

## Climate Governance from the Bottom: Decentralized Adaptation and the Politics of Rural Livelihoods in Southern Africa

Shingirai Mugambiwa<sup>1\*</sup> 

<sup>1</sup> Department of Research Administration and Development, University of Limpopo, P Bag X 1106, SOVENGA, SOUTH AFRICA

\*Corresponding Author: [mugambiwashingirai@gmail.com](mailto:mugambiwashingirai@gmail.com)

**Citation:** Anamofa, J. N., Sartini, S. and Ariani, I. (2025). Climate Governance from the Bottom: Decentralized Adaptation and the Politics of Rural Livelihoods in Southern Africa, *Journal of Cultural Analysis and Social Change*, 10(2), 631-639. <https://doi.org/10.64753/jcasc.v10i2.1664>

**Published:** November 12, 2025

### ABSTRACT

This study interrogates climate governance in the Southern Africa's socio-ecological peripheries, concentrating on how decentralized adaptation policies shape rural livelihoods confronted with deepening climate hazards. The region's ecosystems are worsening under climate stress, with smallholder farmers and forest-dependent communities already positioned at the social periphery bearing the brunt of more erratic precipitation and rising temperatures. The study utilized secondary materials, including peer-reviewed articles, official policy documents, and theoretical discussions on governance and adaptive responses. Data analysis was conducted through an interpretive and integrative approach, critically juxtaposing insights from distinct disciplinary repositories and constructing thematically coherent groupings. The study found that while decentralisation can enhance adaptive governance, its overall effectiveness hinges on bolstering cross-scale finance, capacity, and integration. The study further established that marginalized populations particularly women and youth continue to be underrepresented in decisional arenas, which undermines the equity of adaptation initiatives. The study concludes that decentralized climate governance can achieve transformation only when it is inclusive, sufficiently financed, and intricately linked to overarching rural development plans.

**Keywords:** Climate Governance, Decentralized Adaptation, Rural Livelihoods, Southern Africa, Climate Resilience, Indigenous Knowledge, Institutional Capacity

### INTRODUCTION

Southern Africa is confronted by an intensifying and pervasive threat in the form of climate change (Mugambiwa, 2021a), which compounds an existing legacy of environmental variability, chronic water scarcity, and sustained socio-economic pressures (Chikosi et al., 2018). The region is experiencing a rise in the frequency of droughts, erratic rainfall patterns, and higher average temperatures, each of which is diminishing the resilience of agricultural and natural resource systems that rural populations depend on (Ayanlade et al., 2022; Omokpariola et al., 2025; Ntali et al., 2023). The cumulative effect of these climate stressors is deepening food insecurity and an erosion of living standards, especially within rural communities whose economic survival is tethered to rain-fed cropping and the sustainable harvest of ecosystem goods (Ndlovu et al., 2020). In light of these escalating vulnerabilities, the imperative to construct and nurture governance frameworks capable of anticipating and mitigating climate risks has emerged as an unequivocal priority for countries in the Southern Africa region.

Marginalized rural communities belong to those segments most acutely impacted by climate change because they typically operate with poor access to capital, technical infrastructure, and essential public services (Atkinson & Atkinson, 2023). Often located beyond the locus of political and economic decision-making, such communities find their capacities to adapt constrained. In response, the articulation of decentralized climate governance, where

authority and fiduciary responsibility for climate-related policy and resource allocation are transferred to lower administrative echelons, has gained currency (Mugambiwa et al., 2023). Proponents argue that by placing decision authority in the hands of local actors, governance can be more closely aligned with the distinct spatial and cultural realities that condition adaptive needs. This paper, therefore, focuses on the rural peripheries of Southern Africa to scrutinize how decentralized governance mediates the trajectory of climate adaptation in such settings. While decentralized adaptation mechanisms are increasingly specified in policy, empirical scrutiny of their lived operation in Southern African rural peripheries remains limited, particularly against the fabric of shifting authority, administrative fragmentation, and patronage (Sibiya et al., 2023). This paper interrogates climate governance across the Southern African periphery, foregrounding the decentralised adaptation instruments increasingly shaping the experience of rural households. The resulting analysis intends to enrich both the empirical record and the policy conversation surrounding climate governance and enduring rural prosperity in the region.

## **CONCEPTUAL AND THEORETICAL FRAMEWORK**

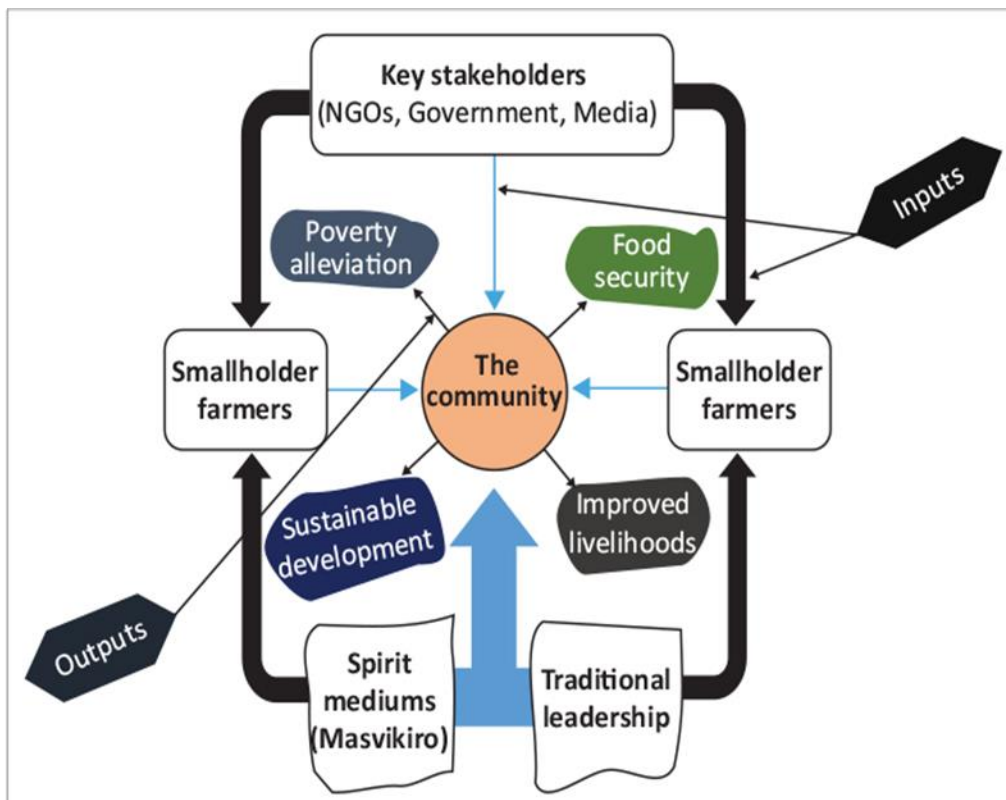
Climate governance encompasses the array of institutions, processes, and instruments through which societies anticipate, mitigate, and adapt to the risks and effects of climate change (Adom et al., 2024). For the Global South, this concept acquires distinctive relevance at the nexus of pervasive environmental hazards and entrenched socio-economic inequalities (Sierra & Suárez-Collado, 2021). Governance operates at multiple scales, engaging international regimes, national authorities, civil society, and the private sector, all of which interact in often overlapping and contested domains

(Tamtik, 2022). Its mandate includes the design and enactment of legislation, the mobilization and distribution of financial and technical resources, and the circulation of climate-relevant knowledge, all oriented toward emissions reduction, enhancement of socio-ecological resilience, and the advancement of equitable and sustainable development (Alcantara, 2016). Governance in this context, however, remains circumscribed by a set of persistent obstacles such as under-resourced institutions, fluctuating regimes of political authority, and stark regional imbalances in infrastructural and human capital. These factors collectively determine the feasibility and effectiveness of climate initiatives once formal policies are set.

Decentralized adaptation refers to a governance model that reallocates both decision-making power and accountability for climate-resilient practices to localized entities including community organisations, local authorities, and customary governance mechanisms (Fischer, 2021; Eakin et al., 2022). This model is based on the premise that local stakeholders have essential ecological and historical knowledge, allowing them to develop strategies that align with the specific ecological and socio-cultural characteristics of their environment. The model functions through a diverse array of agents, ranging from legally recognized district councils to informal networks and traditional authority, all situated within dynamic power structures. These matrices dictate the visibility of specific perspectives, the prioritization of certain interests, and the distribution of financial and material resources. Thus, decentralized adaptation surpasses a purely procedural or technical realm, becoming inherently political; it embodies persistent struggles over power, legitimacy, and the fair allocation of resources.

The investigation of climate governance and decentralized adaptation is anchored in several interrelated theoretical traditions (Zulu et al., 2025). Central to this inquiry is polycentric governance theory, which asserts that effective governance of global commons emerges from numerous, overlapping hubs of authority operating at varied scales (Lozny, 2023). Such a configuration is argued to foster beneficial redundancy, heterogeneity of responses, and locally informed discretion. Complementarily, adaptive governance theory draws attention to the necessity of institutional flexibility, iterative learning, and collaborative engagement across a wide constellation of actors in order to bolster social-ecological resilience (Stockholm Resilience Centre, 2011). Political ecology, by contrast, interrogates the uneven distribution of power and resources, historical legacies, and institutional arrangements that configure the modalities of governance (Kashwan et al., 2021). Finally, livelihoods resilience frameworks interrogate the capacity of households and communities to maintain and reconfigure their subsistence strategies in the face of climate-related shocks and prolonged stresses (Aschinger et al., 2023). These analytical traditions, provide a multidimensional lens through which to interrogate the adaptive agility of decentralized climate governance systems.

Across rural Southern Africa, the adopted theoretical frameworks illuminate the multilayered dynamics of climate governance in peripheral settings. The governance terrain is marked by institutional fragmentation, overlapping institutional mandates, and an interplay between codified regulations and unwritten norms (Mugambiwa, 2021b). Polycentric governance frames the conversation by illustrating the interplay, sometimes synergistic, other times contradictory, between village-level customary councils and more formal climate policy forums at the national echelon (Yadav et al., 2024). Livelihoods resilience frameworks, finally, emphasize the complex, cross-sectoral livelihood choices that rural households mobilize to offset climate shocks without descending into impoverishment.



**Figure 1:** Climate governance Model adapted from Mugambiwa (2021b) <https://doi.org/10.4102/jamba.v13i1.1024>

When theoretical vintage points are synthesized, they yield, in practice, a far more granular portrait of decentralized adaptation as represented in figure 1. a representation of the climate governance system in rural Zimbabwe. The model underscores that resilience is not a by-product of institutional design or technological transfer alone; rather, it is contingent upon active pursuit of social equity, meaningful engagement, and distributive justice. This coherent conceptual framework guides the ensuing empirical inquiry into the development of decentralized governance projects and their actual impacts on rural livelihoods across Southern Africa.

## METHODOLOGY

This study is structured around a conceptual framework to clarify the relationship between climate governance and decentralized adaptation methods in the rural communities of Southern Africa. This approach facilitates the analytical examination of the normative, procedural, and material connections that conditional governance frameworks establish when interacting with adaptive strategies, while explicitly concentrating on rural environments and the epistemic uncertainty inherent in climate change. The study utilized secondary materials, including peer-reviewed articles, official policy documents, and theoretical discussions on governance and adaptive responses. The inquiry utilized a systematic review protocol to enumerate, appraise, and synthesize relevant texts, ensuring a comprehensive survey of both established and emerging contributions to the discourse. Data analysis was conducted through an interpretive and integrative approach, critically juxtaposing insights from distinct disciplinary repositories and constructing thematically coherent groupings. This interpretative exercise revealed recurring patterns, identified conceptual gaps, and established an analytical framework linking governance structures, locally implemented adaptive measures, and rural livelihood paths in the Southern African context.

## RESULTS AND DISCUSSION

### Climate Change and Rural Vulnerability in Southern Africa

Southern Africa is presently among the world's regions most vulnerable to climate change, confronting multiple, interlinked climate risks that disproportionately affect rural societies (See. Table 1). The region is experiencing intensifying droughts, increasingly unpredictable precipitation, severe flooding events, and elevated temperature extremes (Tirivangasi et al., 2022; Mugambiwa, 2024). Each of these stressors has grown more frequent and severe since the late twentieth century, thereby eroding rural agricultural productivity and heightening

the risk of chronic food insecurity. Extended droughts, for example, culminate in widespread crop failures and significant livestock mortalities, while flood surges destroy transport, storage, irrigation infrastructure, and displace poor communities (Dawit & Abebaw, 2020).

**Table 1:** Climate Change and Rural Vulnerability in Southern Africa

<b>Dimension</b>	<b>Key Issues</b>	<b>Impacts on Rural Communities</b>
<b><i>Climate Stressors</i></b>	Intensifying droughts; unpredictable rainfall; severe floods; rising temperature extremes	Crop failures, livestock mortalities, destroyed infrastructure, displacement, altered planting seasons, worsened water scarcity
<b><i>Agricultural Dependence</i></b>	Reliance on rain-fed smallholder farming; limited access to credit, seeds, and advisory services	Heightened sensitivity to rainfall variability; low adoption of resilient practices; persistent food insecurity
<b><i>Gendered Vulnerabilities</i></b>	Women face insecure land tenure, limited decision-making power, and reduced agricultural returns	Reduced adaptive capacity; limited livelihood diversification; perpetuation of poverty among female-headed households
<b><i>Structural Marginalisation</i></b>	Settlements in ecologically fragile areas; poor transport and market infrastructure; weak healthcare and education access	Resource depletion; constrained adaptation options; self-reinforcing cycle of poverty and vulnerability
<b><i>Historical Legacies</i></b>	Colonial land dispossession; inequitable allocation of fertile land; post-colonial continuation of elite capture	Enduring spatial inequality; insecure tenure; exclusion from land reform benefits; concentrated vulnerability
<b><i>Governance Gaps</i></b>	Weak local administrative presence; poorly resourced traditional authorities; disconnect between national policies and local realities	Policy voids; lack of risk information; failure to integrate local actors into adaptation planning
<b><i>Intersecting Social Vulnerabilities</i></b>	Poverty, gender inequality, age, disability, and health disparities	Unequal exposure to food insecurity, water shortages, and mobility barriers in accessing relief or adaptation opportunities
<b><i>Overall Outcome</i></b>	Dynamic interplay of ecological shocks, social inequalities, and governance failures	Deepening rural vulnerability, cycles of poverty, and erosion of livelihood resilience

Rural populations in Southern Africa face heightened climate-related risks due to entrenched socioeconomic vulnerabilities (Hassen, 2008; Mugambiwa, 2021a). Smallholder farmers, constituting the primary demographic in these regions, depend on rain-fed cropping systems that are acutely sensitive to interannual rainfall variability (Zenda et al., 2024). These farmers' limited access to credit, improved seed varieties, and agronomic advisory services constrain the uptake of climate-resilient technologies and practices (Olabanji, & Chitakira, 2025). Within this context, households led by women encounter compounded vulnerabilities such as insecure land tenure, lower cumulative returns from agricultural labour, and marginal representation in local decision-making bodies restrict their ability to implement protective adaptations (Richard et al., 2022). Consequently, these intersecting disadvantages inhibit effective coping and recovery, perpetuating cycles of deepening poverty and heightened food insecurity among already marginalised groups.

Rural settlements often occupy ecologically sensitive zones characterised by degraded soils, intermittent water availability, and inadequate transport and market infrastructure (Lou & Wang, 2024). Such endogenous fragility is compounded by peripheral access to healthcare, primary education, and remunerative off-farm livelihoods, all of which erode the capacities needed for successful adaptation (Matunhu et al., 2020). The interaction of soil depletion, water stress, and poverty generates a self-reinforcing dynamic in which climatic shocks exacerbate resource scarcity, while dwindling resources undermine the feasibility of effective adaptation strategies. These trends are not endogenous to rural settlements alone; they reflect long-standing structural inequalities that marginalise rural populations from equitable governance, resource allocation, and participation in climate-resilient development planning.

Further, climate adaptation exhibits markedly gendered dimensions, with women frequently occupying a critical yet inadequately acknowledged position in both household and community resilience (Adeola et al., 2024; Nyahunda and Tirivangasi, 2022). In numerous rural contexts, they serve as the principal cultivators of food and the managers of water and fuel, thus positioning themselves at the nexus of adaptive practice. Nevertheless, women persist in confronting systemic impediments, including insecure land rights, restricted access to credit, and exclusion from policy-forming arenas, all of which erode their adaptive potential (Ingwani, 2021). Consequently, gender-sensitive frameworks remain imperative if adaptation interventions are to engage the precise vulnerabilities and the differential strengths that characterize rural women's lived experiences.

### **Historical Practices of Land Allocation**

A thorough understanding of rural vulnerability throughout Southern Africa demands analysis situated against historical and political backdrops. Colonial practices of land allocation and resource extraction severed indigenous landholdings to appropriate the most arable regions, concentrating wealth among a small settler elite while relegating a large indigenous population to arid and marginal territories (Nyandoro, 2019). Successive post-colonial regimes, while formally committed to land reform, have often approximated pre-independence exclusion by delegating redistributive decisions to technocratic elites and political intermediaries who reproduce patronage-based land allocation and deny rural populations secure tenure necessary for long-term adaptation (Mkodzongi, & Lawrence, 2019). The spatially uneven development produced by these historical legacies attenuates institutional capacity in the rural periphery.

Climate change intersects with pre-existing social vulnerabilities such as poverty, gender, age, and health status, yielding differentiated effects within rural communities (Bezgrebelna et al., 2024). Women and children, typically responsible for cooking and water collection, find themselves disproportionately affected by heightened food insecurity and water shortages (Magwegwe et al., 2024). Elderly and disabled individuals may encounter mobility limitations that restrict their ability to reach relief services or to pivot toward alternative livelihoods. Such intersecting vulnerabilities must be identified to craft adaptation strategies that are both equitable and inclusive. Rural susceptibility to climate change in Southern Africa arises from the dynamic overlay of environmental hazards, socioeconomic disparities, colonial legacies, and fragmented governance (Zhou, et al., 2022). Effective mitigation must therefore employ integrated methodologies that weigh both ecological and social trajectories of climate impact. Strengthening rural resilience demands not only the deployment of adaptive technologies and resources, but also the dismantling of entrenched inequalities, thereby enabling marginalized populations to co-lead climate governance and inclusive developmental agendas.

### **National Climate Change Frameworks**

Over the past decade, Southern African countries have begun to link national climate frameworks with explicit decentralization policies, intending to strengthen adaptive capacity at the community level (Kweyu et al., 2023). Key documents, such as Zimbabwe's National Climate Policy of 2017, the National Climate Change Adaptation Strategy issued by South Africa in 2020, and Mozambique's National Adaptation Plan, consistently highlight the necessity of cultivating local-level responses and embedding climate considerations into district development planning. Complementary decentralization policies assign differing degrees of decision-making power to subnational authorities, thereby permitting district and municipal planning bodies to assume a more pronounced role in mitigating climate hazards. Nonetheless, the degree to which these cross-cutting policies achieve practical, on-the-ground results varies significantly across the subregion.

Local governments serve as pivotal agents within decentralized climate adaptation systems, charged with orchestrating responses to climate variability, securing and apportioning funding, and embedding adaptive measures within broader development frameworks (Kweyu et al., 2023). In parallel, traditional governance structures comprising chiefs, headmen, and village elders retain considerable authority, particularly in rural settings where customary legal and institutional frameworks remain vibrant (Mugambiwa, 2021b). Complementing these formal tiers are community-based organizations including agricultural cooperatives, faith-based associations, and grassroots NGOs whose roles centre on raising awareness, harnessing indigenous knowledge, and overseeing the implementation of localized projects. The effectiveness of adaptation planning at the local level is thus partly determined by the robustness of collaboration among these varied actors, particularly when roles and responsibilities are explicitly articulated.

Numerous rural communities, acting independently, have begun to formulate adaptation approaches that privilege indigenous knowledge and locally controlled resources (Mugambiwa, 2018). Illustrative cases include the restoration of traditional rainwater-harvesting techniques in Zimbabwe's semi-arid districts (ATPS, 2013), the introduction of diversified cropping systems in Mozambique that integrate indigenous cultivars with newly developed, drought-resilient varieties, and community-governed grazing systems in South Africa that limit herd access to pasture during protracted dry spells (Zorrilla-Miras et al., 2024). Such initiatives typically grow from the experiential knowledge of community members and are finely attuned to prevailing environmental conditions.

### **Migration, Adaptation, and Livelihoods Interplay**

The interplay among migration, adaptation, and livelihoods introduces further intricacy (See Table 2). In several rural settings, the out-migration of young adults and able-bodied men has become a deliberate adaptive response to declining agricultural returns and recurrent climate shocks (Ncube et al., 2024; Mugambiwa & Sibanda, 2025). The remittances these migrants transmit often bolster household food security, finance agricultural inputs, or seed small enterprises (Bharadwaj et al., 2021).

**Table 2:** Migration, Adaptation, and Livelihoods Interplay

Dimension	Key Dynamics	Positive Contributions	Negative Consequences / Risks	Opportunities for Strengthening
<b>Migration as Adaptation</b>	Out-migration of young adults and men in response to climate shocks and low agricultural returns	Remittances finance food security, agricultural inputs, and small enterprises	Loss of local labour; weakened social networks; reduced collective action	Inclusion of returning migrants in adaptation strategies; creation of local job opportunities to reduce out-migration drivers
<b>Adaptation &amp; Livelihoods</b>	Climate initiatives integrated into rural development programmes	Improved food security, diversification (e.g., small enterprises, irrigation, climate-smart agriculture)	Benefits uneven where gender disparities, weak governance, and limited financial access persist	Grounding interventions in local realities; ensuring inclusivity in planning and implementation
<b>Governance Structures</b>	Fragmentation, poor coordination between central, provincial, and local tiers	Potential for coherent, systemic resilience if well-aligned	Redundant programmes; wasted resources; isolated local initiatives	Strengthening vertical and horizontal coordination; harmonising adaptation with broader rural development goals
<b>Local Government Capacity</b>	Municipal/district councils face financial, technical, and institutional shortfalls	Localised leadership potential if resourced	Overburdened officials; weak planning and monitoring; political instability and corruption undermine trust	Training in climate sciences and participatory planning; building institutional solidarity and accountability
<b>Role of NGOs &amp; Donors</b>	External agencies support funding, demonstration projects, capacity-building, and climate information services	Infusion of resources and technical know-how; initiation of adaptation pilots	Risk of dependency; misaligned priorities; short-term cycles; undermining of local ownership	Align donor projects with national frameworks and community priorities; channel funding through local institutions

The net effect of climate adaptation initiatives on rural livelihoods in Southern Africa reveals a dual landscape of progress and enduring vulnerabilities. Gains are most pronounced when interventions are grounded in local realities, involve affected communities, and mesh seamlessly with wider rural development programmes (Yu et al., 2024). Governance remains a critical battleground for climate adaptation in the region, with institutional fragmentation and poor vertical and horizontal coordination as the most pronounced obstacles (Cattivelli, 2021).

Capacity constraints at the municipal and district council level amplify existing governance shortfalls in adaptation governance (Etongo, & Gill, 2022). Many rural councils and district councils confront shortages in technical know-how, financial backing, and institutional solidarity necessary for the coherent conception, execution, and monitoring of adaptation measures (Gonzalez-Iwanciw et al., 2019). Local officials are frequently tasked with an excessive array of duties and may not have received training in the climate sciences or in participatory planning methodologies. Political instability or corruption of varying intensity sometimes erodes trust in subnational institutions, thereby dampening community participation and diminishing the sense of ownership in adaptation programmes.

International donors and non-governmental organizations occupy a critical mediating role, supplying the institutional and financial leg-room that local governments otherwise lack (Mugambiwa, 2021b). Their interventions have supported the initiation of demonstration projects, the delivery of capacity-building curricula, and the distribution of climate information services in the most affected villages. Nevertheless, externally funded programmes risk inducing dependency and misdirecting local priorities if they are not scrupulously synchronised with the broader national frameworks and the articulated priorities of communities. Rapid project cycles and externally dictated objectives may produce disjointed and ephemeral results with limited capacity for self-reinforcement.

## CONCLUSION

This paper elucidates the dynamic and non-linear nature of decentralized climate adaptation processes in Southern Africa, offering substantial insights when analyzed through the frameworks of polycentric governance, adaptive governance, and political ecology. The polycentric governance framework illustrates the complex network of institutions and actors, including local councils, chieftaincies, non-governmental organizations, and emerging community collectives, that function concurrently and frequently in a synergistic manner. The study established that decentralized adaptation can transform the power dynamics of climate governance by shifting authority and decision-making to local communities. It enables rural stakeholders to define priorities, manage resources, and implement policy decisions.

The research presents multiple specific implications for policy and practice. Enhancing the capabilities of local governments and community councils through ongoing training, reliable financial resources, and unrestricted access to climate data is essential for effectiveness. Adaptive instruments require calibration to align with local ecology and the experiences of households, utilizing both empirical climate science and indigenous epistemologies to promote collaborative knowledge generation. Effective multilevel coordination among national ministries, donor agencies, civil society, and local constituencies is essential to prevent conflicting efforts. Incorporating marginalized individuals into the design, ongoing oversight, and evaluation stages of adaptation interventions improves both the technical validity and the legitimacy of the resulting outcomes.

## REFERENCES

- Adeola, O., Evans, O., & Ngare, I. (2024). Gender and climate issues in Africa. In *Gender equality, climate action, and technological innovation for sustainable development in Africa* (pp. xx–xx). Palgrave Macmillan. [https://doi.org/10.1007/978-3-031-40124-4\\_2](https://doi.org/10.1007/978-3-031-40124-4_2)
- African Technology Policy Studies Network. (2013). Indigenous rain water harvesting practices for climate adaptation and food security in dry areas: The case of Bahi District [Deusedit Kibassa]. ATPS Research Paper No. 22.
- Alcantara, C., Broschek, J., & Nelles, J. (2016). Rethinking multilevel governance as an instance of multilevel politics: A conceptual strategy. *Territory, Politics, Governance*, 4(1), 33–51. <https://doi.org/10.1080/21622671.2015.1047896>
- Aschinger, R., Boillat, S., & Ifejika Speranza, C. (2023). Smallholder livelihood resilience to climate variability in South-Eastern Kenya, 2012–2015. *Frontiers in Sustainable Food Systems*, 7, 1070083. <https://doi.org/10.3389/fsufs.2023.1070083>
- Atkinson, C. L., & Atkinson, A. M. (2023). Impacts of climate change on rural communities: Vulnerability and adaptation in the Global South. *Encyclopedia*, 3(2), 721–729. <https://doi.org/10.3390/encyclopedia3020052>
- Ayanlade, A., Oluwaranti, A., Ayanlade, O., Borderon, M., Sterly, H., et al. (2022). Extreme climate events in sub-Saharan Africa: A call for improving agricultural technology transfer to enhance adaptive capacity. *Climate Services*, 27, 100311. <https://doi.org/10.1016/j.cliser.2022.100311>
- Bharadwaj, A., et al. (2021). Connecting the dots: Climate change, migration and social protection. IIED Working Paper. International Institute for Environment and Development.
- Cattivelli, V. (2021). Climate adaptation strategies and associated governance structures in mountain areas: The case of the Alpine regions. *Sustainability*, 13(5), 2810. <https://doi.org/10.3390/su13052810>
- Chikosi, E. S., Mugambiwa, S. S., Tirivangasi, H. M., & Rankoana, S. A. (2018). Climate change and variability perceptions in Ga-Dikgale community in Limpopo Province, South Africa. *International Journal of Climate Change Strategies and Management*. Advance online publication. <https://doi.org/10.1108/IJCCSM-01-2018-0004>
- Dawit, A., & Abebaw, A. (2020). Devastating effect of floods on rice production and commercialisation in the Fogera plain. *Future Agricultures*. <https://www.future-agricultures.org/blog/devastating-effect-of-floods-on-rice-production-and-commercialisation-in-the-fogera-plain/>
- Eakin, H., Keele, S., & Lueck, V. (2022). Uncomfortable knowledge: Mechanisms of urban development in adaptation governance. *World Development*, 159, 106056. <https://doi.org/10.1016/j.worlddev.2022.106056>
- Etongo, D., & Gill, K. (2022). Local governance capacity needs for implementing climate change adaptation in Seychelles: An assessment based on the capital approach. *Challenges*, 13(2), 49. <https://doi.org/10.3390/challe13020049>
- Fischer, H. W. (2021). Decentralization and the governance of climate adaptation: Situating community-based planning within broader trajectories of political transformation. *World Development*, 140, 105335. <https://doi.org/10.1016/j.worlddev.2020.105335>
- González-Iwanciw, J., Dewulf, A., & Karlsson-Vinkhuyzen, S. (2019). Learning in multi-level governance of adaptation to climate change—A literature review. *Journal of Environmental Planning and Management*, 63(5), 779–797. <https://doi.org/10.1080/09640568.2019.1594722>

- Hassen, A. (2008). Vulnerability to drought risk and famine: Local responses and external interventions among the Afar of Ethiopia, a study on the Aghini pastoral community (Doctoral dissertation).
- Ingwani, E. (2021). Struggles of women to access and hold land use and other land property rights under the customary tenure system in peri-urban communal areas of Zimbabwe. *Land*, 10(6), 649. <https://doi.org/10.3390/land10060649>
- Kashwan, P., Mudaliar, P., Foster, S. R., & Clement, F. (2021). Reimagining and governing the commons in an unequal world: A critical engagement. *Current Research in Environmental Sustainability*, 3, 100102. <https://doi.org/10.1016/j.crsust.2021.100102>
- Kweyu, R. M., Asokan, S. M., Ndesanjo, R. B., Obando, J. A., & Tumbo, M. H. (2023). Climate governance in Eastern Africa: The challenges and prospects of climate change adaptation policies. In G. Onyango (Ed.), *State politics and public policy in Eastern Africa*. Palgrave Macmillan. [https://doi.org/10.1007/978-3-031-13490-6\\_16](https://doi.org/10.1007/978-3-031-13490-6_16)
- Lou, R., & Wang, D. (2024). Rural settlement optimization for ecologically sensitive area evaluations based on geoproximity and the soil–water conservation capacity. *Land*, 13(7), 1071. <https://doi.org/10.3390/land13071071>
- Lozny, L. L. (2023). Central to this inquiry is polycentric governance theory, which asserts that effective governance of global commons emerges from numerous, overlapping hubs of authority operating at varied scales. *Social Studies*, 22(2). <https://doi.org/10.30884/seh/2023.02.10>
- Magwegwe, E., Zivengwa, T., & Zenda, M. (2024). Adaptation and coping strategies of women to reduce food insecurity in an era of climate change: A case of Chireya District, Zimbabwe. *Climate*, 12(8), 126. <https://doi.org/10.3390/cli12080126>
- Matunhu, J., Mago, S., & Matunhu, V. (2022). Initiatives to boost resilience towards El Niño in Zimbabwe's rural communities. *Jambá: Journal of Disaster Risk Studies*, 14(1), a1194. <https://doi.org/10.4102/jamba.v14i1.1194>
- Mkodzongi, G., & Lawrence, P. (2019). The fast-track land reform and agrarian change in Zimbabwe. *Review of African Political Economy*, 46(159), 1–13. <https://doi.org/10.1080/03056244.2019.1622210>
- Mugambiwa, S. S. (2018). Adaptation measures to sustain indigenous practices and the use of indigenous knowledge systems to adapt to climate change in Mutoko rural district of Zimbabwe. *Jambá: Journal of Disaster Risk Studies*, 10(1), 388. <https://doi.org/10.4102/jamba.v10i1.388>
- Mugambiwa, S. S. (2021a). Integrating Indigenous Knowledge Systems in entrepreneurship: A case of horticulture farmers in Mutoko District of Zimbabwe. *Indonesian Journal of Social and Environmental Issues*, 2(3), 221–226.
- Mugambiwa, S. S. (2021b). Evoking the epistemology of climate governance through indigenous knowledge systems for sustainable development in rural Zimbabwe. *Jambá: Journal of Disaster Risk Studies*, 13(1), a1024. <https://doi.org/10.4102/jamba.v13i1.1024>
- Mugambiwa, S. S., Rankoana, S. A., & Tirivangasi, H. M. (2023). Climate governance beyond the government: Indigenous knowledge systems in rural Zimbabwe's climate change adaptation. *International Journal of Development and Sustainability*, 12(6), 238–249.
- Mugambiwa, S.S. & Sibanda, P. (2025). Climate change, migration, and displacement: Advancing a risk-informed approach for sustainable solutions. *International Journal of Population Studies*. 11(4), 7–14. <https://doi.org/10.36922/ijps.5165>
- Mugambiwa, S.S. (2024). Water governance and agricultural livelihoods: Navigating human-ecological systems and farmer strategies in Rural Zimbabwe. *Edelweiss Applied Science and Technology*. 8 (6), 949-959. <http://doi.org/10.55214/25768484.v8i6.2188>.
- Ncube, T., Zualii, L., Murray, U., Nguyen, N., Liebig, T., Krendelsberger, A., ... Spillane, C. (2024). Understanding the climate, migration, social protection nexus from a youth mobility dimension: Can social protection address the drivers of climigration? *Climate and Development*, 17(5), 436–457. <https://doi.org/10.1080/17565529.2024.2380380>
- Ndlovu, E., Prinsloo, B., & le Roux, T. (2020). Impact of climate change and variability on traditional farming systems: Farmers' perceptions from south-west, semi-arid Zimbabwe. *Jambá: Journal of Disaster Risk Studies*, 12(1), 742. <https://doi.org/10.4102/jamba.v12i1.742>
- Ntali, Y. M., Lyimo, J. G., & Dakyag, F. (2023). Trends, impacts, and local responses to drought stress in Diamare Division, Northern Cameroon. *World Development Sustainability*, 2, 100040. <https://doi.org/10.1016/j.wds.2022.100040>
- Nyahunda, L., & Tirivangasi, H. M. (2022). Adaptation strategies employed by rural women in the face of climate change impacts in Vhembe district, Limpopo Province, South Africa. *Management of Environmental Quality: An International Journal*, 33(4), 1061–1075. <https://doi.org/10.1108/MEQ-09-2021-0207>
- Nyandoro, M. (2019). Land and agrarian policy in colonial Zimbabwe: Re-ordering of African society and development in Sanyati, 1950–1966. *Historia*, 64(1), 111–139. <https://doi.org/10.17159/2309-8392/2019/v64n1a6>

- Omokpariola, D. O., Agbanu-Kumordzi, C., Samuel, T., et al. (2025). Climate change, crop yield, and food security in Sub-Saharan Africa. *Discover Sustainability*, 6, 678. <https://doi.org/10.1007/s43621-025-01580-4>
- Prakash, K., Mudaliar, P., Foster, S. R., & Clement, F. (2021). Reimagining and governing the commons in an unequal world: A critical engagement. *Current Research in Environmental Sustainability*, 3, 100102. <https://doi.org/10.1016/j.crsust.2021.100102>
- Richard, B., Qi, A., & Fitt, B. D. (2022). Control of crop diseases through integrated crop management to deliver climate-smart farming systems for low- and high-input crop production. *Plant Pathology*. <https://doi.org/10.1111/ppa.13544>
- Richard, K. A., Simatele, M. D., Das, D. K., Mukalazi, K. A., Mazinyo, S., Mudau, L., Sithole, M., Kubanza, S., Vogel, C., & Zhou, L. (2024). Enhancing climate change adaptation governance through transforming institutions in KwaZulu-Natal Province, South Africa. *International Journal of Climate Change Strategies and Management*, 16(4), 413–438. <https://doi.org/10.1108/IJCCSM-12-2022-0157>
- Sibiya, N. P., Das, D. K., Vogel, C., Mazinyo, S. P., Zhou, L., Kalumba, M. A., Sithole, M., Adom, R. K., & Simatele, M. D. (2023). Overcoming bureaucratic resistance: An analysis of barriers to climate change adaptation in South Africa. *Climate*, 11(7), 145. <https://doi.org/10.3390/cli11070145>
- Sierra, J., & Suárez-Collado, Á. (2021). Understanding economic, social, and environmental sustainability challenges in the Global South. *Sustainability*, 13(13), 7201. <https://doi.org/10.3390/su13137201>
- Stockholm Resilience Centre. (2011). *Insight #3: Adaptive governance*. Stockholm University. <https://www.stockholmresilience.su.se>
- Tamtik, M., & Colorado, C. (2022). Multi-level governance framework and its applicability to education policy research: The Canadian perspective. *Research in Education*, 114(1), 20–44. <https://doi.org/10.1177/00345237221140141>
- Tirivangasi, H. M., Rankoana, S. A., & Mugambiwa, S. S. (2022). Community perceptions on the effects of climate change on socio-economic and health conditions of Dikgale community, Limpopo Province, South Africa. *African Journal of Development Studies*, 12(4), 183–200.
- Yadav, A., Anwer, N., Mahapatra, K., Shrivastava, M. K., & Khatiwada, D. (2024). Analyzing the role of polycentric governance in institutional innovations: Insights from urban climate governance in India. *Sustainability*, 16(23), 10736. <https://doi.org/10.3390/su162310736>
- Yu, Y., Appiah, D., Zulu, B., & Adu-Poku, K. A. (2024). Integrating rural development, education, and management: Challenges and strategies. *Sustainability*, 16(15), 6474. <https://doi.org/10.3390/su16156474>
- Zenda, M., Rudolph, M., & Harley, C. (2024). The impact of climate variability on the livelihoods of smallholder farmers in an agricultural village in the wider Belfast area, Mpumalanga Province, South Africa. *Atmosphere*, 15(11), 1353. <https://doi.org/10.3390/atmos15111353>
- Zhou, L., Kori, D. S., Sibanda, M., & Nhundu, K. (2022). An analysis of the differences in vulnerability to climate change: A review of rural and urban areas in South Africa. *Climate*, 10(8), 118. <https://doi.org/10.3390/cli10080118>
- Zorrilla-Miras, P., Lisboa, S. N., López-Gunn, E., & Giordano, R. (2024). Farmers' information sharing for climate change adaptation in Mozambique. *Information Development*. <https://doi.org/10.1177/02666669241227910>
- Zulu, K., Ezeani, E., Salimi, Z., Simenti-Phiri, E., Chunga, C. K., Musanda, P., & Halwiindi, P. (2025). Determinants of effective participatory multi-actor climate change governance: Insights from Zambia's environment and climate change actors. *Environmental Science and Policy*, 167, 104040. <https://doi.org/10.1016/j.envsci.2025.104040>