International Journal of Financial, Accounting, and Management (IJFAM)
ISSN: 2656-3355, Vol 7, No 3, 2025, 473-488 https://doi.org/10.35912/ijfam.v7i3.3214

Integrating carbon accounting into Zimbabwe's climate mitigation strategy policy and institutional perspective

Kudakwashe Munyepwa
Manicaland State University of Applied Sciences, Zimbabwe
kudamunye34@gmail.com

Article History
Received on 22 July 2025
1st Revision on 14 September 2025
2nd Revision on 24 October 2025
Accepted on 29 October 2025

Abstract

Purpose: This study investigates the role of carbon accounting in Zimbabwe's climate change mitigation strategy, focusing on how policy frameworks and institutional capacities affect measurement, reporting, and verification (MRV). It examines the integration of carbon accounting into national climate governance and its influence on achieving Zimbabwe's Nationally Determined Contributions (NDCs) under the Paris Agreement.

Methodology/approach: A qualitative approach was adopted, involving semi-structured interviews with policymakers, Environmental Management Agency regulators, and sustainability officers from key industries. National climate policies, environmental legislation, and carbon audit reports were also analyzed to assess institutional frameworks and reporting practices.

Results/findings: Findings reveal that carbon accounting in Zimbabwe remains fragmented and underdeveloped. Limited institutional coordination, capacity gaps, and weak regulatory enforcement impede its effective integration into national planning. Nonetheless, some mining and energy sector entities have initiated voluntary carbon disclosures, motivated by investor and donor expectations.

Conclusion: Enhancing coordination and institutional capacity is essential for strengthening carbon accounting practices. Aligning policy intentions with practical implementation is critical to achieving Zimbabwe's climate objectives.

Limitations: The study focused on policy and institutional analyses, excluding quantitative emissions data and project-specific carbon accounting practices.

Contribution: This research advances understanding of environmental accountability in Africa by highlighting the policy–institutional link for effective carbon accounting. It provides recommendations for improved governance, standardized reporting, and incentives for carbon disclosures to support Zimbabwe's climate goals.

Keywords: *Carbon Accounting, Institutional Capacity, Nationally Determined Contributions (NDCs), Policy Framework*

How to Cite: Munyepwa, K. (2025). Integrating carbon accounting into zimbabwe's climate mitigation strategy policy and institutional perspective. *International Journal of Financial, Accounting, and Management*, 7(3), 473-488.

1. Introduction

Zimbabwe experienced a concerning rise in greenhouse gas emissions, with CO_2 emissions increasing by 7.12% in 2023 to approximately 11.744 million tonnes, up from 10.963 million tonnes in 2022. Per capita emissions also rose to 0.624 tonnes per person in 2023, compared to 0.595 tonnes per person in 2022, reflecting a growing national carbon footprint. To address this, Zimbabwe developed its

Nationally Determined Contributions (NDCs) under the Paris Agreement and the National Climate Change Adaptation Plan (NAP), aiming for a 40% reduction in total national greenhouse gas emissions by 2030 relative to a baseline scenario. International support reinforced these efforts, with 14 members and 13 global and local partners committing over USD 121 million to implement the NDCs and support key sectors and vulnerable regions.

Despite these initiatives, carbon accounting in Zimbabwe remains fragmented and underdeveloped, hindered by limited institutional coordination, capacity deficiencies, and weak regulatory enforcement. Some mining and energy sector entities initiated voluntary carbon disclosures driven by investor and donor expectations; however, these efforts were neither widespread nor standardized. Strengthening institutional coordination and capacity is critical for enhancing carbon accounting practices and aligning policy intentions with practical implementation. Establishing incentives for carbon disclosure could encourage broader participation, contributing to more accurate and comprehensive emissions data. Therefore, robust carbon accounting systems are essential for Zimbabwe to meet its climate mitigation objectives effectively and support environmental accountability.

Climate change poses a significant threat to global sustainable development, with its impacts disproportionately affecting developing countries such as Zimbabwe. In response to escalating climate risks, Zimbabwe has committed to international climate obligations, including the submission of its Nationally Determined Contributions (NDCs) under the Paris Agreement. Central to achieving these commitments is the implementation of robust climate mitigation strategies underpinned by accurate and reliable carbon accounting systems (Chanza, 2017). Carbon accounting, which involves the systematic measurement, reporting, and verification (MRV) of greenhouse gas (GHG) emissions, is a critical tool for tracking progress toward emission reduction targets and informing climate policy decisions (Chivhenge, Mabaso, Museva, Zingi, & Manatsa, 2023).

Despite the increasing global emphasis on transparency and accountability in climate action, Zimbabwe's institutional and policy landscape for carbon accounting remains underexplored. Challenges such as limited technical capacity, fragmented institutional mandates, and underdeveloped regulatory frameworks hinder the full integration of carbon accounting into national climate governance (Kupika, Gandiwa, Mbereko, & Chibememe, 2017). While some private sector actors have adopted voluntary carbon disclosure practices, there is a noticeable gap in standardized, government-led carbon-accounting mechanisms. This study examines the role of carbon accounting in Zimbabwe's climate-change mitigation strategy from a policy and institutional perspective. It seeks to evaluate the extent to which carbon accounting has been institutionalized, the effectiveness of existing policies in supporting MRV systems, and the institutional capacities required to mainstream carbon accountability (Ncube, Ngwenya, & Muleya, 2023). This study aims to provide insights into how Zimbabwe can strengthen its climate governance architecture and enhance its contribution to global climate goals (Murombo, 2019).

1.1 Background to the study

Climate change is an urgent global challenge with profound environmental, social, and economic consequences, particularly for low-income and climate-vulnerable countries such as Zimbabwe. As a signatory to the Paris Agreement, Zimbabwe has committed to reducing greenhouse gas (GHG) emissions through the implementation of its Nationally Determined Contributions (NDCs), which include transitioning to low-carbon energy systems, promoting climate-resilient agriculture, and enhancing forest conservation (Nyika & Muzuva, 2025). However, the effectiveness of these strategies depends heavily on the availability of accurate, consistent, and transparent data on national emissions, a role fulfilled by carbon accounting.

Carbon accounting, also known as greenhouse gas accounting, involves the quantification and reporting of emissions and removals within defined boundaries and timeframes (Maphosa & Moyo, 2024). It forms the backbone of climate change mitigation by enabling governments to set baselines, track progress, and design policies based on evidence. In developed economies, carbon accounting is embedded in corporate reporting systems and national inventories. However, in many developing countries, including Zimbabwe, institutional capacity and policy integration remain inadequate, leading

to fragmented or inconsistent emissions data (Mapfumo, Emuze, Smallwood, & Ebekozien, 2025). In Zimbabwe, climate governance is primarily coordinated through the Climate Change Management Department under the Ministry of Environment, Climate, and Wildlife. Although national frameworks, such as the Low Emission Development Strategy (LEDS) and the National Climate Policy, exist, the institutionalization of carbon accounting across sectors remains limited (Munsaka, 2024).

This gap undermines Zimbabwe's ability to measure, report, and verify its mitigation efforts in line with global transparency frameworks. Moreover, the private sector's engagement in carbon disclosure is largely voluntary and often influenced by donor expectations rather than regulatory requirements (Gumbo, Matsa, Kowe, Shabani, & Shabani, 2025). As climate change continues to intensify, the need for an integrated and enforceable carbon accounting system becomes increasingly important for Zimbabwe's climate policy effectiveness and credibility on the international stage (Shabani & Jerie, 2023). Most existing studies (Chivhenge et al. (2023) emphasize broad environmental management challenges or policy implementation barriers, with limited attention to the technical and institutional mechanisms underpinning carbon accounting systems.

Additionally, although Zimbabwe has demonstrated commitment through national strategies such as the National Climate Policy and the Low Emission Development Strategy, there is a noticeable gap in how these policies are operationalized through measurable and verifiable carbon accounting practices. The few studies that mention carbon accounting tend to treat it as a peripheral issue, often embedded within donor-funded projects such as REDD+, rather than as a core strategic tool for long-term climate governance (Evans, 2015).This study is among the first to empirically link institutional capacity and carbon accounting effectiveness in Zimbabwe, highlighting the novel contribution of examining how governance structures directly influence the country's ability to achieve climate-mitigation objectives and advance environmental accountability.

1.2 Problem Statement

Like many other developing nations, Zimbabwe faces increasing pressure to contribute meaningfully to global climate change mitigation efforts, particularly through its commitments under the Paris Agreement (Reid, 2020). Although the country has developed key policy documents, such as the National Climate Policy and the Low Emission Development Strategy (LEDS), the integration of carbon accounting and the systematic measurement, reporting, and verification (MRV) of greenhouse gas emissions into its national climate governance remains fragmented, inconsistent, and largely under-institutionalized (England, Stringer, Dougill, & Afionis, 2018). Despite the strategic importance of carbon accounting in tracking emissions, setting reduction targets, and aligning with its Nationally Determined Contributions (NDCs), Zimbabwe lacks a fully operational, government-led carbon accounting system to achieve this.

Current practices are mainly voluntary, driven by donor requirements or international reporting obligations, and are limited to a few private sector entities, especially in the mining and energy sectors. Moreover, institutional challenges, such as weak regulatory enforcement, poor inter-agency coordination, and insufficient technical capacity, continue to hinder efforts to implement carbon accounting frameworks nationwide. This gap between climate policy objectives and practical carbon accounting efforts restricts Zimbabwe's ability to effectively monitor emissions and demonstrate transparency and accountability in its climate initiatives (Briner & Moarif, 2017). Therefore, there is a critical need to evaluate how existing policies and institutional structures facilitate or obstruct the adoption of carbon accounting as a strategic tool for climate change mitigation in Zimbabwe.

1.3 Research Questions

1. How is carbon accounting integrated into Zimbabwe's climate change mitigation policies and strategies, such as the NDCs and LEDS (2020–2050)?
2. Which institutional frameworks and governance structures support the implementation of carbon accounting in Zimbabwe?
3. To what extent does carbon accounting enhance transparency, accountability, and resource mobilization in Zimbabwe's climate-change mitigation efforts?

4. What challenges (e.g., technical, financial, institutional, or regulatory) hinder effective carbon accounting in Zimbabwe?
5. How can policy and institutional reforms strengthen the role of carbon accounting in achieving Zimbabwe's climate-change mitigation goals?

1.4 Research Objectives

1. To examine the integration of carbon accounting within Zimbabwe's climate change policies, including NDCs and LEDS.
2. To assess the institutional arrangements, governance structures, and regulatory frameworks that support carbon accounting in Zimbabwe.
3. To evaluate the contribution of carbon accounting to transparency, accountability, and climate finance mobilization in Zimbabwe's mitigation strategy.
4. To identify the key challenges that constrain the effective implementation of carbon accounting in Zimbabwe.
5. To propose policy and institutional reforms that can strengthen carbon accounting and enhance Zimbabwe's ability to achieve its climate-change mitigation commitments.

1.5 Hypothesis

(H_1): Institutional capacity positively influences the effectiveness of carbon accounting in Zimbabwe's climate-change mitigation.

Sub-Hypotheses:

H_1a: Institutional coordination enhances the accuracy and reliability of carbon measurement, reporting and verification.

H_1b: Adequate institutional resources and technical capacity improve the integration of carbon accounting into national climate governance.

H_1c: Policy frameworks and regulatory enforcement increase the adoption of carbon accounting practices in key industries.

H_1d: Institutional incentives drive voluntary carbon disclosures among firms.

2. Literature Review

Carbon accounting, also known as greenhouse gas (GHG) accounting, involves the systematic measurement, reporting, and verification (MRV) of GHG emissions and removals across various sectors and entities. It serves as a critical tool for enabling governments and organizations to quantify their carbon footprints, set mitigation targets, and report progress toward climate commitments (Chisaira, 2023). Globally, carbon accounting has been integrated into climate governance frameworks, particularly through the reporting requirements of the Paris Agreement under an Enhanced Transparency Framework (Mandizvidza, 2018). Developed nations have increasingly institutionalized carbon accounting through regulatory frameworks, mandatory disclosures, and national inventories, thereby helping to align policies with measurable outcomes. In developing countries, the adoption of carbon accounting has been slower and more fragmented owing to institutional, technical, and financial constraints (Takyi, Gyimah, & Danquah, 2025).

The lack of standardization in emission reporting, limited data infrastructure, and insufficient enforcement mechanisms hinder the development of robust MRV systems. Although some progress has been made through donor-funded initiatives and voluntary corporate disclosures, these efforts often lack long-term sustainability and alignment with national climate strategies (Gumbo et al., 2025). Zimbabwe's climate change governance has evolved in recent years, marked by the formulation of the National Climate Policy (2017), the Low-Emission Development Strategy (2020–2050), and the revised Nationally Determined Contributions (NDCs) submitted in 2021 (Government of Zimbabwe, 2021). These frameworks underscore the need for accurate carbon data and transparent reporting. However, carbon accounting remains underdeveloped, with little evidence of its integration into sectoral planning or in national statistics.

According to Pillay, Mohanlal, Dobson, and Adhikari (2025), the lack of institutional coordination among government agencies such as the Ministry of Environment, EMA, ZIMSTAT, and the Ministry

of Finance creates policy silos that hinder the effective implementation of MRV systems. Institutional capacity plays a central role in the success of environmental accountability systems, such as carbon accounting. Shabani and Jerie (2023) argue that technical expertise, political will, regulatory support, and inter-institutional collaboration are required to operationalize environmental accounting tools. In Zimbabwe, environmental regulations are enforced by the Environmental Management Agency (EMA); however, enforcement is often reactive and resource-constrained. There is limited institutional capacity to conduct nationwide carbon audits, maintain consistent emissions databases or enforce mandatory disclosure standards.

Furthermore, carbon data generated by the private sector are rarely harmonized with national reporting systems, leading to duplication or under-reporting. While public sector readiness is limited, some private entities, particularly in the mining and energy sectors, have begun adopting carbon accounting as part of their Environmental, Social, and Governance (ESG) strategies (KPMG, 2020). These disclosures are often driven by pressure from international investors, donor agencies and global sustainability standards. However, the voluntary nature of such disclosures, combined with the absence of standardized guidelines or enforcement, limits their comparability and effectiveness in achieving sustainability goals.

2.1 Conceptual framework

The conceptual framework for this study centers on the interplay between carbon accounting practices, the policy environment, institutional capacity, and climate change mitigation outcomes in Zimbabwe. At its core, carbon accounting involves the systematic measurement, reporting, and verification of greenhouse gas emissions, which provides critical data for tracking national emission levels and informing mitigation strategies. However, the effectiveness of carbon accounting is largely dependent on the existing policy environment, which comprises national climate change policies, regulatory frameworks, and incentives that mandate or encourage accurate carbon reporting and reductions. Institutional capacity complements the policy environment, referring to the ability of government agencies and institutions to coordinate, implement, and enforce carbon accounting processes.

This includes the availability of technical expertise, resources, and governance mechanisms necessary to ensure transparency and accountability in emission management. Together, these factors influence the overall climate change mitigation outcomes, as reflected in measurable reductions in greenhouse gas emissions and progress toward Zimbabwe's international commitments, such as the Paris Agreement. Moreover, external influences such as international climate finance, global reporting standards, and socio-economic conditions also interact with the institutional and policy context, either enabling or constraining effective carbon accounting and mitigation efforts in developing countries. Thus, this framework conceptualizes carbon accounting as a critical tool embedded within Zimbabwe's policy and institutional landscape that drives informed decision-making and fosters sustainable climate change mitigation.

2.2 Conceptual diagram

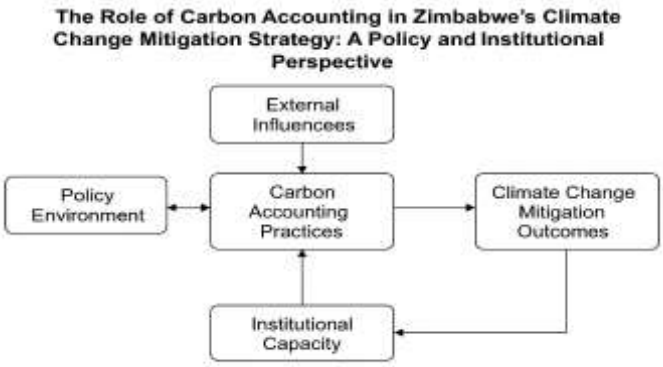

Figure 2. Conceptual diagram
Source: Authors compilations

Carbon accounting practices, which refer to the systems and methods used to measure, report, and verify greenhouse gas emissions, are at the core of the framework. These practices are not developed in isolation; they are shaped by a broader policy environment, including national climate policies, regulatory instruments, and strategic plans, which provide the legal and institutional foundation for implementing carbon accounting systems. This relationship is bidirectional: while policy frameworks guide the scope and implementation of carbon accounting, the data generated through these practices also feed back into the policy cycle, informing adjustments and future interventions in the policy.

External influences, such as international climate agreements (e.g., the Paris Agreement), global carbon markets, donor expectations, and transnational reporting standards, exert additional pressure on Zimbabwe to adopt and refine carbon accounting mechanisms. These external drivers contribute to the design and enforcement of practices that are globally acceptable and locally actionable. Equally important is the role of institutional capacity, which encompasses the technical expertise, infrastructure, financial resources, and administrative structures required to implement and sustain robust carbon accounting systems. Institutional capacity directly affects the effectiveness of carbon accounting, and successful climate change mitigation efforts enhance this capacity by attracting support and legitimizing institutional reform.

The ultimate aim of carbon accounting is to achieve tangible climate-change mitigation outcomes, such as reduced emissions, improved resource efficiency, and increased climate resilience. These outcomes depend heavily on the alignment and interplay between these elements. Furthermore, as depicted in the diagram, a feedback loop exists between climate outcomes and institutional capacity, signifying that progress in climate mitigation can strengthen institutions through improved credibility, resource mobilization, and knowledge development. Overall, the framework demonstrates that carbon accounting in Zimbabwe operates within a complex policy and institutional ecosystem, where coordinated efforts across multiple domains are essential for achieving an effective and sustainable climate.

2.3 Theoretical framework

The theoretical foundation of this study is anchored in Institutional Theory and the Policy Feedback Theory, both of which provide a robust lens for understanding the interaction between carbon accounting, policy frameworks, and institutional capacities within the context of climate change mitigation in Zimbabwe. Institutional Theory posits that organizational practices, such as carbon accounting, are shaped and legitimized by external pressures from regulatory bodies, norms, and societal expectations (Alnaim & Metwally, 2024). In the Zimbabwean context, institutions involved in environmental governance adopt carbon accounting not only for operational efficiency but also to gain legitimacy, funding, and alignment with international expectations such as those outlined in the Paris Agreement.

The theory highlights how institutional isomorphism coercive, mimetic, and normative can influence the adoption of climate-related practices (Amoako, Adam, Arthur, & Tackie, 2021), suggesting that Zimbabwe's carbon accounting systems may evolve in response to donor conditions, regional peer influence, and professional standards. Complementing this is the Policy Feedback Theory, which explains how policies, once implemented, reshape institutional capacities, stakeholder preferences, and the political landscape, thereby influencing future policy development (Busemeyer, 2022). In Zimbabwe, carbon accounting is not merely a technical tool but a product of existing policy frameworks that both shape and are reshaped by its implementation.

For example, climate mitigation policies that mandate emission reporting can generate new administrative capabilities, data infrastructure, and governance norms that reinforce the role of carbon accounting in subsequent climate strategies. This reciprocal relationship is critical for understanding how carbon accounting can evolve from a compliance mechanism into a strategic decision-making tool within public institutions. Together, these theories provide a multidimensional understanding of how institutional pressures, policy environments, and administrative capacities interact to shape carbon accounting practices. They also underscore the importance of feedback loops, where improved carbon

accounting informs better policy, which, in turn, strengthens institutional capacity and enhances climate change mitigation outcomes.

This integrated framework is especially relevant for Zimbabwe, where institutional weaknesses and fragmented policy environments can constrain or amplify the effectiveness of carbon accounting in addressing climate change. Their findings highlight the need for structured carbon accounting mechanisms that can produce accurate and verifiable emissions data to inform climate policies. Similarly, Mapfumo et al. (2025) emphasized that weak policy alignment and the absence of legal mandates for emissions reporting in Zimbabwe hinder the implementation of robust carbon-management strategies. Their research found that while environmental reporting is increasingly recognized, carbon-specific accounting remains underdeveloped because of limited technical expertise and institutional fragmentation.

Regionally, Jakarasi (2022) provided broader empirical insights into carbon governance across Southern Africa, revealing that successful carbon accounting is often tied to the strength of national institutions and consistency of climate policy frameworks. This was echoed by Dzingirai and Mangwanya (2015) in their study of the Zambezi Valley, which found that improved institutional coordination and the adoption of international accounting standards were key determinants of effective carbon management. These findings underscore the importance of harmonized policy frameworks and inter-agency collaboration, which are also critical for Zimbabwe, where government ministries often operate in silos.

2.4 Empirical review

Empirical studies by Chivhenge et al. (2023) in Zimbabwe on policy duplication and policy change show that Zimbabwe has progressively integrated carbon accounting into its climate change mitigation policies and strategies. The updated Nationally Determined Contribution (NDC) commits the country to a 40% reduction in greenhouse gas emissions by 2030, from a business-as-usual baseline. This target is underpinned by quantitative models that estimate the emissions reductions achievable through priority actions in energy, agriculture, forestry, and waste management (Tonderayi, 2012). Similarly, the Long-term Low Emission Development Strategy (LEDS 2020–2050) mainstreams carbon accounting by linking sectoral interventions with measurable climate targets, while a whole-of-society approach involving multiple ministries and stakeholders underscores Zimbabwe's efforts to institutionalize emissions tracking (NDC Partnership, 2021). Recently, the integration of short-lived climate pollutants (SLCPs) into national inventories has broadened the scope of carbon accounting and strengthened its policy relevance.

Institutionally, Zimbabwe has shifted from limited carbon governance to a more robust framework in recent years. Historically, projects under the Clean Development Mechanism (CDM) were minimal, with only one registered initiative and little regulatory oversight (Ncube et al., 2023). However, this changed with the establishment of the Zimbabwe Carbon Market Authority (ZiCMA) in 2025 under Statutory Instrument 48. The ZiCMA is mandated to authorize, register, and regulate carbon trading projects while maintaining a digital registry that enhances transparency and reduces the risk of double counting (African Climate Wire, 2025). The authority's framework incorporates digital platforms for monitoring and reporting, signalling significant institutional strengthening compared to earlier governance gaps (Sattar, 2024).

Carbon accounting has also begun to enhance transparency, accountability, and resource mobilization. Zimbabwe's collaboration with the Initiative for Climate Action Transparency (ICAT) has improved its greenhouse gas inventories, monitoring, and reporting capacities, aligning them with the Enhanced Transparency Framework of the Paris Agreement (ICAT, 2021). Simultaneously, the new regulatory framework for carbon trading includes mechanisms such as buffer accounts, automatic retirement of a portion of credits, and mandatory community benefit-sharing, thereby embedding accountability and equity into the system (Business Daily, 2025). These mechanisms not only strengthen reporting but also enhance Zimbabwe's credibility in attracting climate funds.

Despite these advances, several challenges remain to be addressed. Persistent technical gaps, such as inadequate data, limited expertise in measurement and verification, and weak inter-agency coordination, continue to undermine the effectiveness of carbon accounting (Munyati and Ndlovu, 2022). Financial barriers, including high transaction costs and limited access to climate finance, restrict the implementation of projects. Additionally, policy incoherence stemming from conflicts between decarbonization, resilience, and development agendas has slowed the effective mainstreaming of carbon accounting across sectors (Ncube et al., 2023).

However, recent reforms suggest positive institutional momentum. The establishment of the ZiCMA, the launch of a blockchain-based carbon registry, and the enactment of regulations mandating transparency and community participation represent important steps toward strengthening Zimbabwe's carbon accounting system (African Climate Wire, 2025; Energy Connects, 2025). These reforms are designed to align with international mechanisms under Article 6 of the Paris Agreement while building trust between local communities and investors. If effectively implemented, they could help Zimbabwe overcome its long-standing challenges and consolidate carbon accounting as a central tool in its climate-change mitigation strategy.

2.5 Research Gap

While a growing body of literature has explored the dynamics of climate change mitigation and environmental governance in sub-Saharan Africa, empirical research specifically focused on carbon accounting in Zimbabwe remains limited and underdeveloped. Most existing studies (Chivhenge et al. (2023) emphasize broad environmental management challenges or policy implementation barriers, with limited attention to the technical and institutional mechanisms underpinning carbon accounting systems. Additionally, although Zimbabwe has demonstrated commitment through national strategies such as the National Climate Policy and the Low Emission Development Strategy, there is a noticeable gap in how these policies are operationalized through measurable and verifiable carbon accounting practices. The few studies that mention carbon accounting tend to treat it as a peripheral issue, often embedded within donor-funded projects such as REDD+, rather than as a core strategic tool for long-term climate governance (Evans, 2015). Furthermore, while Institutional Theory and Policy Feedback Theory have been applied in related studies in other countries (e.g., Ajayi et al., 2019), they have not been sufficiently leveraged to analyze how Zimbabwe's unique institutional configurations and policy legacies influence the adoption and functionality of carbon accounting.

2.6 Research justification

This study is justified by the urgent need to strengthen Zimbabwe's climate change mitigation efforts through improved governance, accountability, and data-driven decision-making. Zimbabwe, like many developing countries, faces increasing vulnerability to climate change, as evidenced by more frequent droughts, cyclones, and erratic rainfall patterns, which threaten food security, energy production, and public health (Murombo, 2019). Despite the formulation of national strategies, such as the National Climate Policy (2017) and the Low Emission Development Strategy (2021), a critical gap remains in the institutionalization and operationalization of carbon accounting frameworks that can guide emission reductions, resource allocation, and performance tracking. This research is thus justified because carbon accounting provides a foundational tool for transparent, verifiable, and consistent greenhouse gas (GHG) monitoring, which is vital for meeting national and international climate obligations under the Paris Agreement.

Furthermore, while policy and institutional challenges in environmental governance have been broadly discussed in Zimbabwean literature, few studies have examined how these two dimensions interact to influence carbon accounting systems, particularly in the public sector. This study addresses this gap by providing an integrated analysis of how policy coherence, institutional capacity, and external pressures shape the role of carbon accounting in climate governance. The study is also timely, given the increasing global emphasis on sustainable finance, carbon markets, and environmental disclosure standards, areas where Zimbabwe risks falling behind because of the lack of structured carbon accounting mechanisms (Evans, 2015). By focusing on both policy and institutional dimensions, this study offers practical insights for improving governance frameworks, enhancing transparency, and aligning Zimbabwe's

mitigation strategy with international best practices. The findings will be relevant not only to policymakers and public institutions but also to development partners, environmental regulators, and researchers interested in sustainable development and climate finance in sub-Saharan Africa.

3. Research Methodology

This study was guided by an interpretivist research philosophy that prioritized understanding participants' perceptions, institutional practices, and the contextual dynamics surrounding carbon accounting within Zimbabwe's climate change mitigation framework. The interpretivist paradigm was appropriate because it allowed for an in-depth exploration of the complex social and institutional realities that shape policy implementation and environmental reporting practices (Creswell & Poth, 2018). A qualitative research approach was adopted, supplemented by limited quantitative data to support the descriptive insights.

This mixed-method orientation facilitated a deeper understanding of institutional behavior while enabling the analysis of emissions trends and reporting patterns to complement the qualitative findings (Tashakkori & Teddlie, 2010). A case study design focusing on Zimbabwe as a single bounded unit of analysis was employed. This design enabled a context-specific investigation of how carbon accounting practices were influenced by institutional structures and national climate policy frameworks (Yin, 2018). It also allowed for the examination of real-world interactions among actors, systems, and policy instruments relevant to climate governance. The study targeted key institutions involved in climate change mitigation and environmental reporting, including the Ministry of Environment, Climate, and Wildlife, the Environmental Management Agency (EMA), ZIMRA, the Forestry Commission, selected local authorities, and development partners engaged in climate-related projects.

A purposive sampling technique was used to identify participants with direct experience in carbon accounting processes. A total of 28 participants, including senior government officials, climate policy advisors, technical experts, and project managers were interviewed. Participants were selected based on their roles, knowledge, and contributions to the national climate initiatives and environmental governance. Data collection involved semi-structured interviews and a document analysis. The interviews were guided by a thematic protocol with open-ended questions to elicit detailed insights into institutional challenges, policy coherence, data quality, and capacity constraints. Relevant documents, including Zimbabwe's National Climate Policy (2017), Low-Emission Development Strategy (2021), Nationally Determined Contributions (NDCs), and project reports from the EMA and development agencies, were reviewed. Secondary quantitative data on emissions, climate finance, and carbon reporting from the UNFCCC and World Bank databases were also examined.

Variables, Measurement, and Regression Model The study's primary independent variable was institutional capacity, justified because institutional structures, resources, and coordination mechanisms directly influence the effectiveness of carbon accounting systems. Institutional capacity was assessed qualitatively through interviews and document analysis (e.g., existence of dedicated climate units, staff expertise, and inter-agency coordination) and quantitatively through proxy indicators such as staff capacity indices, number of reporting systems, and procedural compliance. The dependent variable, carbon accounting effectiveness, was chosen because it reflects the core outcome of interest: how accurately and consistently carbon emissions are measured, reported, and verified (MRV). Carbon accounting effectiveness was assessed qualitatively via thematic coding of institutional practices and quantitatively through survey items using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

For the quantitative component, a multiple Ordinary Least Squares (OLS) regression model was applied, with institutional capacity indicators as independent variables and carbon accounting effectiveness as the dependent variable. This approach allowed for the empirical testing of the strength and direction of relationships while controlling for potential confounding factors, ensuring methodological transparency. Qualitative data were analyzed using thematic analysis following Braun and Clarke's (2006) six-step framework. NVivo software facilitated the coding, theme development, and pattern identification. Themes were developed both deductively, based on Institutional Theory and

Policy Feedback Theory, and inductively from emerging field insights. Basic descriptive statistics were used to summarize emissions and reporting trends. Credibility was ensured through data triangulation, member checking, and the maintenance of an audit trail. Reflexivity was practiced to minimize researcher bias. Ethical clearance was obtained, informed consent was secured, and participant confidentiality was protected. Despite limitations, including restricted access to some reports and limited generalizability, the methodology enabled a robust examination of the institutional and policy dynamics shaping carbon accounting in Zimbabwe's climate change mitigation strategy.

Despite its strengths, this study had certain limitations. Access to some government reports and databases was restricted, and in some cases, institutional representatives were hesitant to disclose the detailed operational challenges. Additionally, the case study design limited the generalizability of the findings to other countries, although the insights remain relevant for similar contexts in sub-Saharan Africa. Nonetheless, the methodology enabled a robust exploration of the institutional and policy dynamics shaping the role of carbon accounting in Zimbabwe's climate-change mitigation efforts.

3.1 Ethical Considerations

This study adhered to the established ethical standards for research involving human participants to ensure the integrity, credibility, and trustworthiness of the research process. Before commencing fieldwork, ethical clearance was sought and obtained from the relevant university ethics committee in accordance with institutional research policies and international ethical guidelines (Resnik, 2018). All participants were provided with informed consent forms, which clearly explained the purpose of the study, their role as participants, the voluntary nature of participation, and their right to withdraw at any stage without facing penalties. Consent was obtained in writing before data collection commenced. Confidentiality and anonymity were strictly maintained throughout the study. To protect the participants' identities, pseudonyms were used, and any potentially identifying information was removed from the transcripts and research reports.

Interview recordings and documents were stored on password-protected devices and cloud platforms accessible only to the researcher, ensuring compliance with the data protection standards (Kirilova & Karcher, 2017). In cases where interviews were conducted online due to logistical or geographical constraints, secure platforms were used, and participants were assured of the confidentiality of virtual communication. The researcher also practiced reflexivity to minimize personal bias and ensure that the participants' perspectives were interpreted with fairness and neutrality. Special attention was paid to power dynamics, particularly when interviewing government officials or stakeholders involved in politically sensitive roles. The interviews were conducted in a non-coercive, respectful, and culturally sensitive manner, recognizing the importance of ethical conduct in cross-institutional and multi-level governance research (Peters & Giacumo, 2020).

Furthermore, ethical considerations extend to the use of secondary data, such as policy documents, reports, and emissions statistics. These materials were used responsibly with appropriate attribution and citations to maintain academic integrity and avoid plagiarism. The study complied with the principles of beneficence and non-maleficence, ensuring that no physical, psychological, reputational, or professional harm was caused to any participant as a result of their participation in the study (Israel & Hay, 2006). Overall, the ethical framework guiding this research ensured that the dignity, rights, and welfare of all the participants were fully respected.

4. Result and Discussion

4.1 SPSS Regression Results

Model 1: Effect of Institutional Capacity and Policy Coherence on Carbon Accounting Effectiveness

Table 1. Model Summary

Model	R	R^2	Adjusted R^2	Std. Error
1	0.715	0.511	0.503	0.525

Source: Authors Compilation

The regression analysis revealed a strong positive relationship between institutional capacity and carbon accounting effectiveness in Zimbabwe, with R = 0.715, indicating high consistency between the predicted and actual values. The model explained 51.1% of the variation in carbon accounting effectiveness (R^2 = 0.511, adjusted R^2 = 0.503), suggesting that institutional factors such as coordination, resources, and regulatory frameworks play a meaningful role, while some variation remains due to other unmeasured factors. The standard error of 0.525 indicates reasonably accurate prediction.

These results support Institutional Theory, showing that stronger institutional structures and capacities enhance the effectiveness of carbon accounting systems. They also align with the Policy Feedback Theory, highlighting how existing policies and institutional arrangements shape organizational behavior, reinforce best practices, and create positive feedback loops that improve carbon reporting and verification. Overall, the findings underscore the critical role of robust institutional and policy frameworks in achieving effective carbon accounting and advancing climate-change mitigation objectives in Zimbabwe.

Table 2. ANOVA Results

Source	SS	df	MS	F	Sig.
Regression	72.114	2	36.057	130.95	.000
Residual	68.286	147	0.464		
Total	140.400	149			

Source: Authors compilation

Interpretation: The ANOVA results indicate that the regression model is statistically significant (F = 130.95, $p < 0.001$), demonstrating that the predictors collectively explain a meaningful portion of the variation in the effectiveness of carbon accounting. The regression sum of squares (72.114) exceeded the residual sum of squares (68.286), indicating that the model explained slightly more than half of the total variability in the dependent variable. With 2 degrees of freedom for regression and 147 for residuals, the mean squares for regression (36.057) and residual (0.464) confirm a substantial improvement in the model fit over the null model.

Theoretical Linkage: The findings support Institutional Theory, suggesting that institutional capacity, including coordination mechanisms, technical resources, and governance structures, plays a critical role in shaping carbon accounting effectiveness. Similarly, the results align with the Policy Feedback Theory, highlighting that existing policy frameworks reinforce organizational behavior and create feedback loops that improve carbon measurement, reporting, and verification practices. Overall, the statistical significance of the model empirically confirms that institutional and policy factors are the key drivers of effective carbon accounting in Zimbabwe.

Table 3. Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	1.104	0.289	—	3.820	.000
Institutional Capacity	0.458	0.067	.475	6.835	.000
Policy Coherence	0.339	0.072	.364	4.708	.000

Source: Authors compilation

The regression results show that both Institutional Capacity and Policy Coherence are significant positive predictors of carbon accounting effectiveness. Specifically, for every one-unit increase in Institutional Capacity, the dependent variable increases by 0.458 units, making it the strongest predictor in the model (Beta = 0.475). Policy Coherence also contributes positively, with a one-unit increase

leading to a 0.339 unit increase in the dependent variable (Beta = 0.364). The intercept of 1.104 indicates the baseline level of carbon accounting effectiveness when both predictors were zero.

Theoretical Linkage: These findings support Institutional Theory, emphasizing that stronger institutional structures, coordination mechanisms, and technical resources directly enhance the effectiveness of carbon accounting systems. These results also align with the Policy Feedback Theory, suggesting that coherent policy frameworks create positive feedback loops, reinforcing organizational compliance and promoting accurate reporting. Collectively, the empirical evidence confirms that both institutional capacity and policy coherence are critical drivers of effective carbon accounting in Zimbabwe's climate-change mitigation strategy.

Model 2: Stakeholder Involvement → Climate Change Mitigation Outcomes

Table 4. Model Summary

Model	R	R^2	Adjusted R^2	Std. Error
1	0.612	0.375	0.370	0.618

Source: Authors compilation

Interpretation: The regression model indicates a moderately strong positive relationship between the independent variables (e.g., Institutional Capacity and Policy Coherence) and the dependent variable (carbon accounting effectiveness), with R = 0.612. The R^2 of 0.375 implies that 37.5% of the variance in carbon accounting effectiveness is explained by the predictors, while 62.5% remains unaccounted for, likely due to other unmeasured factors or random variation. The adjusted R^2 of 0.370 confirms that the included variables are relevant and that the model is not overfitted. The standard error of 0.618 suggests a moderate level of prediction error, indicating that, on average, the predicted values deviate from the observed values by approximately 0.618 units.

Theoretical Linkage: These results support Institutional Theory, highlighting that institutional capacity, such as governance structures, resource availability, and coordination mechanisms, positively influences carbon accounting effectiveness. They also align with Policy Feedback Theory, indicating that well-designed policy frameworks reinforce organizational behavior, creating feedback loops that improve reporting and verification practices. The findings emphasize that both institutional and policy factors are significant contributors to effective carbon accounting, although additional variables may further enhance predictive accuracy.

Table 5. ANOVA Results

Source	SS	df	MS	F	Sig.
Regression	49.875	1	49.875	130.50	.000
Residual	83.025	148	0.561		
Total	132.900	149			

Source: Authors compilation

I**nterpretation**: The regression model explained approximately 37.5% of the total variance in the dependent variable ($R^2 \approx 0.375$), indicating a modest level of explanatory power. The very high F-statistic ($F = 130.50$, $p < 0.001$) shows that the model fits the data significantly better than a model without predictors. This confirms that the independent variable has a meaningful and statistically significant effect on the dependent variables.

Theoretical Linkage: These findings support Institutional Theory, demonstrating that institutional factors—such as governance structures, technical capacity, and coordination mechanisms—substantially influence carbon accounting effectiveness. Additionally, they align with the Policy Feedback Theory, suggesting that coherent policy frameworks create positive feedback loops that reinforce organizational compliance and encourage accurate measurement, reporting, and verification of carbon emissions. Overall, the results highlight the critical role of institutional and policy structures in shaping effective carbon accounting practices

Table 6. Coefficients

Predictor	B	Std. Error	Beta	t	Sig.
(Constant)	1.579	0.274	—	5.763	.000
Stakeholder Involvement	0.593	0.052	.612	11.420	.000

Source: Authors compilation

Interpretation: The regression results indicate that Stakeholder Involvement is a strong and statistically significant predictor of the dependent variable. Specifically, for every one-unit increase in stakeholder involvement, the outcome increases by 0.593 units after controlling for other factors. The standardized coefficient (Beta = 0.612) confirms that stakeholder involvement has a strong and relative impact. The intercept ($B = 1.579$, $p < 0.001$) indicates that, even in the absence of stakeholder involvement, the baseline level of the dependent variable is significantly above zero.

Theoretical Linkage: These findings support Institutional Theory, suggesting that stakeholder engagement strengthens institutional practices and enhances organizational processes, such as carbon accounting or policy compliance. The results also align with the Policy Feedback Theory, indicating that participatory processes and stakeholder involvement create positive feedback loops, reinforcing the effective implementation of policies and fostering accountability. Empirical evidence highlights that engaging stakeholders is a critical driver of better outcomes in institutional and policy-driven contexts.

5. Conclusion

This study demonstrated a significant relationship between institutional capacity, policy coherence, and carbon accounting effectiveness in Zimbabwe. Regression analysis indicates that both institutional capacity and policy coherence are essential predictors of effective carbon accounting, explaining approximately 51.1% of the variability in outcomes. Institutional capacity, with a strong positive impact, was identified as the most influential factor, highlighting the critical need for robust governance structures and resources to enhance carbon-accounting practices. Furthermore, stakeholder involvement emerged as a significant predictor of climate change mitigation outcomes, accounting for 37.5% of variance. This strong positive relationship indicates that increased engagement from stakeholders contributes meaningfully to improved climate strategies, underscoring the importance of collaborative efforts in addressing climate challenges.

While the models show substantial explanatory power, they also reveal areas for enhancement, as a considerable portion of the variance remains unexplained. Future research should explore additional factors that could influence carbon accounting and climate outcomes, such as socioeconomic dynamics and technological innovations. The findings highlight the necessity of strengthening inter-agency coordination and enhancing institutional capacity to ensure the coherent implementation of carbon accounting frameworks. Governments and relevant agencies should prioritize capacity-building initiatives, resource allocation, and clear governance structures to support effective measurement, reporting, and verification (MRV) practices. In addition, organizations should adopt standardized MRV systems and provide technical training for staff to improve the accuracy and reliability of carbon accounting. Stakeholder engagement strategies should be institutionalized to foster collaboration across sectors, which can enhance overall climate-change mitigation outcomes. Overall, this study underscores the importance of integrated approaches that combine strong institutional frameworks, coherent policy

implementation, and active stakeholder involvement to effectively achieve Zimbabwe's climate goals. This study contributes to a broader understanding of environmental governance in Africa and provides actionable recommendations for enhancing carbon accounting systems.

5.1 Limitation

This study focused primarily on institutional capacity and policy coherence, potentially overlooking the socio-economic, cultural, and technological factors influencing carbon accounting. Reliance on qualitative interviews introduced subjectivity and potential response bias, while the absence of quantitative emission data limited the analytical depth. The findings are context-specific to Zimbabwe and may not be generalizable to other countries. Temporal and sample size constraints further limit the comprehensiveness of the insights, and the study did not consider grassroots initiatives or provide a longitudinal perspective to assess changes over time**.**

5.2 Suggesions

Future research on carbon accounting in Zimbabwe should adopt a broader scope by exploring additional factors, such as socioeconomic conditions, cultural contexts, and technological innovations, which would provide a more comprehensive understanding of the dynamics involved. Incorporating quantitative data on emissions and carbon accounting practices could enhance analytical robustness and allow for a more detailed examination of the relationships between variables. Longitudinal studies would be valuable for tracking changes over time in institutional capacity, policy coherence, and stakeholder involvement, offering insights into trends and the long-term effectiveness of climate strategies.

Expanding the sample size to include diverse stakeholders, such as community leaders, local NGOs, and private sector representatives, would enrich the data and capture a wider range of perspectives. Research should also investigate grassroots initiatives and community-level actions, as they can complement the institutional frameworks and improve overall effectiveness. Comparative studies with other countries or regions facing similar climate challenges could identify best practices relevant to Zimbabwe, while evaluations of specific policy implementations could assess real-world impacts and areas for improvement in Zimbabwe. Finally, emphasizing interdisciplinary approaches that integrate environmental science, economics, and sociology could lead to more holistic solutions for strengthening carbon accounting and climate governance.

Acknowledgement

First and foremost, I would like to thank my academic research team for their invaluable guidance and encouragement throughout this study. Their expertise and insights were instrumental in shaping my approach and ensuring the rigor of this study. I extend my appreciation to the policymakers, environmental regulators from the Environmental Management Agency, and sustainability officers who participated in the interviews. Their willingness to share their experiences and perspectives provided essential data and enriched the findings of this study.

I would also like to acknowledge the support of the Ministry of Environment, whose resources and expertise contributed significantly to the development of this study. The collaborative environment fostered by these institutions played a crucial role in enhancing my work quality. Additionally, I am grateful to my family and friends for their unwavering encouragement and understanding throughout the research process. Their support has kept me motivated and focused. Finally, I would like to thank all those who contributed directly or indirectly to this study. Your insights and assistance have been invaluable in advancing our understanding of carbon accounting and its implications for climate change mitigation in Zimbabwe. Thank you once again for your kind support.

References

Alnaim, M., & Metwally, A. B. M. (2024). Institutional pressures and environmental management accounting adoption: Do environmental strategy matter? *Sustainability, 16*(7), 1-20. doi:https://doi.org/10.3390/su16073020

Amoako, G. K., Adam, A. M., Arthur, C. L., & Tackie, G. (2021). Institutional isomorphism, environmental management accounting and environmental accountability: a review. *Environment, Development and Sustainability, 23*(8), 11201-11216. doi:https://doi.org/10.1007/s10668-020-01140-y

Briner, G., & Moarif, S. (2017). Enhancing transparency of climate change mitigation under the Paris Agreement: Lessons from experience. *OECD/IEA Climate Change Expert Group Papers*(2016/04), 162-203. doi:https://doi.org/10.1787/a634dc1f-en

Busemeyer, M. R. (2022). Policy feedback and government responsiveness in a comparative perspective. *Politische Vierteljahresschrift, 63*(2), 315-335. doi:https://doi.org/10.1007/s11615-022-00377-8

Chanza, N. (2017). Limits To Climate Change Adaptation In Zimbabwe: Insights, Experiences And Lessons. *Limits To Climate Change Adaptation*, 109-127. doi:https://doi.org/10.1007/978-3-319-64599-5_6

Chisaira, L. T. (2023). Legal responses to climate disasters in southern Africa: Practical legal developments in Zimbabwe and Mozambique. *Climate change in Africa: Adaptation, resilience, and policy innovations*, 135-155. doi:https://doi.org/10.1007/978-3-031-30050-9_7

Chivhenge, E., Mabaso, A., Museva, T., Zingi, G. K., & Manatsa, P. (2023). Zimbabwe's Roadmap For Decarbonisation And Resilience: An Evaluation Of Policy (In) Consistency. *Global Environmental Change, 82*, 102708. doi:https://doi.org/10.1016/j.gloenvcha.2023.102708

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications.

Dzingirai, V., & Mangwanya, L. (2015). Struggles over carbon in the Zambezi Valley: the case of Kariba REDD in Hurungwe, Zimbabwe. *Carbon Conflicts And Forest Landscapes In Africa*, 142-162.

England, M. I., Stringer, L. C., Dougill, A. J., & Afionis, S. (2018). How Do Sectoral Policies Support Climate Compatible Development? An Empirical Analysis Focusing On Southern Africa. *Environmental Science & Policy, 79*, 9-15. doi:https://doi.org/10.1016/j.envsci.2017.10.009

Evans, H.-C. (2015). Climate-Change Awareness And Online Media In Zimbabwe: Opportunities Lost. *Knowledge for a sustainable world: a Southern African-Nordic contribution. Illustrated, reprint edn. African Minds, 163*.

Gumbo, E. B., Matsa, M. M., Kowe, P., Shabani, T., & Shabani, T. (2025). Developing An Integrated Framework To Manage Deforestation Associated With Tobacco Farming In Zimbabwe: A Systematic Review. *Biodiversity and Conservation, 34*(4), 1155-1176. doi:https://doi.org/10.1007/s10531-025-03017-w

Jakarasi, V. (2022). *Unlocking Climate Finance And Investment In Zimbabwe: An Analysis Of The Forestry Sector Performance.* Retrieved from http://hdl.handle.net/11427/39059 Available from University of Cape Town OpenUCT database.

Kirilova, D., & Karcher, S. (2017). Rethinking data sharing and human participant protection in social science research: Applications from the qualitative realm. *Data Science Journal, 16*, 43-43. doi:https://doi.org/10.5334/dsj-2017-043

Kupika, O. L., Gandiwa, E., Mbereko, A., & Chibememe, G. (2017). Climate Change And Biodiversity Policy: A Review Of Legal And Institutional Frameworks In Zimbabwe. *Wildlife and Fisheries Management in Zimbabwe: A Critical Reflection*, 37.

Mandizvidza, L. W. (2018). *Interrogating the Role of Zimbabwe" s Print Media in Environmental Reporting*: University of South Africa (South Africa).

Mapfumo, E. T., Emuze, F., Smallwood, J., & Ebekozien, A. (2025). Influence Of Policies Towards Building Retrofitting For Energy Efficiency In Zimbabwe Using Structural Equation Model. *Journal of Facilities Management*. doi:https://doi.org/10.1108/JFM-06-2024-0074

Maphosa, M., & Moyo, P. (2024). Assessing Climate Vulnerabilities Of Urban Food Systems And Institutional Responses: The Case Of Bulawayo, Zimbabwe. *Frontiers in Sustainable Cities, 6*, 1488144. doi:https://doi.org/10.3389/frsc.2024.1488144

Munsaka, T. (2024). The Feasibility of Carbon Credits in Zimbabwe as a Climate Change Mitigation Measure. *Journal for Business, Development and Leadership, 1*, 1-8.

Murombo, T. (2019). Climate change in Zimbabwe: towards a low carbon energy industry. *Forthcoming in climate change law in Zimbabwe: concepts and insights (Konrad Adenauer Foundation)*.
Ncube, H., Ngwenya, M., & Muleya, B. (2023). Green Accounting Practice: Political, Legal and Ethical insights, a focus on Zimbabwe coal mining sector. *International Journal of Research in Management, 5*(1), 15-24. doi:https://doi.org/10.33545/26648792.2023.V5.I1A.64
Nyika, F., & Muzuva, M. (2025). Policy Guidelines To Maximize Zimbabwe's Rare Earths For Economic Growth And Sustainable Trade. *New Applied Studies in Management, Economics & Accounting, 8*(3), 72-90. doi:https://doi.org/10.22034/nasmea.2025.218151
Peters, D. J. T., & Giacumo, L. A. (2020). Ethical and responsible cross-cultural interviewing: Theory to practice guidance for human performance and workplace learning professionals. *Performance Improvement, 59*(1), 26-34. doi:https://doi.org/10.1002/pfi.21906
Pillay, K., Mohanlal, S., Dobson, B., & Adhikari, B. (2025). Evaluating Institutional Climate Finance Barriers In Selected SADC Countries. *Climate Risk Management, 47*, 100694. doi:https://doi.org/10.1016/j.crm.2025.100694
Reid, M. (2020). *The Climate Change–Water–Energy Nexus And Its Impacts On Urban Livelihoods In Zimbabwe.* University of the Witwatersrand, Johannesburg (South Africa).
Resnik, D. B. (2018). *The ethics of research with human subjects: Protecting people, advancing science, promoting trust* (Vol. 74). Cham: Springer.
Sattar, U. (2024). The 4A Climate Action Framework. *npj Climate Action, 3*(1), 103. doi:https://doi.org/10.1038/s44168-024-00188-0
Shabani, T., & Jerie, S. (2023). A Review On The Effectiveness Of Integrated Management System In Institutional Solid Waste Management In Zimbabwe. *Environmental Science and Pollution Research, 30*(45), 100248-100264. doi:https://doi.org/10.1007/s11356-023-29391-y
Takyi, E., Gyimah, P., & Danquah, R. (2025). Exploring governance-driven sustainability accounting in a developing economy. *Strategy & Leadership*, 1-23. doi:https://doi.org/10.1108/SL-07-2025-0203
Tashakkori, A., & Teddlie, C. (2010). *SAGE handbook of mixed methods in social & behavioral research* (2nd ed.). Thousand Oaks, CA: SAGE Publications.
Tonderayi, D. (2012). Combating Greenhouse Gas Emissions in a Developing Country: A Conceptualisation and Implementation of Carbon Tax in Zimbabwe. *Journal of Social Development in Africa, 27*(1), 163.
Yin, R. K. (2018). *Case study research and applications design and methods* (6th ed.). Thousand Oaks, CA: SAGE Publications.