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The Feasibility of Carbon Credits in Zimbabwe as a Climate Change Mitigation Measure.

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Abstract: The paper examines the feasibility of using carbon credits as a climate change mitigation measure in Zimbabwe. It reviews the country's climate change vulnerabilities, greenhouse gas emissions profile, climate change policies, and its carbon market readiness. The study undertakes a comprehensive literature review covering climate impacts, policy commitments, project implementation, carbon market opportunities, and climate justice perspectives in the Zimbabwean context. The analysis finds that while Zimbabwe has made important progress on climate adaptation and mitigation policies, significant gaps remain in key areas required for effective participation in carbon markets.

These gaps include institutional capacity, access to finance, technology transfer, and knowledge systems. The paper highlights several challenges: data deficiencies, poor institutional coordination, limited climate finance, lack of awareness, and insufficient technical expertise in carbon project development and measurement, reporting, and verification (MRV) systems. A raft of recommendations include developing pilot programs across priority sectors to test methodologies and clarify carbon rights, investing in robust MRV systems, establishing clear sustainable development criteria for mitigation actions, facilitating knowledge exchange with regional partners, strengthening institutional coordination mechanisms, and increasing national and international climate finance flows.

By implementing these recommendations, the author argues that Zimbabwe can enhance its climate resilience while promoting low-emissions growth and sustainable development through participation in carbon markets. The findings and proposed actions offer valuable insights for policymakers, practitioners, and researchers working on climate change mitigation in Zimbabwe and other developing countries facing similar challenges. Overall, the study underscores the need for a multipronged approach that addresses Zimbabwe's technical, financial, and institutional capacity gaps to unlock the potential of carbon markets as a climate change mitigation measure. With targeted investments and a solid national commitment supported by robust policies and increased international support, Zimbabwe can position itself to realize the climate change benefits of carbon finance.

Keywords: climate change, carbon credits, green house gases, climate change regulatory framework, carbon market readiness

1. Introduction

Climate change presents significant challenges for Zimbabwe, including increased temperatures, shifting rainfall patterns, and more frequent extreme weather events. These climatic changes negatively impact agricultural production, water resources, health outcomes, and disaster vulnerability, threatening the country's development prospects (Chivhenge et al., 2023; Mavhura et al., 2022; Mtisi & Prowse, 2012). At the same time, climate change mitigation efforts present opportunities for Zimbabwe to advance sustainable development through carbon markets. As an emissions-limited developing country, Zimbabwe can access new finance streams and technologies by implementing projects that reduce greenhouse gas emissions or increase carbon sinks (Gundu-Jakarasi, 2019; Maponga, 2017). Zimbabwe has made significant commitments under the Paris Agreement and other climate conventions to mitigate climate change while building climate resilience.

However, realizing the benefits of carbon markets requires strengthening technical, financial, and institutional capacity across public and private sectors. This paper reviews Zimbabwe's climate change vulnerabilities and emissions profile, assesses national climate change strategies and carbon market readiness, identifies critical gaps and challenges, and provides recommendations for enhancing Zimbabwe's preparedness to access international carbon finance. The analysis draws upon cited literature spanning climate impacts, policy commitments, project implementation, carbon market opportunities, and climate justice perspectives in the Zimbabwe context. Key findings suggest the need for targeted investments and policies to strengthen measurement, reporting, and verification (MRV) systems, build technical expertise in carbon project development, establish pilot projects, clarify carbon rights, and integrate local knowledge. With concerted efforts to address these gaps at national and local levels, Zimbabwe can pave the way for climate mitigation actions that also further adaptation, resilience, and equitable, sustainable development.

2. Materials and Methods

This comprehensive study employed a mixed methods approach to rigorously analyze Zimbabwe's preparedness and potential to leverage carbon markets as a climate change mitigation and sustainable development strategy. The research drew from diverse peer-reviewed literature, government reports, and grey sources to evaluate critical factors related to climate impacts, policy commitments, project implementation, carbon market opportunities, and climate justice perspectives.

Climate Change Impacts in Zimbabwe

Zimbabwe is widely recognized as one of the countries most vulnerable to the detrimental effects of climate change (IPCC, 2022; Manjengwa et al., 2021). As a predominantly agrarian economy, the country's development and livelihoods are intrinsically linked to climate-sensitive sectors like agriculture, energy, and tourism (Murendo et al., 2018; Mupindu & Manyeruke, 2019). Studies have documented Zimbabwe's increasing exposure to droughts, floods, extreme temperatures, and other climatic stressors are threaten threatening food and water security, infrastructure, and human health and well-being (Chikodzi et al., 2021; Mavhura, 2017). The impacts of climate change are not evenly distributed, with marginalized rural communities and women bearing disproportionate burdens (Dube & Nhamo, 2018; Mubaya & Mafongoya, 2017). These vulnerable groups often have limited capacity to adapt due to socioeconomic inequalities, dependence on climate-sensitive livelihoods, and lack of access to resources and decision-making processes (Mapfumo et al., 2016; Mugandani et al., 2021). Enhancing the resilience of these communities is thus a critical priority for climate change adaptation in Zimbabwe.

To analyze the climate change impacts in Zimbabwe, the study reviewed and synthesized findings from peer-reviewed journal articles, government reports, and international organizations such as the Intergovernmental Panel on Climate Change (IPCC) and the United Nations Framework Convention on Climate Change (UNFCCC). Key factors examined included observed and projected changes in temperature, precipitation, extreme weather events, and their implications for sectors such as agriculture, water resources, infrastructure, and public health. The study also explored the disproportionate vulnerabilities of marginalized groups and the need for equitable adaptation strategies.

While Zimbabwe is considered a low-emitting country, with per capita emissions well below the global average, its greenhouse gas (GHG) footprint remains significant (Government of Zimbabwe, 2021; ZERA, 2019). The energy and agriculture sectors are the most tremendouscontributors to national emissions, accounting for over 80% of total emissions (UNFCCC, 2021). Emissions from the energy sector are primarily driven by fuel combustion for electricity generation, transportation, and residential/commercial uses, while agricultural emissions stem mainly from livestock production and crop cultivation practices (Nyamwanza & Kujinga, 2017; Shoko & Tagwira, 2017). Despite its relatively low emissions profile, Zimbabwe possesses substantial mitigation potential across various sectors

(Chikodzi et al., 2021; Rurinda et al., 2020). Opportunities exist to enhance energy efficiency, expand renewable energy generation, implement sustainable land management practices, and optimize agricultural production systems (Murendo et al., 2018; Mugandani et al., 2021). Tapping into this mitigation potential could not only contribute to global climate change efforts but also yield significant co-benefits for sustainable development, such as improved energy access, food security, and livelihood resilience (Government of Zimbabwe, 2021; Mubaya & Mafongoya, 2017). The study reviewed national GHG inventories, sectoral emissions data, and mitigation assessments from government sources and peer-reviewed literature to analyze Zimbabwe's greenhouse gas emissions profile and mitigation potential. The analysis identified the key emitting sectors, drivers, trends, and the country's untapped mitigation opportunities across various sectors. The study also examined the potential co-benefits of climate change mitigation actions for sustainable development in Zimbabwe.

Policy Commitments and Implementation Challenges

Zimbabwe has demonstrated its commitment to addressing climate change through ratifying the Paris Agreement and developing several national-level policies and strategies (Government of Zimbabwe, 2017; UNFCCC, 2021). These include the National Climate Change Response Strategy, the National Climate Policy, and the Nationally Determined Contribution (NDC) under the Paris Agreement. These policy frameworks outline Zimbabwe's adaptation and mitigation priorities, setting targets for renewable energy deployment, sustainable land use, and ecosystem-based approaches (Government of Zimbabwe, 2021; UNFCCC, 2021). However, implementing these policies has faced significant challenges, including limited coordination across government agencies, insufficient financial resources, and inadequate local-level participation and ownership (Dube & Nhamo, 2018; Mugandani et al., 2021). To analyze Zimbabwe's policy commitments and implementation challenges, the study reviewed and synthesized information from government documents, academic publications, and reports from international organizations. Key factors examined included the content and targets of national climate change policies and strategies, the institutional frameworks for implementation, resources financial and human resources allocation, and the barriers to effective policy execution at the national and sub-national levels. The study also explored the role of stakeholder engagement and community participation in the policy implementation process.

Barriers to Carbon Market Readiness

Zimbabwe's ability to fully capitalize on carbon market opportunities is currently constrained by a range of institutional, technical, and financial barriers (ZERA, 2019; Nyamwanza & Kujinga, 2017). Key barriers identified in the literature include:

1. Weak Measurement, Reporting, and Verification (MRV) systems: Zimbabwe lacks robust, comprehensive, and standardized MRV frameworks to accurately quantify, monitor, and report on its greenhouse gas emissions and mitigation activities (Chikodzi et al., 2021; Rurinda et al., 2020). This hinders the country's ability to participate in carbon markets, where rigorous MRV is a fundamental requirement.
2. Limited technical expertise and capacity: There is a shortage of specialized technical skills and knowledge within government agencies, research institutions, and local communities to design, implement, and monitor carbon projects (Mugandani et al., 2021; Mubaya & Mafongoya, 2017). This includes gaps in greenhouse gas accounting, project development, and carbon finance.
3. Underdeveloped legal and regulatory frameworks: Zimbabwe's legal and regulatory environment for carbon markets is still in its nascent stage, with unclear definitions of carbon rights, ownership, and benefit-sharing mechanisms (Nyamwanza & Kujinga, 2017; ZERA, 2019). This creates uncertainty and risks for potential carbon market participants.
4. Lack of pilot project experience: Zimbabwe has limited experience in the development and implementation of carbon projects, particularly at the community level (Murendo et al., 2018; Mupindu & Manyeruke, 2019). This lack of practical knowledge and lessons learned hinders the country's ability to design and scale up successful carbon market interventions.
5. Inadequate access to finance: The necessary financial resources to invest in carbon projects and strengthen institutional capacity remains a significant challenge for Zimbabwe (Dube & Nhamo, 2018; Manjengwa et al., 2021). This is exacerbated by the country's limited participation in global carbon markets and climate finance mechanisms.

To analyze these barriers, the study reviewed and synthesized information from various sources, including peer-reviewed literature, government reports, and publications from international organizations and research institutes. The analysis examined the current state of Zimbabwe's MRV systems, technical capacities, legal and regulatory frameworks, project implementation experience, and access to finance. The study also explored the implications of these barriers for the country's ability to participate in and benefit from carbon markets.

Recommendations for Enhancing Carbon Market Readiness

Based on the findings of this comprehensive review, several key recommendations emerge to strengthen Zimbabwe's preparedness and participation in carbon markets:

1. Develop and implement pilot carbon projects: Zimbabwe should prioritize the design and implementation of pilot carbon projects, particularly at the community level, to build practical experience, generate lessons learned, and demonstrate the viability of carbon market engagement (Murendo et al., 2018; Mupindu & Manyeruke, 2019). These pilot projects should be tailored to the country's context and focus on high-potential mitigation sectors, such as renewable energy, sustainable agriculture, and forest conservation.
2. Strengthen Measurement, Reporting, and Verification (MRV) systems: Investing in the development of robust, comprehensive, and standardized MRV frameworks is crucial for Zimbabwe to accurately quantify, monitor, and report on its greenhouse gas emissions and mitigation activities (Chikodzi et al., 2021; Rurinda et al., 2020). This will enable the country to participate in carbon markets, where rigorous MRV is a fundamental requirement.
3. Build technical capacity and expertise: Zimbabwe should prioritize the development of specialized technical skills and knowledge within government agencies, research institutions, and local communities to design, implement, and monitor carbon projects (Mugandani et al., 2021; Mubaya & Mafongoya, 2017). This includes building capacity in greenhouse gas accounting, project development, and carbon finance.
4. Establish enabling legal and regulatory frameworks: Zimbabwe should work to develop clear, comprehensive, and enabling legal and regulatory frameworks for carbon markets, including defining carbon rights, ownership, and benefit-sharing mechanisms (Nyamwanza & Kujinga, 2017; ZERA, 2019). This will create the necessary certainty and incentives for potential carbon market participants.
5. Enhance access to finance and climate funding: Zimbabwe should explore and leverage a range of domestic and international financial sources, including climate funds, development assistance, and private investment, to mobilize the resources needed to invest in carbon projects and strengthen institutional capacity (Dube & Nhamo, 2018; Manjengwa et al., 2021).
6. Integrate local knowledge and community participation: The design and implementation of carbon projects should prioritize the inclusion and integration of local knowledge, practices, and community-level involvement to ensure the interventions are culturally appropriate, socially equitable, and aligned with the needs and priorities of vulnerable groups (Mapfumo et al., 2016; Mubaya & Mafongoya, 2017).
7. Foster multi-stakeholder partnerships and collaboration: Strengthening coordination and collaboration among government agencies, the private sector, civil society, and international partners will be crucial for Zimbabwe to leverage the expertise, resources, and networks required to enhance its carbon market readiness (Government of Zimbabwe, 2021; ZERA, 2019).

To develop these recommendations, the study drew insights from the analysis of the barriers to carbon market readiness and the review of existing literature on best practices and successful approaches in other developing countries. The recommendations were further refined through consultations with national and international experts in climate change, sustainable development, and carbon markets.

3. Results and Discussion

Climate Change Impacts in Zimbabwe

The findings from the review of climate change impacts in Zimbabwe paint a concerning picture of the country's vulnerability to the effects of global warming. Studies have documented a clear trend of increasing temperatures, shifting precipitation patterns, and a higher frequency and intensity of extreme weather events (Chikodzi et al., 2021; Mavhura, 2017). Zimbabwe's agricultural sector, the backbone of its economy and the primary livelihood source for most of the population, is particularly threatened by these climate change impacts (Murendo et al., 2018; Mupindu & Manyeruke, 2019). Recurrent droughts, floods, and temperature extremes have severely reduced crop yields, livestock productivity, and overall food security, disproportionately affecting marginalized rural communities and women (Dube & Nhamo, 2018; Mubaya & Mafongoya, 2017).

Beyond the agricultural sector, climate change also poses significant risks to Zimbabwe's energy security, water resources, infrastructure, and public health (Chikodzi et al., 2021; Mavhura, 2017). Droughts have reduced hydropower generation, while extreme weather events have damaged critical infrastructure, disrupting essential services and livelihoods. The country's already fragile health system has been further strained by the spread of climate-sensitive diseases, such as malaria and cholera.

The uneven distribution of climate change impacts is a crucial concern, as marginalized groups, including rural communities, the poor, and women, bear a disproportionate burden (Dube & Nhamo, 2018; Mubaya & Mafongoya, 2017). These vulnerable populations often have limited adaptive capacity due to socioeconomic inequalities, dependence on climate-sensitive livelihoods, and lack of access to resources and decision-making processes (Mapfumo et al., 2016; Mugandani et al., 2021). Enhancing the resilience of these communities is, therefore, a critical priority for Zimbabwe's climate change adaptation efforts. This will require targeted, inclusive, and equitable interventions that address the root causes of vulnerability, empower local stakeholders, and leverage scientific and traditional knowledge (Mubaya & Mafongoya, 2017; Mugandani et al., 2021).

Zimbabwe's Greenhouse Gas Emissions Profile and Mitigation Potential

While Zimbabwe is considered a low-emitting country, with per capita emissions well below the global average, its greenhouse gas (GHG) footprint remains significant (Government of Zimbabwe, 2021; ZERA, 2019). The energy and agriculture sectors are the most significant contributors to national emissions, accounting for over 80% of total emissions (UNFCCC, 2021). Emissions from the energy sector are primarily driven by fuel combustion for electricity generation, transportation, and residential/commercial uses (Shoko & Tagwira, 2017). The country's heavy reliance on fossil fuels, particularly coal, for power generation and the growing demand for transportation fuels have been the main contributors to the energy sector's emissions (Nyamwanza & Kujinga, 2017).

In the agriculture sector, the dominant sources of emissions are livestock production and crop cultivation practices (Rurinda et al., 2020). Enteric fermentation from livestock, the application of synthetic fertilizers, and land-use changes, such as deforestation for agricultural expansion, have been the primary drivers of agricultural emissions in Zimbabwe (Mapfumo et al., 2016; Mugandani et al., 2021). Despite its relatively low emissions profile, Zimbabwe possesses substantial mitigation potential across various sectors (Chikodzi et al., 2021; Rurinda et al., 2020). Opportunities exist to enhance energy efficiency, expand renewable energy generation, implement sustainable land management practices, and optimize agricultural production systems (Murendo et al., 2018; Mugandani et al., 2021).

Enhancing energy efficiency through measures such as building retrofits, appliance upgrades, and industrial process improvements could significantly reduce emissions from the energy sector (Nyamwanza & Kujinga, 2017; ZERA, 2019). Similarly, the country's abundant solar, wind, and hydropower resources provide significant potential for expanding renewable energy generation, which could displace fossil fuel-based electricity (Government of Zimbabwe, 2021; UNFCCC, 2021). In the agriculture sector, implementing sustainable land management practices, such as agroforestry, conservation agriculture, and improved livestock management, could help mitigate emissions while also enhancing food security and livelihood resilience (Rurinda et al., 2020; Mubaya & Mafongoya, 2017). Optimizing fertilizer use, improving manure management, and adopting climate-smart agricultural techniques could further reduce emissions from the agricultural sector (Mapfumo et al., 2016; Mugandani et al., 2021). Tapping into this mitigation potential could not only contribute to global climate change efforts but also yield significant co-benefits for sustainable development in Zimbabwe, such as improved energy access, food security, and livelihood resilience (Government of Zimbabwe, 2021; Mubaya & Mafongoya, 2017). However, realizing these benefits will require overcoming various institutional, technical, and financial barriers.

Policy Commitments and Implementation Challenges

Zimbabwe has demonstrated its commitment to addressing climate change through ratifying the Paris Agreement and developing several national-level policies and strategies (Government of Zimbabwe, 2017; UNFCCC, 2021). These include the National Climate Change Response Strategy, the National Climate Policy, and the Nationally Determined Contribution (NDC) under the Paris Agreement. These policy frameworks outline Zimbabwe's adaptation and mitigation priorities, setting targets for renewable energy deployment, sustainable land use, and ecosystem-based approaches (Government of Zimbabwe, 2021; UNFCCC, 2021). However, implementing these policies has faced significant challenges, including limited coordination across government agencies, insufficient financial resources, and inadequate local-level participation and ownership (Dube & Nhamo, 2018; Mugandani et al., 2021).

One of the key challenges has been the lack of coherence and coordination among the various government agencies responsible for climate change-related policies and programs (Nyamwanza & Kujinga, 2017; ZERA, 2019). This has resulted in a fragmented approach, with duplication of efforts and gaps in implementation. Strengthening institutional arrangements and improving inter-agency collaboration will be crucial for effectively executing climate change policies in Zimbabwe. Inadequate local-level participation and ownership have also been a significant challenge in the implementation of implementing climate change policies in Zimbabwe (Mapfumo et al., 2016; Mubaya & Mafongoya,

2017). The top-down approach to policy development and implementation has often failed to incorporate vulnerable communities' needs, priorities, and traditional knowledge, particularly in rural areas. Ensuring meaningful stakeholder engagement and community-level ownership will be crucial for successfully executing climate change interventions.

Despite these challenges, Zimbabwe's policy commitments demonstrate its recognition of the urgency to address climate change and the importance of developing comprehensive strategies and frameworks to guide the country's adaptation and mitigation efforts. However, effectively implementing these policies will require a concerted effort to address the coordination, financial, and local participation barriers.

Barriers to Carbon Market Readiness

The analysis of the barriers to Zimbabwe's carbon market readiness revealed several key constraints that currently limit the country's ability to capitalize on carbon market opportunities fully. One of the most significant barriers is the lack of robust, comprehensive, standardized Measurement, Reporting, and Verification (MRV) systems (Chikodzi et al., 2021; Rurinda et al., 2020). Zimbabwe's current MRV frameworks are fragmented and lack the necessary technical capacity and institutional arrangements to accurately quantify, monitor, and report on its greenhouse gas emissions and mitigation activities. This hinders the country's ability to participate in carbon markets, where rigorous MRV is a fundamental requirement.

The shortage of specialized technical expertise and capacity within government agencies, research institutions, and local communities is another critical barrier (Mugandani et al., 2021; Mubaya & Mafongoya, 2017). Gaps in knowledge and skills related to greenhouse gas accounting, project development, and carbon finance limit Zimbabwe's capacity to design, implement, and monitor successful carbon projects. Zimbabwe's underdeveloped legal and regulatory frameworks for carbon markets also create significant uncertainty and risks for potential participants (Nyamwanza & Kujinga, 2017; ZERA, 2019). The lack of clear definitions of carbon rights, ownership, and benefit-sharing mechanisms discourages private sector and community-level engagement in carbon market initiatives. The limited experience in developing and implementing carbon projects, particularly at the community level, further constrains Zimbabwe's carbon market readiness (Murendo et al., 2018; Mupindu & Manyeruke, 2019). Without a robust pipeline of successful pilot projects, the country lacks the practical knowledge and lessons learned to scale up its carbon market participation. Finally, inadequate access to finance continues to be a significant barrier for Zimbabwe (Dube & Nhamo, 2018; Manjengwa et al., 2021). The country's limited participation in global carbon markets and climate finance mechanisms, combined with competing development priorities and economic challenges, has made it difficult to mobilize the necessary resources to invest in carbon projects and strengthen institutional capacity. These barriers collectively hinder Zimbabwe's ability to participate in and benefit from carbon markets as a climate change mitigation and sustainable development strategy. Overcoming these constraints will require a comprehensive and coordinated approach that addresses the technical, institutional, legal, and financial challenges.

Recommendations for Enhancing Carbon Market Readiness

Based on the findings of this comprehensive review, several key recommendations emerge to strengthen Zimbabwe's preparedness and participation in carbon markets:

1. Develop and implement pilot carbon projects: Zimbabwe should prioritize the design and implementation of pilot carbon projects, particularly at the community level, to build practical experience, generate lessons learned, and demonstrate the viability of carbon market engagement (Murendo et al., 2018; Mupindu & Manyeruke, 2019). These pilot projects should be tailored to the country's context and focus on high-potential mitigation sectors, such as renewable energy, sustainable agriculture, and forest conservation.
2. Strengthen Measurement, Reporting, and Verification (MRV) systems: Investing in the development of robust, comprehensive, and standardized MRV frameworks is crucial for Zimbabwe to accurately quantify, monitor, and report on its greenhouse gas emissions and mitigation activities (Chikodzi et al., 2021; Rurinda et al., 2020). This will enable the country to participate in carbon markets, where rigorous MRV is a fundamental requirement.
3. Build technical capacity and expertise: Zimbabwe should prioritize the development of specialized technical skills and knowledge within government agencies, research institutions, and local communities to design, implement, and monitor carbon projects (Mugandani et al., 2021; Mubaya & Mafongoya, 2017). This includes building capacity in greenhouse gas accounting, project development, and carbon finance.

4. Establish enabling legal and regulatory frameworks: Zimbabwe should work to develop clear, comprehensive, and enabling legal and regulatory frameworks for carbon markets, including defining carbon rights, ownership, and benefit-sharing mechanisms (Nyamwanza & Kujinga, 2017; ZERA, 2019). This will create the necessary certainty and incentives for potential carbon market participants.
5. Enhance access to finance and climate funding: Zimbabwe should explore and leverage a range of domestic and international financial sources, including climate funds, development assistance, and private investment, to mobilize the resources needed to invest in carbon projects and strengthen institutional capacity (Dube & Nhamo, 2018; Manjengwa et al., 2021).
6. Integrate local knowledge and community participation: The design and implementation of carbon projects should prioritize the inclusion and integration of local knowledge, practices, and community-level involvement to ensure the interventions are culturally appropriate, socially equitable, and aligned with the needs and priorities of vulnerable groups (Mapfumo et al., 2016; Mubaya & Mafongoya, 2017).
7. Foster multi-stakeholder partnerships and collaboration: Strengthening coordination and collaboration among government agencies, the private sector, civil society, and international partners will be crucial for Zimbabwe to leverage the expertise, resources, and networks required to enhance its carbon market readiness (Government of Zimbabwe, 2021; ZERA, 2019).

Implementing these recommendations will require a coordinated, long-term, and multi-faceted approach that addresses the technical, institutional, legal, financial, and social barriers to Zimbabwe's carbon market readiness. By doing so, the country can unlock the potential of carbon markets to contribute to its climate change mitigation efforts and sustainable development priorities.

4. Conclusions

This comprehensive study on Zimbabwe's readiness to participate in carbon markets has several important implications for the country's climate change response and sustainable development efforts. First, analyzing climate change impacts underscores the urgency for Zimbabwe to enhance its adaptation and resilience capacity. The country's vulnerability to the detrimental effects of global warming, particularly in the agricultural sector, poses a significant threat to the livelihoods and well-being of its population. Prioritizing equitable and community-driven adaptation strategies will be crucial for safeguarding the most marginalized and vulnerable groups. Second, identifying Zimbabwe's substantial mitigation potential across the energy, agriculture, and land-use sectors highlights the country's opportunity to contribute to global climate change mitigation efforts through carbon market engagement. Unlocking this potential can yield valuable co-benefits, such as improved energy access, food security, and livelihood resilience, aligned with the country's sustainable development objectives.

Third, examining the barriers to carbon market readiness reveals the significant institutional, technical, and financial constraints Zimbabwe must overcome to capitalize on carbon market opportunities fully. Addressing these barriers through implementing the proposed recommendations will be crucial for the country to participate in and benefit from carbon markets in a meaningful and equitable manner. Fourth, the recommendations emphasize the importance of integrating local knowledge, practices, and community-level participation in the design and implementation of carbon projects. This approach is essential for ensuring the cultural appropriateness, social equity, and long-term sustainability of carbon market interventions in Zimbabwe. Finally, the study underscores the need for a coordinated, multi-stakeholder approach to enhancing Zimbabwe's carbon market readiness. Collaboration among government agencies, the private sector, civil society, and international partners will be crucial for leveraging the necessary expertise, resources, and networks to address the country's complex challenges. In conclusion, this comprehensive study on Zimbabwe's readiness to participate in carbon markets provides a robust analytical foundation to guide the country's climate change mitigation and sustainable development strategies. By addressing the identified barriers and implementing the recommended actions, Zimbabwe can unlock the potential of carbon markets to contribute to its climate change response and broader sustainable development goals.

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