Auditor General's Report, 2023). As a result, vulnerable communities in Sinazongwe continue to experience water scarcity, reduced agricultural output, and livelihood insecurity, despite the availability of expanded CDF resources meant to address these climate stresses. Therefore, this study addressed this gap by analyzing how CDF is being utilized in building climate resilience for vulnerable communities of Sinazongwe District, basing its focus on the past three seasons (2022-2025).

1.2 Theoretical framework

1.2.1 Decentralization Theory

A theoretical framework provides the foundation upon which a study is anchored by explaining the key theories that guide the understanding and interpretation of the research problem. In this study, the focus was on analyzing how the Constituency Development Fund (CDF), as a decentralized financing mechanism, is utilized to build climate resilience in vulnerable communities. To adequately explain this relationship, the study was guided by Decentralization Theory, which emphasizes the transfer of authority, resources, and decision-making power from central government to local levels. This theory is particularly relevant in understanding how local governance structures influence the effectiveness of development interventions, including Disaster Risk Reduction (DRR) and climate resilience initiatives. Decentralization Theory, as articulated by Rondinelli (1981), refers to the systematic delegation of administrative, fiscal, and political authority from central governments to lower levels of government or local entities. The relevance of this theory to the Constituency Development Fund (CDF) lies in its emphasis on strengthening local governance structures, enhancing accountability, and promoting context-specific development interventions such as climate resilience projects (Dodman & Mitlin, 2015).

1.2.2 Rondinelli's Perspective on Decentralization (1981)

Rondinelli conceptualizes decentralization as a multi-dimensional process involving varying degrees of power redistribution. From this perspective, Rondinelli highlight three core dimensions that shape the effectiveness of decentralized governance: fiscal, administrative, and political decentralization.

Additionally, although not classified as decentralization types, accountability, transparency, and development outcomes are emphasized in both theorists' work and broader governance literature as essential elements for successful decentralization. Accountability and transparency ensure that project selection and implementation processes reflect community priorities, reduce misuse of funds, and enhance trust. When effectively implemented, decentralization is expected to foster more responsive governance, strengthen citizen participation, improve efficiency in public service delivery, and promote democratic local development as the positive developmental outcomes. Hence, Rondinelli's classification highlights how different forms of decentralization impact local autonomy and capacity to manage development initiatives. This perspective aligns closely with CDF implementation, where local structures receive varying degrees of authority to identify, allocate, and monitor community projects, including those that address climate-related vulnerabilities (Dodman & Mitlin, 2015).

1.2.3 Relevance and Application of Decentralization Theory to the Study

The theory is grounded in the principle that local authorities are closer to the citizens, better understand local needs, and can allocate resources more efficiently than centralized institutions (UNDP, 2020). It also emphasizes the importance of accountability, transparency, and community participation in decision-making. For this study, the framework links climate change adaptation, community participation, decentralized funding (CDF), and resilience outcomes. Decentralization theory helped explain how the availability of CDF resource (as a decentralized financing tool), empower communities, promote participation, improve service delivery, and strengthen climate adaptation as well as disaster risk reduction (DRR) interventions at the local level. The Decentralization Theory's components correlated with the current research questions and objectives that aimed to analyze the utilization of CDF for building climate resilience in vulnerable communities in Sinazongwe District. These are as follows:

- a) **Fiscal decentralization** involves allocation of financial resources to local authorities for expenditure on locally prioritized projects. The CDF in Zambia embodies principles of fiscal decentralization where constituencies are empowered to allocate funds to local development projects, including climate resilience initiatives such as water harvesting, small-scale irrigation, and disaster preparedness programs. Decentralization Theory suggests that local authorities should prioritize projects that reflect the immediate needs of communities. In the context of Sinazongwe, where droughts and water scarcity are prevalent, CDF resources are expected to fund climate-resilient projects such as irrigation systems, water harvesting structures, and drought-resistant agriculture. However, if CDF projects are predominantly focused on general infrastructure (e.g., schools and clinics) without integrating climate considerations, this indicates a disconnect between decentralization objectives and actual practice (OECD, 2021; UNDP, 2020).
- b) **Administrative decentralization** relates to the local capacity to plan, implement, monitor, and evaluate development initiatives. The theory also acknowledges that decentralization may face challenges, including: Limited technical expertise at local level, political interference in project selection, weak accountability mechanisms, and misallocation of resources (OECD, 2021). This dimension is crucial in Sinazongwe, as these challenges may hinder the effective use of CDF for climate resilience, despite the availability of funds. The study therefore examines institutional and governance barriers that affect the translation of decentralized funding into meaningful resilience outcomes, thereby answering the research question of this study; "What are the key governance and implementation challenges affecting CDF funded climate projects in Sinazongwe District?"

- c) **Political decentralization** entails empowering local leaders and communities including women, youth, and vulnerable groups, to participate in decision-making processes. A central principle of Decentralization Theory is participatory governance (IPCC, 2022). This is reflected in community involvement in project identification, prioritization, and oversight; - a major variable in assessing the effectiveness of CDF-funded climate adaptation interventions. The theory assumes that communities actively participate in identifying and prioritizing development projects. In this study, the level of community involvement in CDF decision-making processes is examined to determine whether vulnerable groups in Sinazongwe are influencing the selection of climate resilience interventions. Limited participation may result in misaligned priorities and reduced effectiveness of CDF in addressing climate risks.
- d) **Accountability, Transparency and Outcome:** Accountability and transparency ensure that project selection and implementation processes reflect community priorities, reduce misuse of funds, and enhance trust. Hence, these determine whether CDF projects adhere to guidelines, including reporting, monitoring, and alignment with DRR/Climate Change objectives. When effectively implemented, decentralization outcome finally analyzes whether local control over resources and participation translates into effective climate resilience outcomes, such as improved water supply, enhanced agricultural productivity, and disaster preparedness (IPCC, 2022). Since Decentralization Theory predicts that devolved resources improve service delivery and development outcomes; in this case, the study evaluates whether CDF-funded projects enhance: Adaptive capacity (e.g., improved farming practices); disaster preparedness (e.g., early warning systems); and livelihood security. If resilience outcomes remain low despite increased funding, it suggests weaknesses in decentralized governance, such as poor planning, limited technical capacity, or inadequate monitoring.

In addition, Decentralization Theory is highly relevant to climate change adaptation and Disaster Risk Reduction (DRR) because: Climate risks are location-specific, requiring localized solutions; community knowledge (including indigenous knowledge) is critical for adaptation; and timely decision-making is essential in responding to climate hazards. The United Nations Development Program emphasizes that decentralized governance systems are essential for effective climate adaptation, as they enable integration of local knowledge and priorities into development planning. Thus, the theory supports the idea that CDF, if effectively managed, can serve as a powerful tool for building climate resilience at the community level (OECD, 2021; UNDP, 2020).

1.3 Conceptual Framework

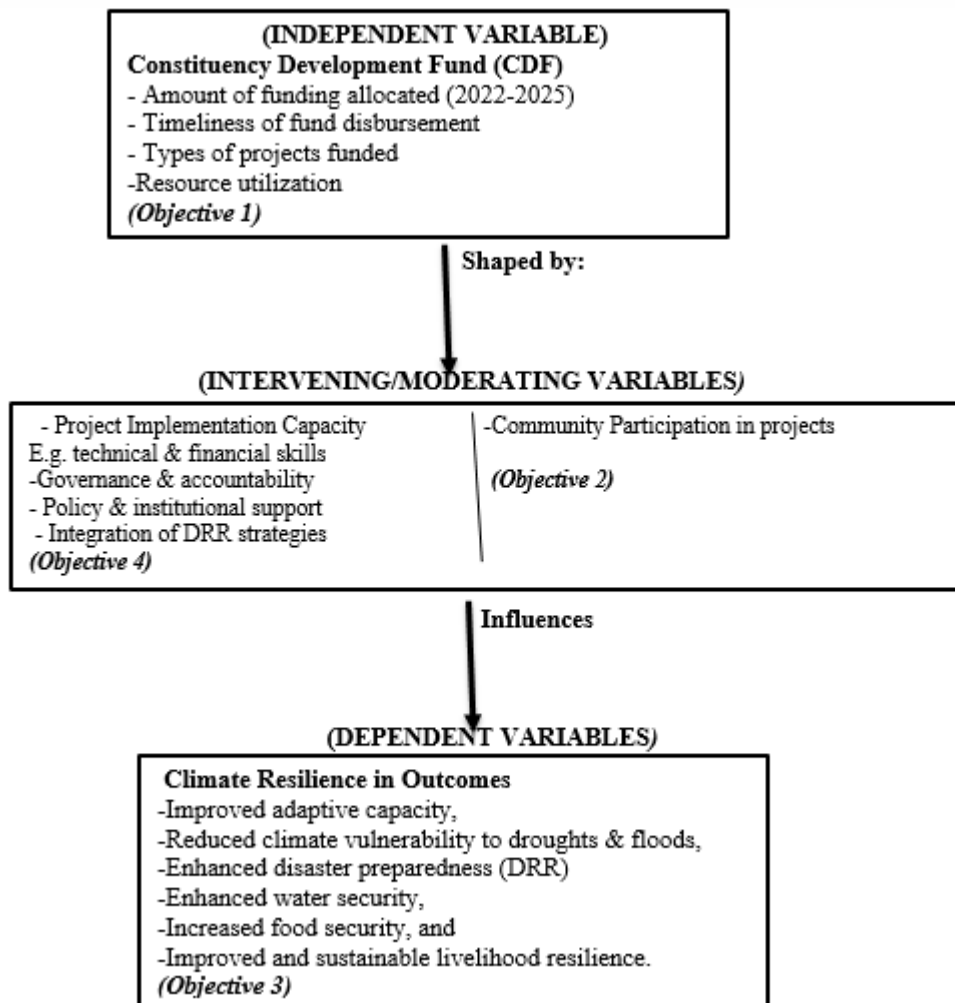


Figure 1: Conceptual Framework

This framework underlines that the effectiveness of CDF-funded projects is contingent upon the principles of decentralization: appropriate allocation of financial resources, active community participation, robust local governance, and administrative capacity. This study conceptualizes that CDF utilization (independent variable) directly influences climate resilience outcomes (dependent variable) in vulnerable communities such as Sinazongwe District. CDF is expected to finance both structural (e.g., irrigation, boreholes) and non-structural (e.g., early warning systems, training) interventions. However, this relationship is not direct; it is shaped by several intervening variables, which determine whether CDF effectively translates into resilience. When these elements function well, they are expected to increase the adaptive capacity of communities to climate variability and shocks. Hence, the framework is particularly suitable for Sinazongwe District because it links financial resources (CDF) with participatory governance and resilience outcomes, allowing for both qualitative and quantitative analysis of project effectiveness over 2022–2025.

2. LITERATURE REVIEW

Based on the available literature at global, regional, and local level, the following themes were identified:

2.2.1 Climate Hazards and Livelihood Impacts

Globally, studies on climate resilience and Disaster Risk Reduction (DRR) demonstrate that climate-

related hazards have increased significantly in frequency and intensity, necessitating proactive and well-financed interventions. Evidence shows a significant increase in climate-related disasters globally. According to the Food and Agriculture Organization and the World Meteorological Organization (2020), more than 11,000 weather-related disasters occurred over the past 50 years, resulting in approximately 2 million deaths and US\$3.6 trillion in economic losses. Similarly, recent FAO (2025) findings indicate that disasters have caused US\$3.6 trillion in agricultural losses globally over the last three decades, disproportionately affecting vulnerable communities dependent on agriculture. These studies demonstrate the scale of global vulnerability and the need for effective resilience strategies.

Regionally, empirical evidence from Sub-Saharan Africa also demonstrates that climate change is significantly affecting livelihoods, particularly in agriculture-dependent communities. A study by Phetole Donald Semosa (2025) examined climate change impacts on agriculture in Southern African Development Community (SADC) countries, including Zambia, Zimbabwe, Malawi, and South Africa. The study found that: Rising temperatures and erratic rainfall patterns significantly reduce agricultural productivity; most countries rely on rain-fed agriculture, making them highly vulnerable to climate variability; and drought frequency has increased, threatening food security and rural livelihoods. Similarly, Ayansina Ayanlade et al. (2024) documented that extreme climate events such as droughts, floods, and heatwaves are causing loss and damage across multiple sectors, including agriculture, water, and health, thereby increasing poverty and vulnerability across Africa. These studies confirm that climate hazards in Africa are systemic and recurring, rather than isolated events, with severe implications for livelihoods.

At the national level, Zambia provides important empirical evidence on climate change impacts, Disaster Risk Reduction (DRR), and climate resilience interventions. Studies consistently show that the country is highly vulnerable to climate variability, particularly droughts and erratic rainfall, which severely affect agriculture-dependent livelihoods. A study by Ngoma, Hachigonta, and Sithole (2019) examined climate variability in Southern Zambia and found that rainfall has become increasingly erratic over the past four decades, with frequent dry spells negatively affecting maize production, the country's staple crop. More recently, the Zambia Meteorological Department (2024) reported that the 2023/2024 rainfall season was 35–45% below normal, making it one of the worst droughts in over 40 years. The drought affected over 6 million people nationally, with Southern Province being the most affected. In Sinazongwe District specifically, empirical observations show: Reduced maize yields and crop failure; declining water levels in Lake Kariba affecting fishing livelihoods; and increased reliance on relief food assistance. These studies clearly demonstrate that climate hazards are a major driver of livelihood vulnerability in Zambia.

2.2.2 Conceptualizing Climate Resilience and Decentralized Funding

Understanding how local finance instruments can support climate resilience requires two linked conceptual strands: first, a working definition of climate resilience and how it is operationalized in development practice; and second, the rationale and evidence for decentralized climate finance that is, transferring funding and decision-making to local levels to support adaptation. The Intergovernmental Panel on Climate Change (IPCC) frames climate-resilient development as a process that integrates adaptation and mitigation options with development choices to sustain human well-being and reduce vulnerability to climate hazards (IPCC, 2022). Resilience is therefore multidimensional; - social, economic, ecological, and measured by the capacity of systems to anticipate, absorb, adapt to, and recover from shocks. This conceptualization has shifted the emphasis from reactive disaster response to proactive investments that reduce exposure and strengthen adaptive capacity.

Global reviews emphasize that many adaptation decisions and benefits occur at local scales (household, community, and city). Local actors typically have contextual knowledge of climate risks and are better placed to identify feasible, cost-effective interventions (e.g., rainwater harvesting, small-scale irrigation, and agroforestry). Decentralization Theory (Rondinelli, 1981; Smith, 1985) posits that transferring responsibilities, resources, and decision-making powers from central government to local structures improves responsiveness and resource allocation efficiency. According to Rondinelli (1981), decentralization enhances local decision-making and ensures that development initiatives respond to locally felt needs. Fiscal decentralization, in particular, enables local governments to prioritize spending based on community needs. Empirical studies across various regions show that resilience is heavily dependent on both local institutional strength and the availability of flexible funding mechanisms that allow communities to design context-specific responses (Dodman & Mitlin, 2015).

In Asia and Latin America, decentralized funding frameworks have been shown to improve climate project implementation by increasing community participation, accelerating decision processes, and aligning interventions with local knowledge (Agrawal & Ribot, 2014). For example, studies from Nepal's Local Adaptation Plans of Action (LAPA) demonstrate that funds allocated directly to communities strengthen early warning systems, water infrastructure, and sustainable agriculture by empowering local institutions to decide priorities (Silva et al., 2019). Similarly, in India, the District Mineral Foundation Fund and Mahatma Gandhi NREGA initiatives show that decentralizing resources enhances climate-smart agriculture, water harvesting, and environmental rehabilitation (Chattopadhyay & Agarwal, 2021). However, global evidence also highlights challenges: weak accountability structures, limited technical capacity, and inconsistent financial disbursement often undermine the effectiveness of decentralized climate financing mechanisms (OECD, 2021; UNDP, 2020).

In Sub-Saharan Africa, climate resilience is a pressing development priority due to recurrent droughts, floods, and extreme temperatures across the region. Empirical studies highlight that decentralized climate finance mechanisms, such as Kenya's County Climate Change Funds (CCCFs) and Ethiopia's Climate-Resilient Green Economy (CRGE) Facility, have improved local infrastructure, rangeland management, and livelihood diversification when communities are engaged in planning and budgeting (Carter et al., 2019; Tessema et al., 2021). Kenya's CCCF model in particular has demonstrated strong evidence that community-driven decision-making increases the relevance and sustainability of climate interventions (World Bank, 2020). Funded projects include water pans, drought-resistant crops, and livestock markets that reduce vulnerability during climate shocks. Importantly, funds are legislated at the county level, ensuring transparency and ring-fencing of climate budgets. Additionally, in West Africa, Ghana and Senegal show that decentralized resource allocation enhances climate adaptation in agriculture, especially when local governments partner with farmer groups and civil society (Nyantakyi-Frimpong & Bezner Kerr, 2017). Yet, regional studies also expose persistent challenges: limited financial autonomy among district councils, delays in fund disbursement from central governments, inadequate monitoring tools, and shortages of qualified technical staff (AUDA-NEPAD, 2021).

In Zambia, climate resilience is framed within national adaptation priorities, which emphasize decentralized implementation through local authorities and community structures (Ministry of Green Economy and Environment, 2021). District-level experiences show increasing reliance on devolved funding mechanisms such as the Constituency Development Fund (CDF), which has been expanded to support locally driven development and resilience-building initiatives. Empirical studies on Zambia's decentralization reforms highlight that enhancing local autonomy and financial transfer increases the

relevance of community-level projects, including irrigation schemes, feeder roads, reforestation, and livelihood diversification programs (Mbao & Phiri, 2022). In rural districts of Southern, Western, and parts of Eastern Provinces, research shows that communities prioritize climate-related investments such as borehole drilling, dip tanks, small dams, and conservation agriculture when given authority to determine local needs (Chitonge & Mfuno, 2021). Sinazongwe District specifically, situated within Zambia's drought-prone Southern Province, faces recurrent climate hazards that necessitate resilient local infrastructure and community-based adaptation initiatives. Research in Southern Province shows that local governments increasingly depend on decentralized funding, including CDF; for climate-related projects such as water harvesting, fishery restoration, and environmental protection (Ziba & Chikuba, 2022). However, studies focusing on climate adaptation financing reveal mixed results. On one hand, district councils report improved community participation and timely problem identification under decentralized arrangements (GRZ/UNCDF, 2020). On the other hand, constraints such as bureaucratic delays, insufficient technical officers, limited climate-specific expertise, and gaps in transparent monitoring systems weaken the overall effectiveness of climate resilience interventions at local level (Mulenga & Banda, 2023).

2.2.3 Types of Climate Resilience Projects and DRR Interventions

2.2.3.1 Early Warning Systems (EWS)

Early Warning Systems (EWS) are among the most extensively studied and empirically validated DRR interventions globally. A study by the World Bank (2024) shows that: Universal access to EWS could reduce disaster-related losses by US\$35 billion annually; and that approximately one-third of the global population still lacks access to EWS. Similarly, Beaudet et al. (2025), in a World Bank study, found that households receiving early warnings are more likely to adopt preventive measures and experience significantly lower casualty rates during disasters. In countries such as Bangladesh and India, early warning systems have significantly reduced mortality from cyclones and heatwaves through timely alerts and preparedness measures (World Bank, 2023). Empirical synthesis by Lumbroso (2018) and Rokhideh et al. (2025) further shows that about 60% of studies report significant positive impacts of EWS and DRR interventions, including: Reduction in crop losses by 5–30%; as well as improved preparedness and food security outcomes. In practice, FAO-led projects in countries such as Dominica and Somalia demonstrate that integrating EWS with agricultural advisory services improves farmers' ability to anticipate climate shocks and adopt coping strategies (FAO, 2025). According to the Food and Agriculture Organization (2025), early warning combined with anticipatory action significantly reduces disaster impacts on agriculture and livelihoods; and that people-centered early warning systems improve resilience among vulnerable populations. These findings are reinforced by global initiatives such as the "Early Warning for All" program, which emphasizes proactive rather than reactive disaster management.

Regionally, early warning systems are also considered as critical DRR tools. A study by L Nhamo, T Mabhaudhi, and AT Modi (2019) assessed drought resilience in Southern Africa and found that: Rainfall has declined by 26% between 1960 and 2007, while aridity increased by 11%; existing early warning systems are largely reactive, focusing on monitoring rather than forecasting; and that lack of forecasting capacity limits preparedness and leads to delayed responses. In another study, Masego M. et al. (2025) found that indigenous early warning indicators, such as observing vegetation changes, animal behavior, and wind patterns, play a crucial role in improving disaster preparedness in rural South African

communities. However, these indigenous systems are often not integrated into formal early warning frameworks.

At nation level, a study by Phiri, Chipeta, and Banda (2021) assessed DRR implementation in Zambia and found that: DRR systems are largely reactive rather than preventive; early warning systems exist but are poorly disseminated at community level; and only about 30–40% of district officials actively integrate early warning information into planning. Similarly, Musonda (2018) found that although Zambia has established the Disaster Management and Mitigation Unit (DMMU), most interventions focus on emergency relief rather than long-term risk reduction. These findings are consistent with Simatele and Simatele (2015), who argue that DRR in Zambia is constrained by weak coordination, limited funding, and low community engagement.

2.2.3.2 Climate-Resilient Agriculture

Globally, climate-smart agriculture (CSA) has been widely studied as a resilience strategy. FAO (2022) reports that integrating climate-resilient practices such as crop diversification, soil conservation, and water management, significantly improves agricultural productivity and reduces vulnerability to climate shocks. It has also been shown that combining CSA with climate information services enhances farmers' decision-making and resilience outcomes (FAO, 2022).

Moreover, climate-smart agriculture (CSA) is one of the most widely studied resilience strategies in Sub-Saharan Africa. A study by Getu Mitiku Bekuma (2024) in Ethiopia found that CSA practices such as crop diversification, agroforestry, and conservation agriculture, significantly improved productivity, income stability, and resilience among smallholder farmers. Similarly, regional analyses indicate that promoting drought-resistant crops, irrigation, and improved farming techniques can stabilize food production and reduce vulnerability to climate shocks. However, adoption remains constrained by limited access to finance; weak extension services; and poor institutional support (FAO, 2022).

Locally, a study by Thierfelder et al. (2017) on conservation agriculture in Zambia found that: Minimum tillage and crop rotation improved yields by up to 60% in drought years; soil moisture retention increased significantly; and that farmers practicing climate-smart agriculture were more resilient to rainfall variability. However, adoption remains limited due to high labor requirements, limited access to inputs, and inadequate extension services. Additionally, Musole and Panda (2020) found that irrigation development in Zambia significantly enhances agricultural resilience, but: Less than 20% of irrigation potential is currently utilized; and many rural communities lack access to functional irrigation infrastructure. This limits adaptive capacity in drought-prone regions such as Southern Province.

2.2.3.3 Climate-Resilient Infrastructure

Globally, the World Bank has conducted multiple studies demonstrating that investments in climate-resilient infrastructure significantly reduce disaster risks. For example: Flood protection systems reduce economic losses in high-risk areas; irrigation infrastructure enhances agricultural resilience in drought-prone regions; and transport systems designed for extreme weather improve connectivity during disasters. These studies highlight the importance of combining “gray infrastructure” (engineering solutions) with “green infrastructure” (ecosystem-based approaches) (World Bank, 2024). Moreover, studies further show that investments in irrigation systems, flood control infrastructure, and climate-resilient roads, have significantly reduced vulnerability in several African countries. For example: Irrigation schemes in Ethiopia and Kenya have improved food production in drought-prone areas; and also flood management systems in Mozambique have reduced disaster losses. However, infrastructure gaps remain significant due to limited financial resources and weak institutional capacity (World Bank, 2024).

2.2.4 Financing Mechanisms for Climate Resilience

2.2.4.1 Global Climate Finance

Global climate resilience efforts are supported by various financing mechanisms, including: Green Climate Fund (GCF); Adaptation Fund; and Global Environment Facility (GEF). The World Bank (2024) reports that approximately US\$63 billion was invested in adaptation globally between 2021 and 2022, although this remains far below the estimated US\$212 billion needed annually by 2030. These funds provide grants and concessional financing to developing countries for climate resilience projects.

2.2.4.2 Disaster Risk Financing and Insurance Mechanisms

Global empirical studies show that risk financing mechanisms such as insurance and contingency funds: Reduce economic losses from disasters; support rapid recovery; and enhance household resilience. The Global Facility for Disaster Reduction and Recovery (GFDRR), supported by the World Bank, has funded over 400 resilience projects across 136 countries, focusing on: Early warning systems, resilient infrastructure, and disaster risk management planning. This demonstrates the importance of targeted financing for DRR. Global strategies also include: Climate risk insurance schemes, catastrophe bonds, and social safety nets. These mechanisms help countries and communities absorb shocks and recover quickly from disasters (World Bank, 2023).

Regionally, financing remains a major constraint in climate resilience. Studies across Sub-Saharan Africa show that: Climate adaptation requires investment in irrigation, early warning systems, and infrastructure; many countries rely heavily on external funding from development partners; domestic financing for DRR and adaptation is often limited. Hence, these financing mechanisms for climate resilience include: (a) Regional and Continental Initiatives; - the African Union has established initiatives such as: African Multi-Hazard Early Warning System (AMHEWAS), as well as Africa Drought Watch. These initiatives support early warning, preparedness, and coordinated responses across countries. (b) International Climate Finance; -Sub-Saharan Africa receives funding from global mechanisms such as: Green Climate Fund (GCF), Adaptation Fund, as well as Global Environment Facility (GEF). However, evidence shows that Africa receives less than 1% of global climate finance, despite its high vulnerability. (c) Development Partner Support; -Development agencies such as the World Bank and United Nations Development Program support: Climate-smart agriculture, disaster risk management programs. And infrastructure development. These interventions have contributed to resilience-building but often depend on external funding, raising sustainability concerns (IIED, 2020).

Locally, CDF is a key decentralized financing mechanism in Zambia aimed at promoting local development. However, a study by Chisanga and Banda (2021) found that: Over 70% of CDF projects are infrastructure-based (schools, clinics, roads); less than 20% of projects address environmental sustainability or climate resilience; and community awareness of climate-related CDF projects is very low. Similarly, Mwanza (2022) observed that although CDF allocations have increased significantly (up to K25–30 million per constituency annually), there is limited evidence that these funds are strategically used for climate adaptation. Beyond CDF, Zambia utilizes several financing mechanisms: (a) Government DRR Funding; -The Disaster Management and Mitigation Unit (DMMU) provides funding for disaster response. However, Phiri et al. (2021) found that, most funding is directed toward emergency relief; and preventive DRR receives limited financial allocation. (b) International Climate Finance; -Zambia also receives support from Green Climate Fund (GCF), Global Environment Facility (GEF), and Adaptation Fund . (c) NGO and Donor Projects; -Organizations such as the UNDP and FAO also support climate-

smart agriculture, water resource management, and community resilience programs. However, these projects are often pilot-based and not fully scaled up nationwide (Adaptation Fund, 2024).

2.2.5 Community Engagement and Participation in Climate Projects

Community engagement and meaningful participation are fundamental to the success of locally financed adaptation. Participation is not only a normative requirement (inclusivity, or equity) but also a practical determinant of project relevance, ownership and sustainability. According to International literature on locally led adaptation (LLA) and community-based adaptation (CBA) consistently finds that community participation yields higher adoption rates, improved local appropriateness, better use of indigenous knowledge, and greater sustainability (UNDP, 2023). Participatory planning increases the likelihood that interventions respond to actual needs and that communities invest in maintenance and stewardship. According to Pretty (1995), participation in development occurs in levels ranging from passive involvement to full empowerment. Climate resilience literature indicates that community-led adaptation strategies yield more sustainable outcomes than top-down interventions (Adger, 2003). For example; Studies from Kenya, Bangladesh, and Nepal show that community participation in identifying resilient infrastructure (such as embankments, water points, and irrigation micro-systems) significantly improves adaptation success (UNDRR, 2020).

However, evidence from multiple African settings warns that “participation” can be tokenistic. Common problems include elite capture, lack of representation of women/youth/disabled persons, limited transparency of selection processes, and insufficient feedback mechanisms. When participatory processes are weak, the most vulnerable are often excluded from benefits (World Bank, 2022). Therefore, decentralized governance bodies working in tandem with local civil society, transparent procurement procedures, and inclusive community engagement frameworks tend to enable better participation outcomes (UNDP, 2023).

Based on policy provisions for participation, Zambia’s revised CDF Guidelines (2022) explicitly require public participation in project identification and prioritization, and mandate that CDF committees include community representatives for project selection. The Guidelines also suggest gender and youth inclusivity (MLGRD, 2022). Civil society monitoring and media reports indicate variable implementation: some constituencies demonstrate robust processes and transparent project lists, while others show weak participation and limited public disclosure (CUTS Lusaka, 2023). Hence, practical barriers exist. Reports from NGOCC (2023) and ZIPAR (2022) show that citizen involvement is limited by: low awareness of CDF programming; elite capture; insufficient representation of women, youth, and persons with disabilities; and bureaucratic procedures that discourage participation.

2.3 Gaps in Literature

Globally, the United Nations Office for Disaster Risk Reduction (2022) emphasizes that proactive DRR investments are more cost-effective than reactive disaster response. However, empirical studies show a persistent focus on response rather than prevention. For instance, Hallegatte (2016) found that many developing countries underinvest in preventive DRR despite clear economic benefits. In Zambia, Phiri et al. (2021) found that most disaster management interventions are reactive, focusing on relief rather than risk reduction. Additionally, only a limited number of districts actively utilize early warning systems. Hence, there is limited integration of DRR strategies into decentralized funding mechanisms such as CDF. Therefore, there is need to identify the governance and implementation challenges affecting CDF funded climate initiatives in Sinazongwe District.

Lastly, most studies in Zambia are conducted at national level, with limited focus on specific districts. For example: Mulenga et al. (2020) focused on national agricultural adaptation trends; as well as Phiri et al. (2021) examined DRR at broader levels. However, there is little empirical research specifically focused on Sinazongwe District, despite its high vulnerability to drought and water scarcity. Therefore, this gap justified the focus of this study on Sinazongwe District to provide context-specific evidence by “Analyzing the Utilization of the Constituency Development Fund (CDF) for Building Climate Resilience in Vulnerable Communities: A Case of Sinazongwe District, Southern Province, Zambia.”

RESEARCH METHODOLOGY

The researcher adopted a descriptive case study design with a mixed-methods approach to conduct a research on the community members/beneficiaries; and key informants (such as WDCs, DMMU officers, CDFC, Satellite disaster committee, and traditional leaders). The case study design is appropriate because it allows for an in-depth examination of how the Constituency Development Fund (CDF) is utilized in Sinazongwe Constituency to address climate change and promote sustainable development. Both random and non-random (purposive or non-probability) sampling procedures were used in choosing the respondents for this study. The sample size for this study was determined using the Yamane Formula, which is widely used for calculating sample sizes in social science research when the population size is known. Hence, a sample size of 120 respondents was used for this study. Prior to conducting the research, the researcher obtained permission from all levels of authority and maintain ethical considerations. The researcher then employed the semi-structured questionnaires to community members/beneficiaries, designed with likert-scale questions, multiple-choice, and open-ended questions to gather quantitative data; as well as the conduction of interviews using the semi-structured interview guide on the CDF committee members, WDCs, and government officials, to gather in-depth qualitative insights; and FGD held with community groups to understand collective perceptions, challenges, and recommendations regarding CDF and sustainable development. This collected data was then analyzed through both quantitative and qualitative methods for results. The quantitative data from the semi-structured questionnaires was analyzed using the Statistical Package for Social Sciences (SPSS) to generate simple descriptive statics in form of frequencies and percentages. Then, the qualitative data from the semi-structured interviews and FGDs was analyzed through thematic and content analysis.

Study Group	Sampling Technique	Estimated Sample
Community members	Simple random	70
WDC members	Purposive	20
Local authority officials	Purposive	10
CDFC members	Purposive	10
Traditional leaders	Purposive	5
Implementers/contractors	Purposive	5

Table 2

4. PRESENTATION OF FINDINGS

This chapter presents the findings of the study carried out in vulnerable communities of Sinazongwe District. The purpose of the study was to analyze the utilization of the Constituency Development Fund (CDF) for building climate resilience in vulnerable communities of Sinazongwe District, Southern Province of Zambia. The findings from the administered semi-structured questionnaires on the community

members were presented under quantitative data, whereas the findings from the semi-structured interviews, and focused group discussions conducted on WDCs, government officials, and community groups, were presented under qualitative data respectively. This was aimed at answering the following question: What are the key governance and implementation challenges affecting CDF funded climate projects in Sinazongwe District?

4.1 QUANTITATIVE DATA

4.1.1: The Key Governance and Implementation Challenges Affecting CDF Funded Climate Projects in Sinazongwe District

This research question sought to identify the governance, institutional, financial, and operational challenges affecting the implementation of Constituency Development Fund (CDF) funded climate resilience and Disaster Risk Reduction (DRR) interventions in Sinazongwe District. It aimed at establishing the major barriers limiting the effectiveness, sustainability, transparency, and impact of climate-related projects funded through CDF. Hence, respondents were asked to identify the major challenges affecting implementation of climate resilience projects funded through CDF, and their responses were as follows:

4.1.2. Major Challenges Affecting CDF Climate Projects

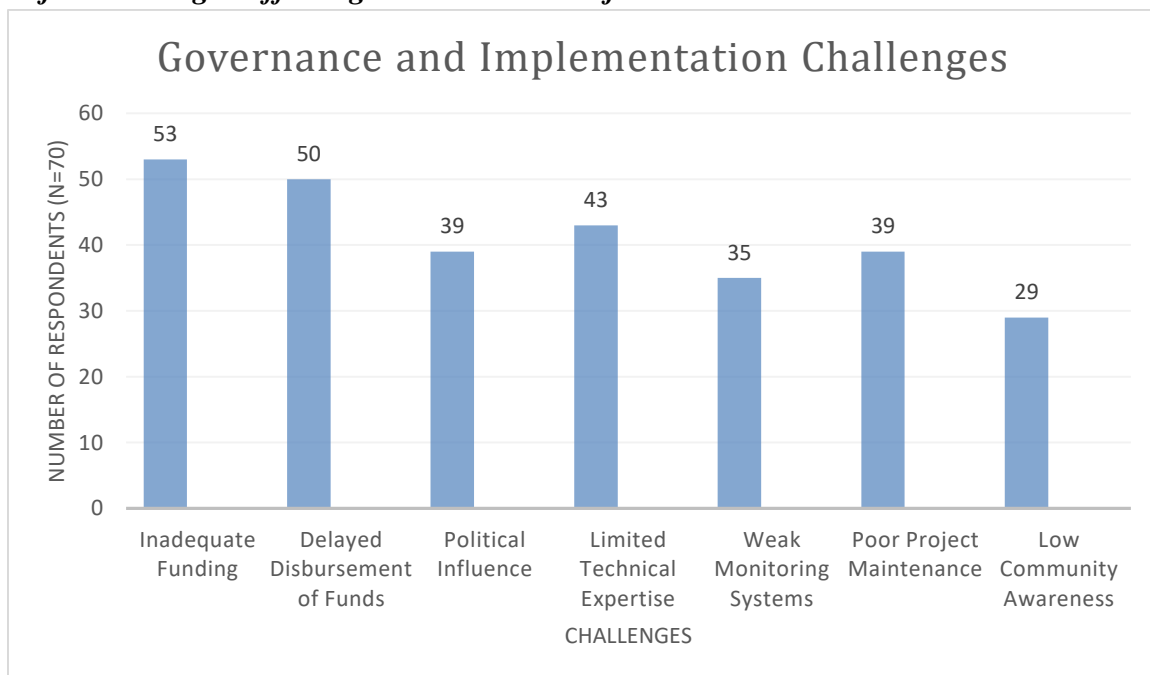


Figure 2

The findings in figure 2 reveal that inadequate funding was the most significant challenge affecting implementation of climate resilience projects in Sinazongwe District, as indicated by 75.7% (53/70) of respondents. Respondents explained that although climate-related challenges such as droughts, water scarcity, and food insecurity continued increasing, the available CDF resources remained insufficient to adequately address community needs. The findings suggest that many communities required: More boreholes; expanded irrigation systems; water harvesting infrastructure; disaster preparedness programs; and climate-smart agricultural support. However, funding limitations restricted the scale and coverage of these interventions. Delayed disbursement of funds was identified by 71.4% (50/70) of respondents as another major challenge. Respondents explained that delays in release of funds often slowed project

completion and affected implementation schedules. Respondents further indicated that delays in release of funds negatively affected: Project implementation timelines; completion rates; and continuity of interventions. Limited technical expertise was also identified as a major problem by 61.4% (43/70), especially in planning climate-specific interventions such as: Irrigation systems; water harvesting infrastructure; and climate adaptation projects. The findings therefore imply that limited technical capacity reduced the quality and sustainability of climate resilience interventions.

The findings also revealed that political influence 55.7% (39/70) and elite dominance sometimes affected project prioritization and allocation decisions, leading to concerns regarding fairness and transparency. Respondents indicated that certain projects were selected based on political interests rather than climate vulnerability levels. This finding suggests weaknesses in governance and accountability within decentralized funding processes. Further, the findings indicate that lack of maintenance funding 55.7% (39/70), was one of the most significant sustainability challenges affecting climate resilience projects. Respondents explained that several projects, particularly boreholes and water systems, experienced operational problems because: Repair systems were weak; maintenance funds were unavailable; and technical support was inadequate. Delayed repairs were also identified as a major challenge. Respondents indicated that some infrastructure remained non-functional for long periods after breakdowns. The findings therefore suggest that sustainability planning remained weak within CDF project implementation processes. This reduced the long-term impact of resilience interventions. The study further examined how low community awareness and limited participation affected project implementation. The findings indicate that many community members lacked adequate knowledge as shown by 41.4% (29/70) regarding: CDF procedures, budget allocations, climate resilience objectives, and monitoring systems. The findings therefore imply that weak communication and participation systems reduced effective community ownership and accountability.

4.2 QUALITATIVE FINDINGS

This section presents the qualitative findings on the climate resilience projects and Disaster Risk Reduction (DRR) interventions funded through the Constituency Development Fund (CDF) in Sinazongwe District between 2022 and 2025. The findings were obtained through semi-structured interviews conducted with: District officials, WDCs, and Traditional leaders; as well as from the Focused Group Discussions (FGDs) conducted with community groups. The qualitative findings provided deeper understanding regarding: The types of projects implemented; reasons for prioritizing specific projects; community perceptions regarding climate-related challenges; the extent to which projects addressed vulnerability and disaster risks; and gaps in climate resilience planning and implementation. Hence, the qualitative findings are presented according to the research questions of the study and are organized into several themes that emerged from the analysis of interview responses. Moreover, precise quotations from participants have been included to support the findings.

4.2.1: The Key Governance and Implementation Challenges Affecting CDF Funded Climate Projects in Sinazongwe District

4.2.1.1 Theme 1: Inadequate Funding for Climate Resilience Interventions

One of the major themes that emerged from the interviews was inadequate funding for climate resilience and Disaster Risk Reduction interventions. Most participants explained that although climate-related challenges such as droughts, water scarcity, crop failure, and food insecurity were increasing, the available CDF resources remained insufficient to adequately address community needs. A district official explained:

“The demand for climate resilience projects is very high, but the available funds cannot adequately cover all vulnerable communities.”

Similarly, a Ward Development Committee member stated:

“Many communities need boreholes, irrigation systems, and water harvesting facilities, but funding limitations affect implementation.”

Participants further explained that due to limited resources, many climate-related projects either: Covered only a few communities; were implemented partially; or experienced delays in completion. The findings therefore indicate that inadequate funding significantly limited the scale, effectiveness, and coverage of climate resilience interventions in Sinazongwe District. The study further established that competing development priorities such as: School construction, health facilities, and road rehabilitation, often reduced the amount of CDF resources directed specifically toward climate adaptation and DRR initiatives. This suggests that climate resilience interventions were competing with other urgent community development needs within the district.

4.2.1.2 Theme 2: Delayed Disbursement of CDF Funds

Another important theme that emerged was delayed disbursement of CDF funds. Participants explained that despite the increased CDF funds, delays in release of funds negatively affected: Project implementation schedules, procurement processes, completion timelines, and seasonal climate interventions. A district official stated that:

“Delayed funding affects timely implementation of projects, especially agricultural and water-related interventions that depend on seasons.”

Similarly, an agricultural officer explained:

“When funds are delayed, some projects miss the farming season and their impact becomes reduced.”

Respondents further explained that delayed funding sometimes caused: Suspension of projects, increased implementation costs, and loss of community confidence. The findings therefore suggest that delayed disbursement weakened the efficiency and effectiveness of climate resilience interventions, particularly projects requiring urgent implementation before drought periods.

4.2.1.3 Theme 3: Political Influence in Project Selection and Allocation

Another major theme that emerged from the findings was political influence in project selection and resource allocation. Many respondents explained that political actors sometimes influenced: Prioritization of projects; allocation of resources; selection of beneficiary communities; and decision-making processes. One respondent explained:

“Some projects are implemented in areas that are politically favored or inclined to the ruling party rather than areas with the highest climate vulnerability.”

Participants further explained that political influence occasionally undermined fairness and transparency in project implementation. A Ward Development Committee member explained:

“There are situations where communities propose important climate projects, but other projects are prioritized because of political pressure.”

The findings therefore indicate that political interference affected equitable allocation of climate resilience resources. This suggests that governance weaknesses reduced the effectiveness of decentralized development processes and weakened community trust in CDF systems.

4.2.1.4 Theme 4: Limited Technical Expertise and Capacity

The study further established that limited technical expertise affected implementation of climate resilience

projects. Participants explained that local committees and some implementing structures lacked sufficient technical knowledge in areas such as: Climate adaptation planning; disaster Risk Reduction; irrigation design; water harvesting systems; environmental management; and climate-smart agriculture. An agricultural officer explained:

“There is still limited technical capacity in climate adaptation planning at local level. Some committees do not have specialized knowledge on climate resilience and DRR integration.”

Respondents further explained that limited technical expertise affected: Quality of project planning, sustainability of interventions, as well as monitoring and evaluation processes. The findings therefore suggest that institutional and technical weaknesses reduced the overall effectiveness of CDF-funded climate interventions. This implies that climate resilience building requires not only financial resources but also adequate technical capacity and specialized expertise.

4.2.1.5 Theme 5: Weak Monitoring and Poor Maintenance

Another important theme that emerged was weak monitoring and evaluation systems. Participants explained that follow-up monitoring of completed projects was often inadequate due to: Limited resources, inadequate staffing, and weak coordination systems. A district official explained that:

“Monitoring of projects is sometimes affected by inadequate transport and limited operational resources. Some projects are left without proper supervision after implementation.”

Participants further explained that weak monitoring affected: Accountability, project quality, sustainability, and timely identification of challenges. The findings therefore indicate that weak monitoring and evaluation systems reduced the long-term effectiveness and sustainability of climate resilience interventions. Additionally, the study also established that poor maintenance systems affected sustainability of many CDF-funded climate projects. Participants explained that some boreholes and water systems stopped functioning due to: Lack of maintenance funds; delayed repairs; weak community ownership; and limited technical support. One respondent stated that:

“Some boreholes break down and remain non-functional for long periods because repair systems are weak.”

Participants further indicated that maintenance committees were either: Weak, inactive, or insufficiently trained. The findings therefore suggest that sustainability planning remained inadequate in many climate resilience interventions. This reduced the long-term resilience benefits of projects intended to support vulnerable communities.

5. DISCUSSION OF FINDINGS

5.1 The Key Governance and Implementation Challenges Affecting CDF Funded Climate Projects in Sinazongwe District

The study sought to identify the governance and implementation challenges affecting Constituency Development Fund (CDF) funded climate resilience and Disaster Risk Reduction (DRR) initiatives in Sinazongwe District. The findings revealed that despite the positive contribution of CDF toward climate resilience building, implementation of climate-related projects faced numerous governance, financial, technical, institutional, and operational challenges that reduced effectiveness, sustainability, and long-term resilience outcomes. The major challenges identified by respondents included: Inadequate funding; delayed disbursement of funds; political interference; limited technical expertise; weak monitoring and evaluation systems; poor project maintenance; weak transparency and accountability mechanisms; limited

community sensitization; weak integration of Disaster Risk Reduction (DRR); and low participation of vulnerable groups.

5.5.1 Inadequate Funding

The findings established that inadequate funding was one of the most serious barriers affecting implementation of climate resilience projects in Sinazongwe District as indicated by 75.7% (53/70) in table 14 above. Respondents explained that although climate-related hazards such as droughts, water scarcity, crop failure, and food insecurity continued increasing, the available CDF resources remained insufficient to adequately address the growing needs of vulnerable communities. Communities reported that many areas still lacked: Reliable water infrastructure; irrigation systems; climate-smart agricultural support; environmental conservation initiatives; and disaster preparedness interventions. This finding suggests that climate vulnerability in Sinazongwe District exceeded the level of resources available through CDF. The findings agree with the United Nations Environment Programme (UNEP, 2021), which reports that climate adaptation financing in developing countries remains significantly below the amount required to effectively respond to growing climate risks and vulnerabilities. Similarly, the Intergovernmental Panel on Climate Change (IPCC, 2022) argues that inadequate financing remains one of the major obstacles limiting effective adaptation and resilience building in vulnerable regions, particularly in Sub-Saharan Africa.

5.5.2 Competing Development Priorities, and Delayed Disbursement of Funds

The study further established that competing development priorities also affected allocation of CDF resources toward climate resilience interventions. Respondents explained that CDF funds were simultaneously needed for: School construction; health infrastructure; road rehabilitation; youth empowerment; and community development projects. As a result, climate adaptation and DRR initiatives often received limited financial attention despite increasing climate-related challenges. This finding demonstrates the complex balance between development needs and climate resilience priorities within decentralized local governance systems. The study further revealed that delayed disbursement of funds negatively affected implementation of climate resilience projects as shown by 71.4% (50/70) in table 14. Respondents explained that delays in release of funds disrupted: Project timelines; procurement processes; seasonal agricultural interventions; and water infrastructure implementation. Some respondents indicated that delayed funding caused certain agricultural and irrigation projects to miss critical farming seasons, thereby reducing their effectiveness and intended impact. This finding supports Smoke (2015), who observed that decentralized development systems in many developing countries experience financial management delays and administrative inefficiencies that weaken local implementation effectiveness. Similarly, Crook and Manor (1998) argued that fiscal decentralization often faces operational challenges associated with delayed transfers of financial resources from central government to local structures.

5.5.3 Political Interference

The findings further established that political interference affected implementation and prioritization of CDF-funded climate projects as shown by 55.7% (39/70) in table 14. Respondents explained that political actors sometimes influenced: Selection of projects; allocation of resources; identification of beneficiary communities; and prioritization of interventions. Some participants perceived that politically favored areas occasionally received greater attention compared to highly climate-vulnerable communities. This finding suggests that political considerations sometimes undermined fairness, transparency, and equity in allocation of climate resilience resources. The findings support Mansuri and Rao (2013), who found that participatory and decentralized development programs are vulnerable to elite capture and political

interference when governance and accountability systems are weak. Similarly, Chanda (2019) observed that political influence remains a significant governance challenge affecting decentralized development implementation in Zambia.

5.5.4 Limited Technical Expertise, and Weak Monitoring/Evaluation Systems

The study further established that limited technical expertise affected effective implementation of climate resilience interventions. Respondents explained that some local committees and implementing structures lacked adequate knowledge and skills in: Climate adaptation planning; Disaster Risk Reduction; environmental management; climate-smart agriculture; water resource management; as well as monitoring and evaluation. This finding suggests that although communities could identify their immediate needs, technical capacity for designing comprehensive and sustainable climate resilience interventions remained limited. The findings agree with the United Nations Development Programme (UNDP, 2020), which argues that local climate adaptation requires strong institutional and technical capacity to effectively integrate resilience principles into local development planning. Similarly, Twigg (2015) emphasized that successful Disaster Risk Reduction interventions require specialized technical expertise in: Risk assessment; preparedness planning; early warning systems; and climate vulnerability analysis. The study further revealed that weak monitoring and evaluation systems reduced accountability and sustainability of projects. As a result, some projects experienced: Poor supervision; delayed identification of problems; weak quality control; and limited follow-up after completion. This finding suggests that institutional monitoring systems remained inadequate for ensuring sustainability and effectiveness of climate resilience interventions. The findings support Adger et al. (2005), who argued that institutional support and long-term monitoring are critical components of sustainable resilience building.

5.5.5 Poor Maintenance Systems, And Inadequate Community Sensitization

The study also established that poor maintenance systems affected long-term functionality of some projects, particularly boreholes and water infrastructure as shown by 55.7% (39/70). Respondents explained that some facilities became non-functional because of: Lack of maintenance funds; delayed repairs; weak community ownership; and limited technical support. This finding demonstrates that sustainability planning remained weak within implementation processes. The findings agree with Simatele and Simatele (2015), who found that sustainability challenges frequently undermine long-term effectiveness of rural adaptation infrastructure in climate-vulnerable communities. The study further established that inadequate community sensitization reduced effective participation and accountability. Many respondents lacked adequate understanding regarding: CDF procedures; project allocation processes; climate resilience objectives; monitoring systems; and community oversight responsibilities. As a result, some communities were unable to effectively participate in project monitoring and governance processes. This finding supports Cornwall (2008), who argued that meaningful participation depends on access to information, awareness, and empowerment.

The study further revealed that Disaster Risk Reduction (DRR) principles were weakly integrated into many CDF-funded projects. Most interventions focused mainly on infrastructure development and immediate livelihood needs rather than: Preparedness planning; early warning systems; community disaster training; climate information dissemination; and risk prevention measures. This finding suggests that resilience programming remained reactive rather than preventive and preparedness-oriented. The findings agree with Manyena et al. (2019), who argued that resilience interventions in many African countries remain focused on post-disaster responses rather than proactive DRR integration. Similarly, Twigg (2015) emphasized that effective resilience building requires combining infrastructure

development with non-structural DRR measures such as: Preparedness education; early warning systems; community awareness; and risk reduction planning.

From the perspective of the Decentralization Theory guiding this study, the findings demonstrate that decentralization through CDF created opportunities for local development and climate resilience interventions. Communities were able to identify local priorities and propose projects addressing immediate climate-related challenges. However, the findings further demonstrate that decentralization alone does not automatically guarantee effective climate resilience outcomes. Institutional weaknesses such as: Weak governance systems; political interference; limited technical capacity; financial constraints; and weak accountability mechanisms, can significantly undermine effectiveness of decentralized climate adaptation initiatives. Overall, the findings indicate that although CDF has significant potential for supporting climate resilience and DRR interventions at community level, several governance and implementation challenges continue limiting its effectiveness in Sinazongwe District. The study therefore implies that strengthening climate resilience through decentralized financing mechanisms requires: Increased climate adaptation financing; timely disbursement of funds; strengthened technical and institutional capacity; improved transparency and accountability systems; enhanced DRR integration; effective monitoring and maintenance systems; greater inclusion of vulnerable groups; and improved community sensitization and participation. The study concludes that effective governance and strong institutional systems are essential for ensuring sustainability, accountability, and long-term success of CDF-funded climate resilience interventions in vulnerable rural communities such as Sinazongwe District.

6.1 Conclusion of the Study

From the perspective of the Decentralization Theory underpinning the study, the findings demonstrated that decentralized financing mechanisms such as CDF have significant potential to improve local responsiveness to climate-related challenges because communities better understand their own vulnerabilities and development priorities. The study therefore confirmed that decentralized governance can enhance local participation and facilitate implementation of locally relevant resilience interventions. However, the study also demonstrated that decentralization alone is insufficient to guarantee effective climate resilience outcomes without: Adequate financial resources; strong governance systems; institutional accountability; technical expertise; effective monitoring systems; and inclusive participation mechanisms. Hence, the study concludes that strengthening climate resilience in vulnerable communities such as Sinazongwe District requires integrated and sustainable approaches that combine: Structural interventions such as boreholes and irrigation systems; non-structural interventions such as early warning systems and preparedness training; environmental conservation initiatives; livelihood diversification programs; community empowerment and participation; as well as strong governance and accountability systems. Overall, the study concludes that the Constituency Development Fund has strong potential to serve as an effective local climate resilience financing mechanism in vulnerable rural communities. However, for CDF to effectively contribute toward sustainable climate resilience and Disaster Risk Reduction, climate adaptation principles must be systematically mainstreamed into decentralized planning, budgeting, implementation, and monitoring systems.

6.2 Recommendations

Based on the findings and conclusions of the study, several recommendations are proposed to improve the utilization of the Constituency Development Fund (CDF) for strengthening climate resilience and Disaster

Risk Reduction (DRR) in vulnerable communities of Sinazongwe District.

6.2.1 Recommendations to Government

- The Government of Zambia should increase financial allocation toward climate resilience and Disaster Risk Reduction interventions within the Constituency Development Fund framework.
- The government should further ensure timely disbursement of CDF resources to improve implementation efficiency and prevent delays affecting seasonal agricultural and climate-related projects.
- Additionally, the Ministry of Local Government and Rural Development should strengthen policy guidelines to ensure that climate adaptation and Disaster Risk Reduction are fully integrated into local development planning and CDF project selection processes

6.2.2 Recommendations to Local Authorities

- It is recommended that the local authority should strengthen governance and accountability systems to minimize political interference and elite dominance in project implementation processes
- Sinazongwe Town Council should also strengthen community participation mechanisms in order to promote inclusive and transparent decision-making processes.
- The council should also establish stronger monitoring and evaluation systems to ensure: Accountability, sustainability, and quality control of climate resilience projects.

6.2.3 Recommendations to Disaster Management and Climate Institutions

- The Disaster Management and Mitigation Unit (DMMU) should therefore ensure that Disaster Risk Reduction principles are fully mainstreamed into all CDF-funded projects and local development planning processes.

6.2.4 Recommendations on Environmental Conservation and Sustainable Natural Resource Management

- The government, local authorities, and environmental agencies should strengthen environmental conservation programs aimed at improving ecosystem resilience and reducing environmental degradation.
- Programs should promote: Reforestation and afforestation; tree planting initiatives; sustainable land management; and controlled charcoal production among others.

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