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The Interlinkages Between Climate Change Responses and Sustainable Development Goals at the Local Government Level in the Eastern Cape Province, South Africa

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Abstract

Climate change poses a significant threat to achieving Sustainable Development Goals in South Africa, particularly in the vulnerable Eastern Cape Province. This study examines the interlinkages between climate-change responses (SDG 13) and selected SDGs (1, 2, 3, 4, 6, 7, 8 and 9) at the municipal level. It investigates climate-financing mechanisms, lessons and opportunities from climate response practices, and their contribution to development outcomes. A qualitative approach was adopted, involving 20 purposively selected participants from metropolitan, district and local municipalities, as well as national institutions. Data were collected through semi-structured interviews and secondary-document analysis. It was analysed using thematic analysis informed by the Rapid Risk and Institutional Appraisal and Adaptive Capacity Wheel frameworks. The key findings show that climate responses are poorly financed at the local level but indirectly benefit from some municipal service provision. The findings further indicate that institutional learning and inclusive stakeholder engagement are central to effective climate response. Furthermore, the findings illustrate that climate change responses and SDGs may generate synergies at the project-outcome level while competing at the budget-allocation level. In essence, the study demonstrates that climate change responses and SDG achievement are closely interconnected but remain inadequately integrated into municipal planning processes. It concludes that stronger institutional mandates, dedicated financing mechanisms and improved climate mainstreaming are required to enhance resilience and development outcomes at the municipality level. The study contributes empirical evidence on the climate-SDG nexus and demonstrates the usefulness of RRIA and ACW in informing climate-governance reforms.

Keywords: climate change response; climate change governance; sustainable development goals; local government; South Africa



Academic Editor: Vilas
Nitivattananon

Received: 19 July 2026

Revised: 9 September 2026

Accepted: 16 September 2026

Published: 23 September 2026

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1. Introduction

Efforts to address climate change and the pursuit of achieving Sustainable Development Goals (SDGs) are often intertwined. Climate change has become one of the most urgent global challenges and poses a significant threat to achieving SDGs [1]. It is both an

environmental and developmental concern, functioning as a risk multiplier that intensifies socioeconomic vulnerabilities and slows progress toward sustainable development [2]. Moreover, limited adaptive capacity in Africa continues to undermine development trajectories and threatens the attainment of the SDGs by 2030 [3,4]. Climate variability is unfolding alongside developmental transitions in many African economies, intensifying pre-existing vulnerabilities [5]. Thus, strengthening scientific understanding of how climate risks shape development pathways is essential for informed policy responses [3]. To contextualise these global dynamics, it is crucial to recognise that South Africa's local government sphere is where many climate-related development pressures materialise most directly, making municipal-level analysis essential.

Globally, governments are mobilising institutional mechanisms to respond to escalating climate impacts [6]. Although mitigation and other response strategies are being implemented, adaptation remains the most appropriate approach for local-level climate governance due to the spatially differentiated nature of climate risks. Adaptation is widely recognised as a predominantly local responsibility due to the spatially differentiated nature of climate risks [7]. Local governments are therefore central to climate governance [8,9], yet many municipalities remain inadequately prepared for emerging climate-related challenges [10]. Their core mandate of equitable service delivery often competes with long-term adaptation planning, as persistent resource constraints compel municipalities to prioritise short-term developmental needs [11,12]. Adaptation is therefore an urgent priority, yet it remains complex, costly and often perceived as competing with immediate development needs [13,14]. This limits investment in forward-looking initiatives such as resilience building and climate-responsive infrastructure. These institutional tensions are particularly consequential because local governments are also responsible for advancing SDG-related development outcomes, making the alignment between adaptation and SDG progress a critical governance challenge.

South Africa exemplifies these challenges, with intersecting environmental and socioeconomic pressures that strain limited government resources. The country faces intersecting environmental and socioeconomic pressures that strain limited government resources [15]. Municipalities play a decisive role in shaping climate change response outcomes through local policy, development decisions and resource allocation. However, many struggle to fulfil their developmental mandates due to political, financial and capacity constraints [16,17]. Despite national climate policies and strategies [18], local implementation remains weak, with climate change often treated as an unfunded mandate and positioned within the least resourced municipal units [19]. These constraints not only weaken climate-response capacity but also impede progress toward SDGs related to poverty, water security, health, energy and infrastructure, underscoring the need for integrated climate-development planning.

Empirically, climate adaptation is frequently overshadowed by pressing socioeconomic demands, including poverty eradication, water provision, and energy access [20]. As a result, climate actions are often perceived as competing with rather than supporting development priorities [12]. These tensions highlight the need for institutional and policy reforms that embed climate considerations within municipal planning systems. Adaptation remains a relatively new governance imperative [21], yet it must be implemented within fragmented institutional structures that require significant adjustment to support effective climate responses [8]. This interplay between developmental pressures and institutional fragmentation illustrates why municipalities struggle to integrate adaptation into routine planning, reinforcing the importance of examining how climate actions intersect with SDG outcomes.

The literature indicates that the institutional reforms are necessary to successfully address climate change at the local government level in South Africa, particularly in the

Eastern Cape Province [19,22]. Previous studies examined adaptation mainstreaming [22], institutional barriers [19] and local implementation [23] in the Eastern Cape Province. However, limited research examines how local governments pursue SDGs within the context of climate change, creating a critical gap in understanding climate development linkages at the municipal level [24], underscoring the need for empirical evidence of climate change responses and sustainable development co-benefits at the municipal level. This gap is especially pronounced in climate-vulnerable provinces such as the Eastern Cape, where municipalities must simultaneously address climate risks and advance SDG priorities, yet empirical analyses of these interlinkages remain scarce. Against this backdrop, the present study responds to the identified gap by examining how climate-change responses intersect with SDG-related development outcomes at the municipal level.

Considering these gaps (this paper, the article titled “The Complex Task of Evaluating the Institutional Adaptive Capacity to Climate Change at Local Government Level: A Study of the Eastern Cape Province of South Africa” <https://doi.org/10.1002/cli2.70003>, and the article titled “Mind the gap: The fissure between aspirations and actions in climate change governance at a local government level: A study of the Eastern Cape Province of South Africa” <https://doi.org/10.1002/cli2.72> are part of the same bigger study), this paper examines the interlinkages between climate change responses (SDG-13) and the achievement of inductively identified SDGs (1, 2, 3, 4, 6, 7, 8, and 9) at a local level in the Eastern Cape Province, South Africa, under the following objectives. (1) To understand how climate change related activities are financed at the local government level in the province. (2) To examine the lessons emerging from climate-change adaptation and the opportunities generated by municipal climate-response practices at a local government level. (3) To examine the relationship between climate change responses and other SDGs in the province. In doing so, the study contributes empirical evidence on the climate SDG nexus within a highly vulnerable provincial context, offering insights relevant for strengthening local climate governance.

2. Theoretical Framework

The analysis of climate-change governance at the local government level requires a theoretical framing capable of illuminating both the structural and functional determinants of institutional resilience. Although several analytical approaches exist, including the Participatory Climate Change Adaptation Appraisals (PCCAA), the Rapid Risk and Institutional Appraisal (RRIA), and the Adaptive Capacity Wheel (ACW), this paper adopts RRIA and ACW because, when applied together, they provide a comprehensive and theoretically coherent lens for interrogating the institutional conditions that shape adaptation outcomes in South African municipalities. Their integration enables a nuanced examination of how governance systems, organisational behaviour and institutional capacity mediate the alignment between climate-change adaptation and sustainable-development imperatives. To operationalise the RRIA and ACW frameworks, the study developed an analytical matrix that translated each theoretical dimension into observable indicators used during coding. These indicators guided the identification of mandates, regulations, programmes, budgetary allocations, learning processes, leadership practices, resource constraints, and stakeholder-engagement patterns within interview transcripts and policy documents.

RRIA provides the foundational analytical lens for this paper by exposing the institutional architecture within which climate governance unfolds, particularly the clarity of mandates, coherence of regulatory frameworks, adequacy of budgetary arrangements, and alignment of responsibilities across spheres of government structural elements widely recognised as central to effective adaptation planning in developing-country contexts where climate change is often treated as an unfunded mandate [25]. The findings of this paper re-

flect these concerns, making RRIA essential for explaining the institutional marginalisation of adaptation and the difficulty municipalities face in prioritising climate resilience within broader developmental obligations. Complementing this structural perspective, the ACW illuminates the functional attributes that shape institutional behaviour in the face of climate risks, including knowledge systems, organisational learning, leadership, stakeholder engagement, and institutional flexibility [26]. These dimensions resonate strongly with the Eastern Cape context, where limited technical expertise, weak interdepartmental coordination, and inconsistent political support emerged as enduring barriers. Thus, the combined frameworks show that adaptation challenges stem not only from resource constraints but also from institutional cultures that fail to incentivise learning, collaboration, and long-term planning, offering a comprehensive explanation for the governance shortcomings observed in the study.

RRIA and ACW form a theoretically synergistic framework that captures the full spectrum of institutional determinants of adaptive capacity. While RRIA explains why adaptation is structurally marginalised, the ACW explains how functional weaknesses undermine implementation. Their combined application reveals that adaptive capacity is embedded not only in financial and technical resources but also in governance quality, organisational behaviour, and the broader political economy of municipal decision-making. This dual perspective aligns with global literature emphasising the interdependence between climate adaptation and sustainable development. Scholars increasingly argue that adaptation and development are inseparable, as climate impacts intensify existing socio-economic vulnerabilities and adaptation interventions often generate co-benefits across poverty reduction, water security, health, and infrastructure [27–29].

In South Africa, where municipalities operate under conditions of structural inequality, political volatility, and chronic capacity constraints, the relevance of RRIA and the ACW becomes particularly pronounced. These frameworks clarify why adaptation remains weakly embedded in municipal planning despite strong national policy commitments and why climate responses often occur indirectly through service-delivery functions rather than through dedicated adaptation programmes [16,30]. These frameworks also illuminate the developmental opportunities associated with climate action, including job creation, skill development, improved natural resource management, and enhanced infrastructure planning, which are increasingly recognised in both global and local literature [31], thereby positioning adaptation as a governance process deeply intertwined with local development trajectories.

3. Literature Review

3.1. *Climate Change Adaptation and the SDGs Context: A Global Perspective*

The mechanisms that underpin climate resilience have become a central focus in global climate governance debates [32–34]. Climate response is explicitly embedded within the United Nations SDGs, with SDG 13 calling for strengthened resilience and enhanced adaptive capacity [35]. Owen [13] observes a global expansion in the development of adaptation responses, while Busayo [23] similarly notes that governments worldwide are increasingly investing in climate-resilience measures. These responses span multiple interconnected systems including environmental management, water resources, agriculture, health, and urban and coastal development [13], all of which are foundational to the SDG agenda. Consequently, many adaptation initiatives are embedded within the core systems targeted by the SDGs, making it difficult to draw clear distinctions between climate-change adaptation and broader sustainable-development efforts [13].

It should be noted that water scarcity exacerbated by climate change is a global challenge directly linked to SDG 6 on clean water and sanitation and aligns with adaptation

measures addressing drought [36]. Similarly, the livelihoods of communities on the Tibetan Plateau in China depend heavily on pastoral production, yet agricultural viability is increasingly threatened by shifting climate patterns [37]. As a result, Abbasi and Nawaz [38] argue that the agricultural sector must adjust its practices to remain viable under changing climatic conditions.

Climate-adaptation planning, however, remains a complex undertaking. Islam and Nurse-Bray [6] emphasise that climate variability interacts with already challenging social contexts characterised by limited resources in many developing countries [39,40]. Within government, climate-resilience initiatives often compete for scarce financial resources with pressing socioeconomic priorities such as economic development (SDG 8) and poverty eradication (SDGs 1 and 2) [41]. At the municipal level, adaptation similarly competes with essential service-delivery needs, including road maintenance (SDG 9) and electricity provision (SDG 7) [12]. Additionally, adaptive actions are frequently delayed because climate impacts are perceived as future risks, leading local policymakers to prioritise immediate socioeconomic challenges over long-term adaptation planning [19,42].

Nightingale [43] emphasises that analysing political dynamics is fundamental to advancing climate-resilience scholarship. Owen [13] further notes that the outcomes of climate-change adaptation initiatives are often not immediately observable. Measham and others [12] argue that resource constraints compel local governments to prioritise short-term objectives. Other scholars similarly contend that the short electoral cycles of democratic governments, combined with the political imperative to demonstrate rapid results, lead to the prioritisation of immediate development needs such as poverty reduction (SDGs 1 and 2), access to clean energy (SDG 7), and water provision (SDG 6) over longer-term climate-resilience investments, particularly in underdeveloped regions [17,44]. Dannevig and others [42] likewise observe that in many developing contexts, adaptation actions are postponed because climate impacts are perceived as distant future risks, prompting local policymakers to focus on more immediate socioeconomic pressures. Consequently, Sovacool et al. [45] argue that adaptation measures yielding direct and visible benefits for local populations tend to be more politically acceptable. Supporting this view, Pasquini and Shearing [17] highlight that political influence shapes local government mandates and affects both service-delivery functions and climate-resilience responsibilities. Given that climate-change governance unfolds within inherently political environments, the effectiveness of adaptation efforts is therefore contingent on sustained political support, particularly at the municipal level.

3.2. *Adaptation Mainstreaming and Implementation Gaps in South Africa*

Policy progress is dependent on implementation [46]. Adequate mainstreaming requires climate change responses to be recognised and prioritised as part of the overall strategy and principles that guide all development within a municipality. In addition, the institutional structure and dynamics play an integral part in the integration of climate change responses into planning processes [47]. The embedment of climate response in municipals plans is demonstrated in Figure 1 below.

The South African government has established policies, strategies and plans to mitigate and adapt to climate change [18,48]. Nonetheless, the failures of moving planning into implementation are well documented in the scholarly literature, particularly at the local government level [46]. Currently, climate change response is mainstreamed in a disjointed manner in South Africa [47]. Pieterse and du Toit [49] argue that in South Africa, climate adaptation mainstreaming requires clear alignment between adaptation and broader development agendas.

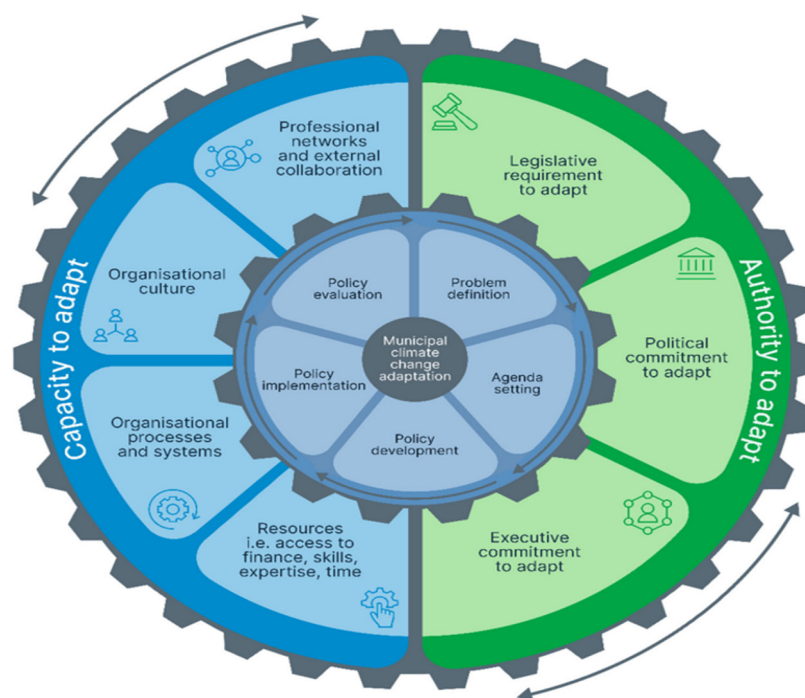


Figure 1. Conceptual framework of the factors that shape municipal climate change adaptation mainstreaming. Source: [46].

Municipalities responsible for frontline service delivery play a significant role in addressing immediate socioeconomic needs [11]. Yet, many South African municipalities struggle to fulfil their developmental mandates due to political instability, governance weaknesses, and capacity constraints [16,17], even before considering the additional burden of building climate resilience [22]. South African municipalities possess formal planning mandates and regulatory instruments but frequently struggle to operationalise climate responses due to political, financial, and institutional constraints [17,50]. Challenges of climate change governance in South Africa include poor collaboration and weak coordination between various spheres of government [51]. In addition, classification of climate change as an unfunded mandate creates a disconnect between the ambitions and actions of the nationally established but locally implemented policy [19]. These challenges create policy implementation gaps that affect the mainstreaming of climate change at the local government level [19,49]. Even municipalities such as eThekweni [52] with a well-developed climate change institutional framework struggle to achieve adaptation success.

Despite its recognised leadership in climate-resilience planning, cities such as eThekweni Municipality have struggled to manage recent episodes of extreme flooding. These challenges illustrate that even the country's most advanced local government institution remains vulnerable to the impacts of climate variability. Achieving meaningful climate resilience therefore requires institutions to fulfil their core mandates effectively. Adaptation measures must not undermine service-delivery obligations; rather, they should enable development and generate economic opportunities that contribute to redressing the structural inequalities inherited from apartheid [53].

3.3. The Synergies and Trade-Offs Between Climate Responses and SDGs

Climate change is a socioeconomic and environmental concern in South Africa [48]. The country faces a wide range of socioeconomic and environmental challenges that compound the threat posed by climate change [17]. The country's political history has produced deep structural inequalities: under apartheid, access to land, quality education, and economic opportunities was racially stratified, leaving enduring social and economic

disparities. Consequently, South Africa continues to grapple with multiple development pressures alongside the escalating risks associated with climate variability [17]. Since 1994, the state has pursued extensive social, economic, and political reforms aimed at redressing these historical imbalances [54,55]. Climate change increasingly undermines progress in addressing these socioeconomic challenges. Ngcamu [56] argues that the adverse impacts of climate variability are intensifying existing vulnerabilities, while Santhia and others [22] highlight the close interlinkages between climate impacts and broader development constraints. Pieterse and du Toit [49] argue that mainstreaming allows climate response to be seamlessly included in the planning processes, creates opportunities within planning, and enables better management of trade-offs between adaptation and pressing socioeconomic challenges.

Although climate change is widely understood as a threat to social, ecological and economic systems, scholars increasingly argue that it also creates an important policy window for rethinking development pathways at the local level [5,57]. Nonetheless, Pieterse et al. [47] argue that local government functions such as service provision can facilitate or adversely affect climate adaptation. In South Africa, where municipalities are central to service delivery, infrastructure management, spatial planning and local economic development, the climate agenda can stimulate more integrated, resilient and inclusive forms of development [11,15]. The opportunity does not lie in climate change itself, but in the institutional, infrastructural and developmental innovations that adaptation can catalyse when embedded in local planning and governance [52]. Climate action and the SDGs are increasingly recognised as mutually reinforcing, with scholars emphasising that adaptation and development planning should not be treated as separate policy spheres [1,57]. When climate responses are framed through an SDG lens, they can generate multiple co-benefits across poverty reduction, sustainable cities, water security, health and institutional strengthening [4,28].

4. Methodological Considerations

4.1. The Study Area

The Eastern Cape Province is one of the nine provinces of South Africa, and it is situated in the southern coastal area of South Africa [58]. This province consists of two metropolitan municipalities and six district municipalities, which are further subdivided into 29 local municipalities [22]. See Figure 2 below.

The Eastern Cape is widely recognised as one of the poorest provinces in South Africa [22]. It has a disproportionately high share of households dependent on small-scale and subsistence agriculture [58], alongside persistently high levels of poverty, unemployment and illiteracy [59]. These structural characteristics are strongly associated with heightened vulnerability to climate change, as socioeconomic marginalisation reduces the capacity of households and institutions to anticipate, absorb and recover from climate-related shocks [60]. Consequently, the Eastern Cape is regarded as one of the most climate-vulnerable regions in the country [22]. The province is particularly prone to recurrent droughts and rainfall variability, which further undermine agricultural livelihoods and water security [58]. At the same time, municipalities in the Eastern Cape remain severely under-resourced, with limited technical skills, institutional capacity and financial means to implement effective climate-change adaptation measures [22]. These intersecting socioeconomic and institutional constraints compound the province's exposure to climate risks and weaken its overall resilience. As a result, the area is critical and theoretically relevant for the study.

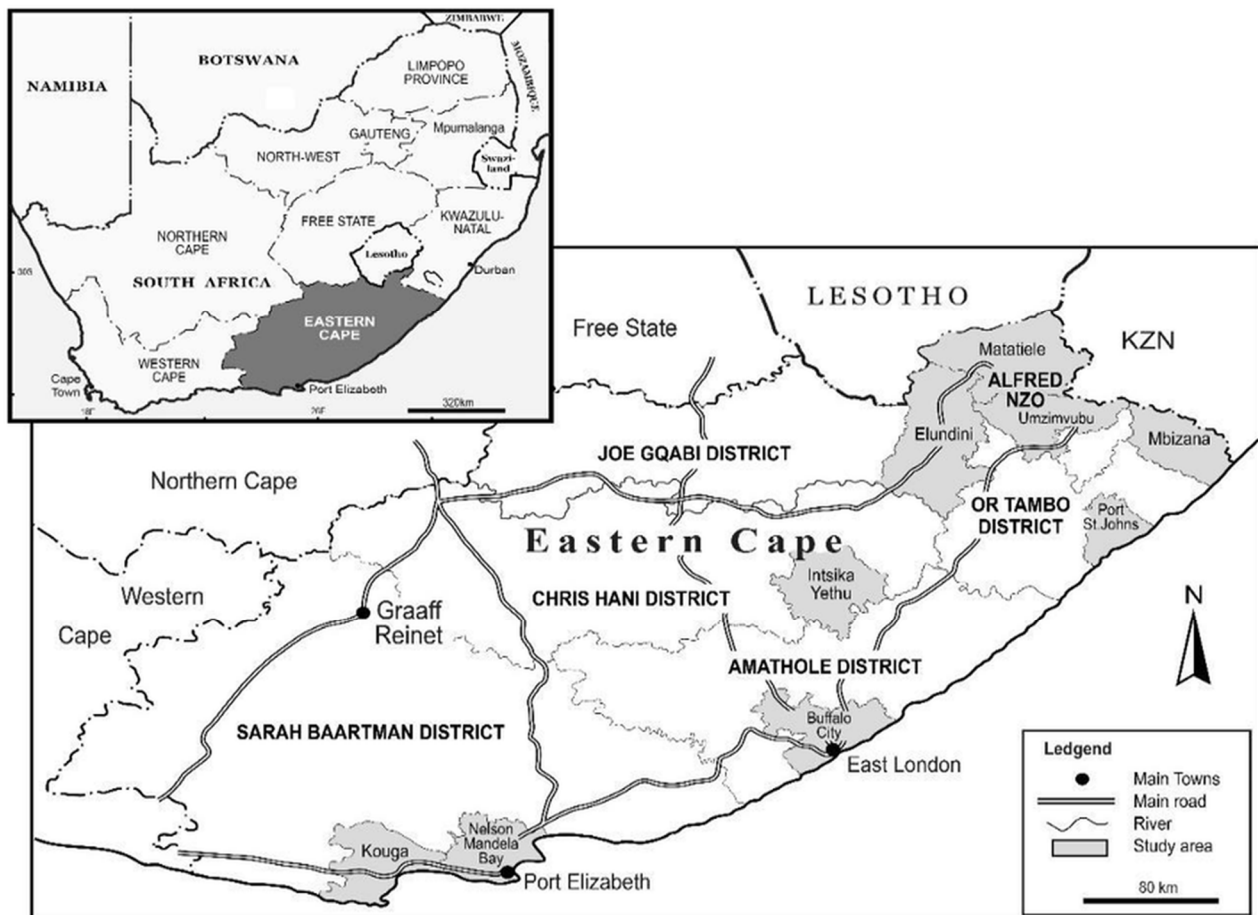


Figure 2. Study sites in the Eastern Cape Province, South Africa. Source: Cartography Unit, University of the Witwatersrand (2022) [59].

4.2. Research Design

This study employed a qualitative research approach to examine the interlinkages between climate-change governance and the pursuit of the Sustainable Development Goals (SDGs) in South Africa. The qualitative design enabled the researchers to develop a comprehensive understanding of the research problem and to generate rich, context-specific insights through systematic data interpretation. This approach was particularly well suited to the complexity of climate-change governance in the Eastern Cape Province, as it allowed for an in-depth exploration of institutional dynamics, governance challenges and local development priorities. It also provided nuanced insights into the conditions required to strengthen climate-change governance in accordance with the sustainable developmental plans within the province and beyond. Specifically, the study utilised qualitative methods to collect data on financial resources for climate response, lessons emerging from adaptation practices, and the opportunities that climate change presents for advancing sustainable development. The qualitative approach also shed light on the synergies between climate change and SDG domains.

4.3. Sampling Procedures and Sampling Size

The data for this study were collected between 2021 and 2023 in the Eastern Cape Province (see Figure 2). The selected institutions included a range of local municipalities as well as organisations recognised for their influence on climate-change adaptation within South Africa's local government sphere. In total, twenty participants from different institutions took part in the study. A purposive sampling strategy was employed to ensure that

the respondents possessed direct knowledge of climate-change governance, adaptation planning and municipal development processes. This approach enabled the researchers to target individuals with relevant expertise across both government and non-governmental institutions. Importantly, the sampling strategy ensured representation across all three categories of municipalities in the Eastern Cape—metropolitan, district and local—thereby capturing the diversity of institutional contexts within the province. While the study did not include all the Local Government Authorities (LGA) in the Eastern Cape, the sample was intentionally structured to reflect the full spectrum of municipal types and geographic variation, which is methodologically appropriate for qualitative inquiry focused on depth rather than population-wide enumeration.

The final sample included participants from the Department of Forestry, Fisheries and the Environment (DFFE) ($n = 2$), the South African Local Government Association (SALGA) ($n = 1$), and officials from a range of Eastern Cape municipalities: Nelson Mandela Bay Metropolitan ($n = 1$), Buffalo City Metropolitan ($n = 1$), Amathole District ($n = 1$), Chris Hani District ($n = 2$), Mbizana Local ($n = 2$), Elundini Local ($n = 2$), Intsika Yethu Local ($n = 1$), Matatiele Local ($n = 2$), Port St Johns Local ($n = 1$), Mzimvubu Local ($n = 2$), and Kouga Local Municipality ($n = 2$). The participation of twenty experts was deemed sufficient for the qualitative design, as the sample provided rich, context-specific insights into climate-change governance and SDG-related adaptation practices across the province.

4.4. Data Collection Method

Interviews and secondary data were used to collect the primary data for this study. All engagements were conducted virtually due to COVID-19 restrictions in place during the data-collection period. The research team employed semi-structured open-ended interviews to elicit detailed insights into financial mechanisms for climate response, lessons emerging from adaptation practices, and the opportunities generated by climate change responses in the province. The use of semi-structured interviews provided the flexibility needed to probe complex governance issues while allowing participants to elaborate on institutional experiences and contextual factors. Primary data were complemented by secondary sources, including government gazettes, policy documents, official reports and archival materials. These secondary sources were instrumental in identifying opportunities associated with climate change and in providing additional insight into the financial resources available for adaptation at the local government level. The integration of primary and secondary data strengthened the robustness of the analysis and enhanced the study's ability to triangulate findings across multiple evidence streams.

4.5. Data Analysis

The primary data obtained from the interviews were digitally recorded and subsequently transcribed verbatim. The qualitative data were analysed using inductive thematic analysis, which Kiger and Varpio [61] describe as a systematic method for identifying, analysing and reporting patterns within a dataset through an inductive, iterative process. The coding was inductive; therefore, it was data driven. The whole data was interrogated repetitively, in search of recurring patterns of meaning. The use of inductive thematic analysis in this study provided a structured framework for organising interview transcripts into coherent themes, enabling the researchers to capture recurring ideas and interpret the underlying meanings relevant to climate-change governance. To strengthen analytical transparency, the coding process followed a structured, multi-stage procedure. First, all transcripts were read repeatedly to ensure familiarisation with the data. Second, initial codes were generated inductively, resulting in a preliminary set of 42 descriptive and interpretive codes. Third, these codes were iteratively refined, merged and organised into

code families aligned with the RRIA and ACW analytical dimensions. Finally, related codes were clustered to form higher-order themes that captured institutional, financial and governance patterns within the data. This process ensured that theme development was grounded in the data rather than predetermined categories.

Secondary data including government gazettes, policy documents, official reports and archival materials were examined using document analysis. This analytical approach facilitated a deeper interrogation of “what, why and how” questions relating to climate-change governance at the local government level, enabling the researchers to critically assess institutional narratives, policy orientations and governance practices. The integration of these analytical methods strengthened the robustness of the study by allowing triangulation across multiple data sources. Thematic saturation was assessed throughout the coding process. Saturation was considered reached when no new codes, concepts or insights emerged from successive transcripts. After analysing the 17th interview, additional transcripts yielded only repetitions of existing patterns, indicating that sufficient depth and breadth of data had been captured. This provided confidence that the themes reflected the full range of perspectives relevant to climate-change governance in the Eastern Cape. Although the thematic analysis was conducted by a single coder a methodological limitation that may introduce interpretive bias, the study mitigated subjectivity through reflexive note-keeping, peer-debriefing with two co-authors, and cross-validation of emerging themes against the RRIA-ACW analytical matrix.

The thematic analysis was conducted by a single coder, which presents a potential limitation regarding interpretive bias. To mitigate this, the coder maintained reflexive notes throughout the analysis, engaged in peer-debriefing sessions with two co-authors, and cross-validated emerging themes against the analytical matrix derived from the RRIA and ACW frameworks. These strategies helped reduce subjective bias and ensured that coding decisions were systematically grounded in the data.

4.6. Validation and Reliability Procedures

To strengthen analytical rigour, a post hoc reliability assessment was conducted. Two independent reviewers were provided with 25% of the coded transcripts ($n = 5$) and asked to apply the final codebook. Inter-rater reliability was calculated using Cohen’s Kappa, yielding a score of $\kappa = 0.82$, which indicates strong agreement. Percentage agreement across all codes was 87%. These measures demonstrate that the coding structure was consistently interpretable and that thematic boundaries were clear. Bias mitigation was addressed through three strategies: (1) field-note reflections throughout the coding process to document analytic decisions; (2) peer-debriefing sessions with two co-authors who reviewed emerging themes and challenged interpretive assumptions; and (3) triangulation of interview data with policy documents, government reports, and archival materials. Together, these procedures ensured transparency, reduced interpretive subjectivity and enhanced the credibility of the findings.

5. Results

Although the study used a qualitative design, numerical summaries were incorporated to reinforce the findings. Of the twenty participants, 14 (70%) reported that climate change is treated as an unfunded mandate, while 12 (60%) noted reliance on indirect funding such as disaster-relief or water-augmentation projects. Resource competition was highlighted by 15 participants (75%), who indicated that basic service delivery takes precedence over climate-change initiatives. Fragmented mandates and legislative ambiguity were raised by 13 participants (65%), and 11 (55%) emphasised the role of traditional leadership in rural climate-resilience efforts. In terms of opportunities, job creation was identified by

16 participants (80%), skill development by 12 (60%), and improved natural-resource management by 14 (70%). These corrected frequencies align with the qualitative themes and reflect consistent perspectives across institutional contexts.

5.1. Financial Capacity for Climate Change Activities at Local Government Level

This study examines how climate-change governance intersects with the pursuit of the Sustainable Development Goals (SDGs) at the local government level in South Africa, with a particular focus on the Eastern Cape Province. As a starting point, it was necessary to investigate the funding mechanisms that underpin climate-change activities within municipalities. To address this, participants were asked to reflect on the financial capacity of local government to support climate-change responses. The perspectives of the respondents on financing climate response activities highlighted institutional and legislative barriers, indirect funding mechanisms and tough competition for resources.

The results indicate that municipalities face significant institutional constraints, particularly a lack of dedicated funding for climate-change activities. To substantiate this finding, the respondents' illustrative comments are presented below.

Names of Institutions	Respondent's Comments
DFFE	"The entire climate change in government is donor funded except the personnel, the implementation of projects and everything else is donor funded. Thus, we have climate change finance training with municipalities, write a proposal with them and go and knock on doors for funding" (personal communication, 2021).
Amathole District	"Climate change is regarded as an unfunded mandate, and is under the Environmental management, which is the least funded unit in the local government institutions in general" (personal communication, 2021).
Mbizana Local	"The resources are not enough, for this year, we only received R372 00 from the municipal budget for climate change related activities." (personal communication, 2021).

Source: Based on field notes (2021–2023).

The results indicate that the classification of climate change response as an unfunded mandate in the policy framework is one of the barriers to the allocation of sufficient resources for climate activities at the local government level. In addition, the results further indicate that climate-change activities at the local government level are predominantly supported through indirect funding mechanisms. To substantiate this finding, the respondents' illustrative comments are presented below.

Names of Institutions	Respondent's Comments
Nelson Mandela Metropolitan	"Climate change funding must come from municipal funding, at this point in time and to my knowledge. The exception is Disaster Relief funding, which can at times respond to impacts of climate change, such as drought or flooding." (personal communication, 2021).
	"Climate change action is often an indirect consequence of a resource- oriented deliverable, such as the provision of alternative water during prolonged drought, or the installation of energy-saving LED lights for roads or within vulnerable communities." (personal communication, 2021).
Mbizana Local	"We did receive a funding from the DFFE for removal of alien plants, but I am not sure if that falls under climate change related activities." (personal communication, 2021).

Source: Based on field notes (2021–2023).

The results indicate that, in some cases, it is difficult to differentiate between climate actions and other service provisions at the municipal level. This highlights the synergies

between the climate responses and service delivery at the local government level. Furthermore, the study outcomes also show that climate change activities face tough competition for resources at the local government level. In support of the above results, the participant views are presented below.

Names of Institutions	Respondent's Comments
Amathole District Municipality	<i>"If you look at the Integrated Development Plan (IDP), the biggest chunk of the budget goes to basic service delivery, for example, building of houses, provision of water services, collection of waste, roads, etc. Anything that is left will be allocated to environmental management, which is not only climate change. Environmental management includes air quality, biodiversity, coastal management, renewable energy. Climate change is not even competing with other socioeconomic challenges, competing will be an overstatement, it is the least priority in terms of budget."</i> (personal communication, 2021).
Mbizana Local Municipality	<i>"There are other pressing issues that compete with climate change for resources within the municipality, and they usually overpower climate change, and climate change end up not being prioritised as it should. For example, the council will prioritise building a hall than dealing with climate change, for instance, building a fire belts."</i> (personal communication, 2021).

Source: Based on field notes (2021–2023).

The results demonstrate that climate response and service delivery might be viewed as competing tasks at the municipal level, at least at the resources allocation stage. Moreover, respondents consistently highlighted fragmented mandates, rigid financial regulations and structural weaknesses within municipal systems as key obstacles. Their perspectives are presented below.

Names of Institutions	Respondent's Comments
Nelson Mandela Metropolitan Municipality	<i>"National Treasury and other authorities want climate change response information from the municipality but are unconcerned with the lack of staff, lack of capacity, line function and funding to perform actions which reduce the city's risk to the impacts of climate change."</i> (personal communication, 2021).
DFFE	<i>"One of the challenges is that climate change is not a legislated function within the government institutions; therefore, it is difficult to prioritise or get funding for it [...] Before the Climate Change Bill is finalised and becomes an act, climate change is still an unfunded mandate"</i> (personal communication, 2021). <i>"Clean audit is a requirement for donors, but if the funding comes from the fiscus it will be easier to access it, and if the climate change bill is passed into an act, that might not be a barrier anymore."</i> (personal communication, 2021).

Names of Institutions	Respondent's Comments
SALGA	<i>"Most municipalities cannot access global climate funding from the gate, due to poor audit outcomes and political interference." (Personal communication, 2021)</i>
Elundini Local	<i>"We are aware that there is funding for these types of issues, but do we attempt to access these types of funding? No really, because donors will not just give you funding, you need to have an idea of what you want to do first. Therefore, commonly, local municipality do not access these funding, either because they do not know or they do not have the appetite for environmental issues such as climate change." (personal communication, 2021).</i>

Source: Based on field notes (2021–2023).

The findings show that institutional and legislative barriers significantly restrict access to funding for climate-change activities at the local government level. These insights highlight the inadequacy of existing funding mechanisms and legislative constraints that affect access to climate finance.

5.2. Lessons Learned and Opportunities Generated by Climate Change Responses

The study also examined the lessons emerging from municipal efforts to adapt to climate change, recognising that experiential learning is a critical component of effective climate governance. To explore this, respondents were asked to reflect on insights gained from implementing various coping and adaptation measures at the municipal level. Their reflections provided evidence of institutional learning, governance challenges and adaptive practices within the Eastern Cape context. The key lessons identified are summarised in Table 1.

Table 1. Lessons learnt from adapting to climate change at the municipal level.

Lessons	Type of Municipality
Without capacity to implement, climate resilience policies, strategies and plans are ineffective.	Metropolitan, district and local municipalities
Public buy-in is vital in climate change adaptation.	Metropolitan, district and local municipalities
Traditional leader's buy-in is very important in climate resilience.	District and local municipalities
There is minimal development of infrastructure in response or in anticipation of climate change impacts.	Metropolitan, district and local municipalities
The importance of awareness programmes	Metropolitan, district and local municipalities

Source: Based on field notes (2021–2023).

Table 1 shows that several lessons were learned from climate-resilience actions across municipalities, with strong consistency across different institutional types. The results indicate that the traditional leader's buy-in is essential in all types of municipalities except the metropolitan. These lessons emerged from an interview question that required participants to reflect on insights gained from implementing adaptation and coping measures, with supporting respondent comments presented below.

Names of Institutions	Respondent's Comments
Amathole District	<i>"Traditional leaders are important because they are in charge of communal land and most of climate change related disasters or activities happen within that space. The biggest chunk of land in Amathole District Municipality is communal land"</i> (personal communication, 2021).
Nelson Mandela Metropolitan	<i>"There is no infrastructure built that was but in response or in anticipation of climate change, because much of the service infrastructure predates current legislation"</i> (personal communication, 2021).
Mbizana Local	<i>"One program that we did every year, and we are satisfied with is the awareness program. Due to frequent veld fires, there are awareness programs for villages to warn them in time. One of our mandates is to educate the community, we have 4 awareness workshops (for example, river pollution, recycling, etc.) per year and we ensure that one of them is about climate change"</i> (personal communication, 2021).

Source: Authors Compilation (2026).

The participants' views indicate that inclusive participation of all stakeholders is critical in the success of climate change responses. The absence of infrastructure built in anticipation of climate impacts shows that the municipalities adapt to climate change in a reactive manner. In addition, although climate change impacts human and environmental systems in a devastating manner, the study was interested in the opportunities presented by varying climate. In consideration of this, respondents were interrogated about the prospects presented by a varying climate, and South Africa's First Annual Climate Change Report [62] and the Climate Change Let's Respond Toolkit [63] were analysed. The results are presented in Table 2 below.

Table 2. Opportunities generated by climate change responses in South Africa.

Opportunities	South Africa's First Annual Climate Change Report	Climate Change Let's Respond Toolkit	Research Participant's Views
Job creation	✓	✓	✓
Skill development	✓		✓
Sustainable natural resources management	✓	✓	✓
Emissions reductions	✓	✓	
Food security	✓		
Information and knowledge management	✓		✓
Awareness raising	✓		✓
Economic development	✓	✓	
Improved health care	✓	✓	
Improved quality infrastructure design	✓		
Improved education	✓		
Improved livelihoods	✓		
Improved quality of life		✓	✓
Urban greening		✓	
Energy efficiency		✓	
External funding support			✓

Source: Based on field notes, (2021–2023). The "✓" indicates whether a particular opportunity was identified in government documents or mentioned by respondents.

Table 2 results revealed that there are many opportunities that are presented by climate change responses in South Africa. The results uncovered that some opportunities are mentioned by all data sources, whilst others are not. Job creation and sustainable natural resource management are the only opportunities mentioned across all data sources. This highlights the inconsistency between different government data sources.

5.3. Interlink Between Climate Change Adaptation and SDGs in South Africa

To address this research objective, participants were asked to reflect on the relationship between climate change adaptation activities and the achievement of the SDGs within their municipal contexts. Their responses provide insight into how adaptation actions, resource allocation decisions, and institutional priorities shape progress toward SDG-related outcomes. The key perspectives are presented below.

Names of Institutions	Respondent's Comments
Amathole District	"If you look at the Integrated Development Plan, the biggest chunk of the budget goes to basic service delivery, for example, building of houses, provision of water services, collection of waste, roads, etc. Anything that is left will be allocated to environmental management, which is not only climate change" (personal communication, 2021).
Elundini Local	"We may not have climate change as a function in the municipality but there are certain things we need to do to prevent climate change effects. We can do it in many ways, from the planning of developmental of residential area, commercial development or any other type of development. We have legislation that guides us; for example, the Sustainable Development Framework, which guides the municipality on how to develop in a sustainable manner" (personal communication, 2021).
Elundini Local	"If you look at climate change in a positive light, it assists in releasing resources to solve the pressing issues; for example, our area is infested by alien vegetation, and this enhances the negative effect of climate change impacts. Employing people, even if temporary, to eradicate the alien vegetation is another form of solving one of the pressing issues such as unemployment and poverty. Therefore, climate change brings an opportunity to create a social net for the community" (personal communication, 2021).
Elundini Local	"This is not a subject that most people can relate to; therefore, there will not be automatic release of resources to attend to it, compared to building of roads and installation of electricity, which usually has adequate or more than adequate resources, but those are obvious political issues" (personal communication, 2021).
SALGA	"I feel like there is no separation between adaptive capacity and municipal functionality; if the municipality are able to deliver service delivery and their other mandates, it actually enhances their ability to adapt" (personal communication, 2021).
Mbizana Local	"Although the council is aware of climate change, their understanding of it as a root cause of many issues is very limited. The council prefer projects that can be seen by the people that vote for them" (personal communication, 2021).

Source: Based on field notes (2021–2023).

The responses of the participants highlight the interconnection between adaptation to climate change and the pursuit of sustainable development goals. Even though the results demonstrate different perspectives among participants, the outcome highlights the strong link between climate change responses and the pursuit of sustainable development goals. The respondents' views indicate that there is competition at the resource allocation stage between climate action and SDGs, but these activities have synergies at the project outcome phase.

6. Discussion

The empirical findings reveal a governance landscape in which climate change adaptation is widely acknowledged as a developmental imperative, yet remains structurally marginalised within Eastern Cape municipalities. Interpreting these results through the RRIA and ACW frameworks provides a deeper understanding of the institutional, financial and political determinants shaping local adaptive capacity. The discussion below synthesises these insights and demonstrates how climate adaptation intersects with the pursuit of the SDGs.

6.1. Institutional and Legislative Constraints: Structural Determinants of Adaptive Capacity

The study shows that climate change is consistently treated as an unfunded mandate, positioned within the least resourced municipal units and lacking a legislated functional mandate in all different types of municipalities. Similar observations were made by Sibiya et al. [64] that climate change is an unfunded mandate and is positioned at the periphery of the municipal responsibilities in some of the municipalities of KwaZulu Natal Province. This institutional positioning weakens accountability, limits long-term planning and reinforces the perception of adaptation as peripheral to core municipal responsibilities. These findings and RRIA concur that unclear mandates may create uncertainty regarding budgetary responsibility and prioritisation of climate actions. The absence of a legislated climate function highlighted repeatedly by respondents creates ambiguity in responsibility and undermines the institutionalisation of adaptation within routine governance processes. Similar findings were made by Santhia et al. [22] that lack of legislation is one of the barriers of climate change response in the province. This institutional marginalisation is consistent with national [11] and international [12] literature, which shows that municipalities often lack incentives to integrate adaptation into development planning. The findings therefore confirm that institutional architecture, rather than the absence of climate awareness, is a primary barrier to effective adaptation. It must be noted that since the data of the study was collected, the South African government has enacted the Climate Change Act 22 of 2024 to address the absence of legislation and other barriers.

6.2. Funding Dynamics and the Politics of Resource Allocation

The results demonstrate a dual funding reality: climate change receives minimal direct funding, yet adaptation and mitigation occur indirectly through disaster relief, water augmentation, alien vegetation clearing and energy-efficiency initiatives. The finding concurs with observations by Owen [13] that, occasionally, it is difficult to distinguish between some adaptation activities and related service provision. This pattern reflects adaptive opportunism; this can be attributed to what ACW identifies as institutional flexibility, where municipalities respond to climate risks through existing service-delivery functions rather than dedicated adaptation programmes. This is a useful method, especially in financially constrained institutions.

Several participants reported the heavy reliance on donor funding, and this also reflects the financial limitations within the municipalities. In addition, respondents' concerns about

poor audit outcomes, political interference and limited proposal-writing capacity further illustrate how governance quality shapes access to international climate finance. These findings highlight that financial constraints are not merely budgetary but deeply political, shaped by institutional performance, audit compliance and political priorities. The findings are similar to observations made by Sibiya et al. [64] in another province of South Africa, KwaZulu Natal, that low prioritisation of climate action is prompted by institutional structures and policy frameworks at the local government level. Therefore, institutional and policy reforms are necessary to address the lack of financial capacity for climate change response at the local government level in the country.

6.3. *Lessons Learned: Institutional Learning, Local Knowledge and Governance Practice*

The lessons emerging from municipal practice underscore the centrality of institutional learning and community engagement in shaping adaptation outcomes. Respondents emphasised the importance of public awareness, traditional leadership involvement and capacity development elements which highlights the importance of some of the ACW's dimensions of knowledge, learning and stakeholder engagement. The prominence of traditional leaders in communal land governance highlights the need for culturally grounded adaptation strategies, particularly in the district and local municipalities. Similar observations were made by Adeola et al. [65] that an inclusive approach is important in addressing climate change challenges, particularly in the rural areas of the global south countries. This disconnect raises questions about the effectiveness of awareness programmes and consultation processes, particularly in district and local municipalities that are dominated by rural population.

6.4. *Opportunities Generated by Climate Change Responses: Reframing Response as Development*

A key analytical insight from the findings is that climate change presents not only risks but also developmental opportunities. The opportunities identified include job creation, skill development, improved natural resource management, and enhanced infrastructure planning aligned closely with SDGs 1, 4, 6, 7, 8, and 9. The uptake of these opportunities may potentially reduce poverty (SDG 1) and increase food security (SDG 2) in the community, even if temporarily. The finding is similar to the remarks made by Fuso Nerini et al. [66] that addressing climate change may reinforce almost all SDGs. These co-benefits challenge the persistent perception that adaptation diverts resources from core municipal mandates. Nonetheless, the findings indicate that climate actions and SDGs may generate synergies at the project-outcome level while competing at the budget-allocation level. Therefore, the relationship is conditional on financing arrangements, policy design, local administrative capacity, and the distribution of benefits and costs.

6.5. *The Climate Action-SDG Nexus: Implications for Integrated Local Governance*

The study reveals a strong but underutilised nexus between climate change and SDG governance. Respondents' reflections show that climate responses, whether intentional or indirect, advance SDG outcomes related to poverty reduction, improvement of infrastructure and livelihoods. However, this nexus remains poorly articulated in municipal planning. Climate response is seldomly framed as a developmental enabler, resulting in fragmented interventions and missed opportunities for integrated governance. Strengthening this nexus requires reframing climate response as a strategic tool for achieving municipal development priorities rather than a competing agenda. This shift would support more coherent planning, improved resource allocation and stronger institutional alignment with national and global development frameworks. Similar findings were made by Fuso Nerini et al. [66] that climate change and sustainable development governance should be better linked to maximise the success of action in both realms.

6.6. Synthesis: Advancing Climate Governance in the Eastern Cape

From this study, the analysis demonstrates that the barriers to effective adaptation in the Eastern Cape are not merely technical or financial but deeply institutional and political. Weak mandates, fragmented governance structures, limited capacity and short-term political incentives constrain municipalities' ability to plan and implement adaptation. Yet, the study also shows that adaptation holds significant potential to advance sustainable development if strategically integrated into municipal planning systems.

The findings in Figure 3 demonstrate that the opportunities arising from climate change closely align with the Sustainable Development Goals (SDGs) and with both municipal and national government mandates, particularly those related to service delivery and socioeconomic priorities such as job creation, poverty reduction, economic development, education, and health care. Similarly, the results corroborate Filho et al. [28], who identify a clear relationship between climate resilience and socioeconomic advancement. These findings suggest a need to strengthen decision-makers' understanding, especially in developing-country contexts of how adaptation can function as a strategic lever for addressing service-delivery deficits and broader development challenges. This interpretation aligns with Leck and D. Simon [15]'s argument that climate action in South Africa is frequently constrained by an entrenched environmental development divide, despite the interdependence of these domains. Supporting this view, Sovacool et al. [45] contend that adaptation measures yielding direct, tangible benefits for local populations tend to be more politically acceptable. The evidence, when considered holistically, emphasises the importance of framing adaptation as an ally of service delivery and sustainable development, a perspective that warrants further promotion and application within the province and across the country.

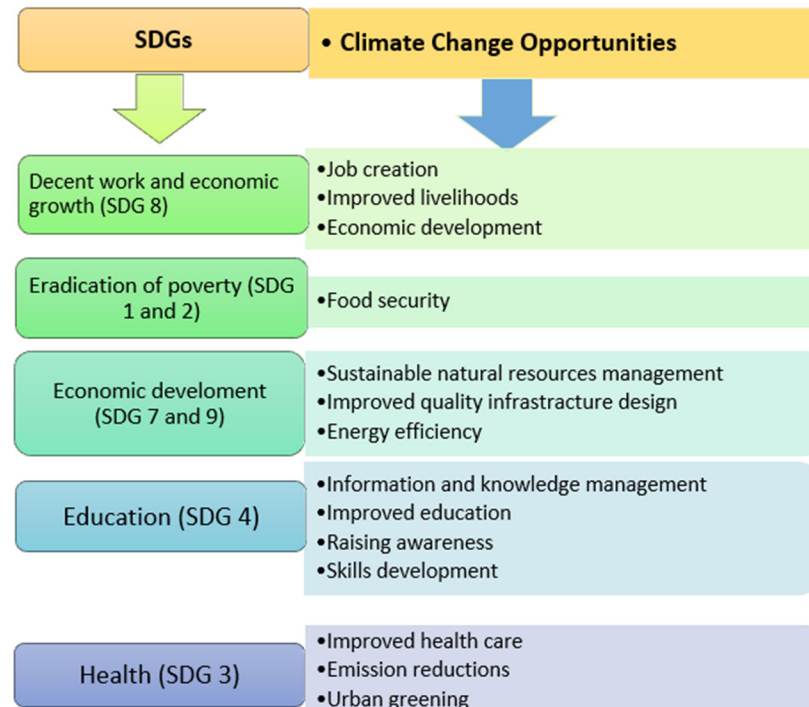


Figure 3. Relationship between SDGs and opportunities generated by climate change responses in South Africa. Source: Based on field notes (2021–2023).

7. Conclusions

This study set out to examine the relationship between climate actions and the pursuit of SDGs at the local government level in the Eastern Cape Province. The evidence

should be understood as a pre-Climate Change Act 22 of 2024 baseline, as the research was conducted before the Act was enacted. The findings demonstrate that although climate change is widely recognised as a growing threat to socioeconomic development, climate response remains severely constrained by institutional, financial and legislative barriers. Climate change continues to be treated as an unfunded mandate, positioned within the least resourced municipal units and overshadowed by immediate service-delivery pressures. These structural limitations significantly weaken the ability of municipalities to plan for, finance and implement long-term resilience measures. Despite these constraints, the study reveals that adaptation actions generate important developmental co-benefits that directly support multiple SDGs. Lessons from municipal practice show that public awareness, institutional learning and inclusive engagement are necessary for effective adaptation. Furthermore, the opportunities identified such as job creation, skill development, improved natural-resource management and enhanced infrastructure planning illustrate that climate response can serve as a strategic enabler of sustainable development rather than a competing priority. The evidence therefore challenges the prevailing perception that adaptation diverts resources from core municipal mandates. Instead, the findings show that the relationship is conditional on financing arrangements, policy design, local administrative capacity and the distribution of benefits and costs. In light of these insights, the study concludes that reframing climate response as an ally of development is essential for improving local climate governance in South Africa. This requires institutional reform, clearer legislative mandates, improved financing mechanisms and the integration of climate considerations into routine municipal planning. Strengthening adaptive capacity at the local government level is not only necessary for responding to climate risks but is also central to achieving inclusive and sustainable development in the Eastern Cape and beyond.

This study clearly demonstrates that climate change response at the municipal level in the Eastern Cape remains structurally marginalised, financially constrained and institutionally fragmented, yet capable of generating developmental co-benefits that advance multiple SDGs. The key findings show that climate responses are poorly financed but indirectly benefit from some municipal service provisions. The findings also indicate that institutional learning and inclusive stakeholder engagement are central to effective climate change response. Furthermore, the findings illustrate that climate actions and SDGs may generate synergies at the project-outcome level while competing at the budget-allocation level. These insights strengthen the empirical contribution of the study by illustrating how climate response unfolds within real governance systems rather than idealised policy frameworks. Future studies should examine how the newly enacted Climate Change Act 22 of 2024 reshapes municipal mandates, explore comparative provincial dynamics and develop models for integrating climate-response financing into routine municipal planning.

Limitations

This study has several limitations. The sample was purposively selected and institutionally focused, which excludes community-level perspectives. Data collection was conducted remotely, limiting opportunities for deeper engagement and observational validation. The findings rely on participants' perceptions, which may not fully represent operational realities across all municipalities. The data were collected in 2021–2023, and more recent policy or institutional changes may not be captured. Finally, the study's geographical scope is restricted to the Eastern Cape, limiting the generalisability of the results to other provinces.

Author Contributions: Conceptualization, S.E.G. and M.M.M.; methodology, S.E.G. and M.M.M.; formal analysis, S.E.G., M.M.M., M.M., B.N.-M. and B.Y.C.M.; investigation, S.E.G.; resources, S.E.G.; data curation, S.E.G.; writing—original draft preparation, S.E.G., M.M.M. and M.M.; writing—review

and editing, B.N.-M. and B.Y.C.M. All authors have read and agreed to the published version of the manuscript.

Funding: The funding was provided by the National Research Fund of South Africa for Postdoctoral Research Fellowship.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by Human Research Ethics Committee (Non-Medical) of the University of the Witwatersrand (protocol code: H21/05/11 and date of approval: 8 June 2021).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

SDG	Sustainable Development Goal
IPCC	Intergovernmental Panel on Climate Change
PCCAA	Participatory Climate Change Adaptation Appraisals
ACW	Adaptive Capacity Wheel
LGA	Local Government Authorities
SALGA	South African Local Government Association
DFFE	Department of Forestry, Fishery and the Environment
IDP	Integrated Development Plan

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