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Local Authority Responses to Climate Change in South Africa: The Challenges of Transboundary Governance

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Abstract: Recent progress and innovation are testament to the willingness of municipal authorities to address climate change. However, urban regions worldwide exhibit an immense diversity of conditions, capabilities and responses to the challenges of changing climatic conditions. While separated by politico-administrative borders, adjacent municipalities within such regions are connected through biophysical, politico-economic, and social systems likely to be reconfigured under changing climatic/environmental conditions. Yet, to date, politico-administrative borders have largely determined the parameters of local government climate change adaptation strategies, with insufficient attention to the role of inter-municipal collaboration, especially between neighbouring rural, peri-urban and urban municipalities, for co-ordinating such policies and interventions. Within a multi-level governance framework, this paper considers the recent evolution of climate agendas in the eThekwini (formerly Durban City Council) metropolitan municipality and the adjacent Ugu (predominantly rural) district municipality on the south coast of KwaZulu-Natal province (KZN), South Africa, focusing particularly on cross-border collaboration within the greater city region. The challenges were investigated by means of 53 in-depth, semi-structured interviews with municipal, regional and local authority association staff in November 2009, March 2012, and August 2017. Our core argument is that weak inter-municipal collaboration, particularly between urban, peri-urban and rural areas within metropolitan and functional city regions, has been a significant impediment to realizing transformative adaptation within such regions. The experiences of these two contiguous yet contrasting municipalities represent a microcosm of the dramatic discontinuities and inequalities on all variables within adjacent urban metropolitan and rural contexts in South Africa and beyond. Despite promising recent signs, the challenges of inter-municipal collaborative action are therefore formidable.

Keywords: climate change adaptation; local authorities; cross boundary governance; collaborative governance

1. Introduction

Municipal authorities, non-governmental bodies, and diverse local actors are at the frontline of climate action. Many are demonstrating increasing willingness to address climate and broader environmental change, as shown by recent progress and innovation. However, urban regions worldwide exhibit an immense diversity of conditions, capabilities, and responses to the challenges of changing environments and climatic conditions. As dynamic spaces, urban, peri-urban, and rural

components of functional city and metropolitan regions are always in transition, shaped by multiple spheres of influence and actors seeking power over resources, processes, and more recently, climate action agendas. Moreover, while separated by politico-administrative borders, adjacent municipalities within such regions are connected through biophysical, politico-economic, and social systems which are likely to be reconfigured under changing climatic/environmental conditions. The importance of linkages and systems interconnectivity among urban, peri-urban and rural areas is well-established. Yet, to date, politico-administrative borders have determined, to a large degree, the parameters of local government climate change adaptation strategies with insufficient attention to the role of inter-municipal collaboration, especially between neighbouring rural, peri-urban, and urban municipalities, for coordinating such policies and interventions. As documented elsewhere, even holistic or 'joined up' integration across sectoral or line departments within individual municipalities remains challenging [1–4].

To date, global 'learning networks' of leading cities such as the C40, Rockefeller 100 Resilient Cities, ICLEI and UCLG have been strongly promoted for their supportive roles in facilitating different forms of climate change and resilience information sharing and action by local governments [5,6]. While these international networks are important, we argue that greater attention needs to be paid to facilitating more localized collaborations between proximate local governments on the scale of individual city regions, just as among departments within individual municipalities. This type of collaboration has the potential to facilitate the necessary extension of adaptation initiatives, both horizontally across a larger number of municipalities (and vulnerable communities), and vertically, to support policy and legislative traction between local authorities and regional, national, and international bodies. Boyd et al. [7] (p. 140) point out that there is "increasing interest in the role that cities can play in climate change as sites of transformation". Indeed, over the past decade, there has been a strong shift in emphasis from resilience building to transformative responses to climate change. However, despite notable progress, both adaptive urban and rural transformation in relation to climate change and sustainability remain a long way off in many contexts. Our core argument is that weak inter-municipal collaboration, particularly between those in predominantly urban, peri-urban, and rural areas within city or metropolitan regions, has hitherto been a significant impediment to realizing such transformative needs and expectations within such regions. However, as this paper shows, recent emergent collaborative strategies and initiatives indicate transformative shifts taking place in this regard.

By way of illustration, this paper considers the recent evolution of climate agendas in the eThekwini (formerly Durban City Council) metropolitan municipality and the adjacent Ugu (predominantly rural but partially peri-urban) district municipality on the south coast of KwaZulu-Natal province (KZN), South Africa (SA) (see Figure 1). Juxtaposing extremes of wealth, poverty, and resources, these two contiguous yet contrasting municipalities embrace and represent a microcosm of the dramatic discontinuities and inequalities on all variables within adjacent urban metropolitan and rural contexts, and hence, offer valuable insights into the challenges of simultaneously overcoming the deep-rooted structural and institutional legacies of unequal development which are rooted in apartheid, and addressing the growing impacts of climate change. Accordingly, the significance of their governance processes and challenges is not limited to the South African context, but has far wider relevance for addressing environmental, social, and economic equity and justice in complex municipal formations anywhere. These are characterized by politico-administrative boundaries delimiting discontinuities of resources and institutional capacities that cross-cut biophysical and socio-ecological systems for which holistic, integrated climate change action is important. The divisive effects of these often historically embedded challenges are exacerbated by the generally short-term nature of local and other institutional decision making in favour of high visibility projects that maximize political capital for the current leadership ahead of the next election [8]. Reimagining and finding ways to transcend boundaries is fundamental to transformation, yet existing frameworks of governmental institutions within and across scales are predominantly not adjusted to

the transboundary nature of climate and other environmental problems [8–10]. Indeed, transcending boundaries for climate change adaptation requires "re-thinking and re-imagining the way climate change adaptation is currently governed and regulated" [10] (p. 17).

Such problems can be mitigated by strategic metropolitan urban governance institutions with powers over classic local authority transboundary issues, of which infrastructure and environmental issues like pollution and climate/environmental change are prime examples. The bulk of the existing literature addressing these challenges focuses on OECD countries and global North contexts (e.g., [10–12]), but there is significant and growing interest in climate agendas in the Global South, with a strong focus to date on a few core early adaptor cities such as Cape Town and Durban. As such, our choice of study sites seeks to extend existing literature on large cities and 'leaders' in the climate change field, often investigated as isolated case studies, and to underscore the importance of recognizing urban areas as integral parts of broader cross-boundary regional systems in physical, functional, administrative terms.

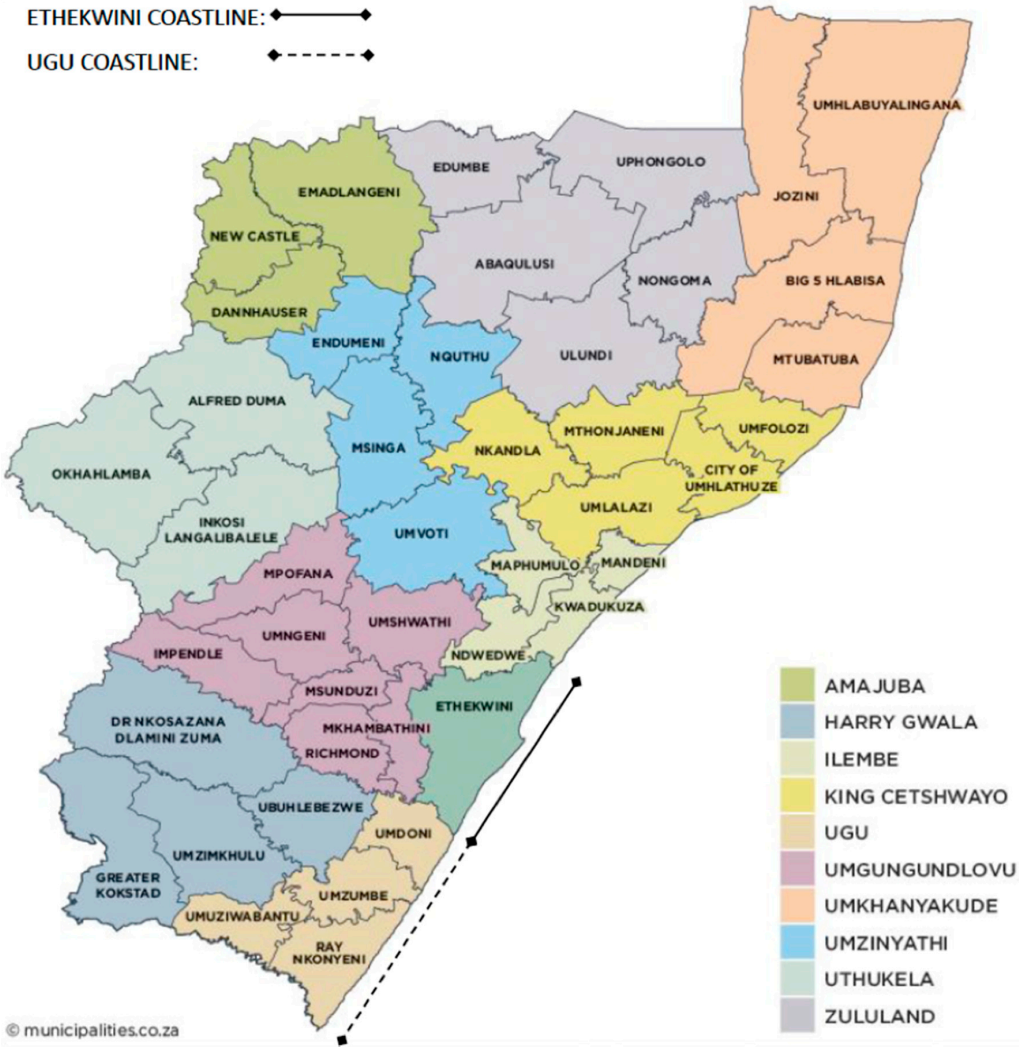

Figure 1. Map indicating KwaZulu Natal Municipalities and eThekwini and Ugu Coastlines. Source: [13].

Insights are drawn from existing literature and empirical research undertaken in Ugu and eThekwini over an extended period. Principal data collection was completed between October 2009 and June 2011. This research included (i) in-depth, semi-structured interviews, (ii) surveys and focus groups with key local and provincial authorities, community members, and other stakeholders such as non-governmental organisations (NGOs), and (iii) environmental consultancies. Follow-up research was also undertaken between 2012 and 2013, and more recently in December 2017 and February 2018,

in the form of in-depth interviews, email exchanges, and informal conservations with key junior and senior municipal officials from several departments (e.g., planning, disaster risk management and environment), local environmental consultants, representatives from provincial and national government levels (e.g., South African Local Government Association) and representatives from community and non-governmental organisations from both the Ugu and eThekwini municipalities. The empirical data presented in this paper are based predominantly on this series of 53 in-depth interviews undertaken during these extended periods. Table 1 summarises the stakeholder categories interviewed and their respective governance levels.

Table 1. Stakeholder categories interviewed and governance level.

Governance Level	Department/Organisation
Municipal Level Departments	eThekwini: Environmental Planning and Climate Protection Department (EPCPD), Coastal Engineering, Stormwater and Catchment Management Coastal Policy Unit Management, Development Planning Unit, Disaster Management Unit, Traditional Authorities Ugu/Umdoni: Water Services, Environmental Services, Environmental Management, Parks and Waste Management; Disaster Management Unit, Planning and Development, Traditional Authorities
Provincial Level	South African Local Government Association (SALGA), Department of Agriculture, Environmental Affairs & Rural Development; WESSA, KwaZulu Natal Local Government Association (KWANALOGA)
National Level	South African Local Government Association (SALGA); South African Cities Network; Department of Co-operative Governance and Traditional Affairs (CoGTA)
Non state institutions (various levels)	ICLEI Local Governments for Sustainability, Council for Scientific and Industrial Research (CSIR), environmental consultants, rate payers associations, civil society and non-governmental organisations

Several of the same post-holders were interviewed in both periods, which was very informative for attaining insights into the evolution of key issues. Interviewees were asked a series of questions under interrelated themes, including views on institutional roles and relations for addressing climate change, horizontal and vertical climate governance relations, environmental decision making, and the role of cross-border collaboration and planning for supporting climate change adaptation. In follow-up interviews, respondents were probed as to whether and how any shifts have taken place in relation to the core issues explored since the initial interview. Importantly, this longitudinal research approach enables us to trace the evolution of key shifts in approaches to and perspectives on collaboration embraced by the two adjacent municipalities over the past 10 years. In doing so, we build on our 2013 paper in *Urban Studies* [14], and revisit key arguments in light of the changing climate action landscapes in the study contexts.

2. Linkages between Development, Adaptation and Justice Issues in South Africa

Although classified as a middle-income developing country, SA has one of the world's highest levels of emissions per capita, at 10.3 | tCO_2 per person (t cap^{-1}), considerably above the global (6.3 | t cap^{-1}) average (but heavily skewed to industry and upper class minorities), combined with highly uneven development patterns and pressing adaptation challenges for large populations vulnerable to projected climate change impacts [15]. As with all development decisions, climate change adaptation and linked actions have far-reaching intra- and inter-generational justice implications [16,17]. In this sense, SA faces an additional challenge of ensuring that climate adaptation actions are broadly consistent with—and certainly not contrary to—the priorities of ongoing post-apartheid restructuring to redress the long-term structural inequalities and historical injustices and to avoid reproducing or reinforcing existing social and environmental inequalities and injustices [17]. This is crucial to ensuring that those who benefit from climate change adaptations are

not disproportionately the middle class and elites rather than the poorer social strata, as has been the case with 'development' [18].

As a result of an inequitable political and economic history, combined with current inequalities and biases, South African local government is operating within a decidedly spatially differentiated environment. In contrast to the traditional three-tiered hierarchical central–provincial–local government structure characteristic of the apartheid era, in the post-apartheid context, local, provincial, and national governments are regarded constitutionally as three separate, yet interrelated, spheres [19]. Thus, unlike many other countries, this structure is not simply an administrative construct, and each local government has a democratically elected municipal council. Nevertheless, local government is closely tied to provincial and national government, since these spheres regulate municipal functions [19]. Municipal governance is comprised of a non-executive elected Mayor, Executive Committee, councillors, and traditional leaders. As a significant and autonomous sphere, local government has been assigned multi-functional roles and responsibilities for fostering local democracy and equitable social and economic development [19]. All of these fit within the transformative multi-level governance analytical framework adopted by this paper (see Section 4 below).

SA's nine provinces all comprise several diverse municipalities which have been restructured twice since the end of apartheid, most recently in the 1996 Constitution. Especially in metropolitan areas and other large cities, dominant urban municipalities perform more effectively than their de facto subordinate rural neighbours. This is due, amongst other factors, to their greater budget allocations and resource generation capabilities through, for example, attracting investors, human capital, and commercial activities such as hosting major events [19]. They also contain the bulk of high-value private residential and industrial/commercial property, from which property rates and taxes are derived. In sum, the "apartheid inheritance means that post-apartheid local government effectively functions as a differentiated democracy," with municipalities having very different capacities to implement adaptation measures and support local citizens' adaptive actions [20] (p. 36).

Addressing these disparities, especially through encouraging inter-municipal collaboration, between neighbouring as well as more distant municipalities, is important for joined-up climate change and environmental policy and action across urban regions in SA and globally which is also characterized by such disparities. Such collaboration is necessary for adaptation measures and processes such as coastal sand dune reinforcement that straddle politico-administrative boundaries. It also critical for ensuring that citizens within district municipalities are not further disadvantaged in the context of climate change, simply as a result of being classified under a different jurisdiction with less capable local governments [8,14]. Ecological, social, economic, political, and infrastructural factors and functions are rarely neatly contained within politico-administrative boundaries. Overlaps frequently occur, creating interdependencies and shared problems and opportunities between the adjacent municipalities. Challinor et al. [21] explain that since environmental and climate change issues do not respect borders, risk can be transferred from one region to another in complex ways, such as pollution spilling across jurisdictions through water and in air flows, and fluctuating shared resources such as fisheries. They further note that climate risks have far-reaching "multiple direct and indirect pathways that cascade through complex social–ecological systems", including flows of material and people, as well as trade and other linkages [21] (p. 3).

However, due to well established politico-administrative boundaries, municipal funding structures and mandates and other factors, there is a pervasive tendency for municipalities and regional authorities to focus narrowly within their respective delineated areas (i.e., as 'siloed' municipalities within metropolitan or function city regions) [8,14].

Nevertheless, there has recently been growing recognition of the need for collaboration across local and regional boundaries for climate/environmental action (and many other shared challenges) [9,11,21]. A key feature of these challenges is that they transcend such boundaries; indeed, impacts are often felt at great distances from their sources in today's globally integrated world economy—known as teleconnections in the environmental change lexicon [21,22]. Such complexity

underscores the need for bold and integrated transformative actions that transcend boundaries in order to make any real difference; isolated, local incremental reforms are not adequate (see Section 4 below).

Despite the welcome recent attitudinal shift, only limited attention has yet been devoted to the importance of collaboration between contiguous municipalities, particularly those spanning urban, peri-urban, and rural locales in academic and policy circles, or in practical terms by local authorities. For effective transboundary multi-level governance to be achieved, both horizontal relational dynamics at the inter-municipal scale and vertical relations with higher government tiers need to be considered (see Section 4 below). While multi-scalar governance is emphasized rhetorically [14,23–25], overcoming historically entrenched centralised and hierarchical decision-making structures in practice is very challenging in the South African context and beyond.

That said, it is important to acknowledge the increased attention to climate/environmental change at all levels of government, both in SA and globally, over recent years. This is attributable to a combination of the more widespread, frequent, and severe experience of extreme events and their costs, and the progress made internationally in this sphere. In particular, the Sendai Framework for Disaster Risk Reduction, Agenda 2030 and its Sustainable Development Goals, and the Paris Accord (COP 21), were all adopted in 2015. The prevailing development and economic policy environments at all scales strongly influences the extent to and manner in which adaptation is addressed. The following section contextualizes the South African local government policy arena.

3. The South African Policy Environment for Climate Change Adaptation

Following a root and branch post-1994 policy and legislative overhaul, a sophisticated legal framework now regulates environmental and developmental issues in SA. Recently, the national government has also made considerable progress in developing a climate action roadmap to deal with the multiple climate change threats facing different parts of the country, including flooding, sea level rise in coastal regions, and drought, as recently exemplified through severe drought, particularly in the Western Cape. The National Climate Change Response Policy White Paper (NCCRP) [26] provides guidance for policy development and implementation in the short, medium, and long term (up to 2050), and while the predominant focus is on mitigation, there is also a chapter on adaptation. More recently, the National Adaptation Draft Strategy [27] has been launched.

However, substantive implementational and budget deficits remain, with major structural constraints to the transformation of SA's political economic trajectory to becoming low-carbon and well adapted to climate change. Heavy industry, both privately and publicly owned, remains energy intensive and a major source of emissions. Against the backdrop of a highly unequal society with immense disparities in wealth distribution, the need to meet pressing developmental and environmental rights creates major competition for limited government resources across the country.

As a significant and autonomous sphere, post-apartheid local government has been assigned multi-functional roles for driving SA's transformation, including fostering local democracy and equitable social and economic development [19]. Integrated development plans (IDPs)—a comprehensive planning tool to facilitate developmental local government—have been used as vehicles for integrating brown (developmental) and green (environmental) agenda issues that have conventionally been addressed separately and embedding sustainable development discourse into strategic planning [14,28]. However, the simultaneous elevation and revision of environmental and developmental agendas from 1994 onwards created tensions and conundrums at different government levels, particularly within local governments, in seeking to balance and integrate these agendas [29].

Environment and development issues are often entangled in a tense relationship due to the entrenched (mis-)perception in many contexts of the environment as being antagonistic to, instead of co-dependent with, development [18,30–32]. Therefore, green spaces often have negative connotations, and in SA this perception has been historically underscored by the distinctive, destructive and discriminatory apartheid-era policies and practices favouring elite and middle class (predominantly white) communities, the legacies of which continue to bear on current environment and climate

change agendas [14,18,30,31]. This false environment–development schism constrains the urgent advancement of climate change adaptation and mitigation agendas at all government scales, as well as the realization of interdependent constitutional human and environmental rights [33]. However, as discussed below, there is growing evidence of shifts in this perspective, particularly through community-based adaptation initiatives with developmental co-benefits.

4. From Resilience to Transformative Urban Governance and Adaptation Conceptual Framing: International Trends Resonate in South Africa

The promotion of resilience to climate change impacts (e.g., 'resilient cities') has been a major trend in academic and policy circles, and has consequently underpinned the development of many international climate change agendas at all levels over the last decade. Indeed, the Rockefeller 100 Resilient Cities programme focuses on the appointment of a resilience officer in each municipality. While interpretations of resilience vary considerably, implicit in common understandings of resilience is the notion of recoverability. Hence, "[f]rom the perspective of adaptation, resilience is made distinct because of the aspiration of maintaining functional persistence" [34] (p. 170) (see also [35,36]). As such, uncritical resilience efforts could just as readily be applied to—or have the indirect effect of bolstering—unjust, inequitable and/or unsustainable systems or characteristics, thereby entrenching rather than ameliorating problematic situations. Put differently, if functional persistence means restoring existing, ineffective urban governance and unsustainable development paths, then more than resilience is required for such circumstances to be transcended for effective and sustainable adaptation. It also needs to be recognized that many impoverished or resource-constrained actors and organizations are already under intense pressure, operating at or near the limits of their and their environments' adaptive capacities under prevailing circumstances. Hence further adaptation initiatives will require innovative governance and partnering to enable step-changes in addressing the increasing stresses heralded by environmental change [25].

Accordingly, in a manner reminiscent of earlier theoretical and ideologically driven debates on the social and economic transformation of (post)colonial political economies and urban transitions, rather than incremental reform [37–39], there are increasing arguments in favour of thinking in transformative terms about the conditions and nature of change required in addressing climate change. This is as true at the local government level as any other. This conceptual framing links with wider emerging trends within climate change literature, and indeed, recent thinking within the Intergovernmental Panel on Climate Change [40] where transformative adaptation (or adaptive transformation) and climate action or new so-called 'radical approaches' to resilience (e.g., [41]) are being increasingly promoted (e.g., see also [34,36–39]).

While transformative theory and practice have diverse disciplinary roots, the key discernible characteristics of transformation or transformational adaptation include efforts to transcend (i.e., move beyond) incremental and transitional actions by focusing on tackling root causes of vulnerability, opening up opportunities for revision and replacement of existing unsustainable development trajectories and technological path dependencies, the successful negotiation of power relations, building empowerment, encouraging innovation, and protecting positive gains such as the inclusive modes of governance which have already been achieved [34,42–45].

Kates et al. [46] (p. 7156) propose that adaptations can be described as 'transformational' rather than incremental when 'they are adopted at a much larger scale or intensity, those that are truly new to a particular region or resource system, and those that transform places and shift locations'. However, in practice, the differences between incremental and transformative adaptations may be difficult to distinguish, while incremental changes may be retrospectively classified as transformational in the long run, such as cumulative institutional shifts in adaptive capacities and understandings that improve overall capacities to undertake transformational change [46]. Furthermore, the translation of a transformative conceptual device into action faces formidable barriers and will entail transcending business-as-usual and challenging the status quo, which requires political will and overcoming inertias

that reflect the vested interests of existing power relations embedded in political institutions, large private companies, and non-governmental organisations, access to and rights over (peri-) urban land, and even more supposedly 'technical' mechanisms such as land-use and planning regulations. Thus, much more research is required to understand catalysts for transformation to inform broader policy formulation [6].

Both eThekwini and Ugu had an initial strong focus on resilience for developing their climate agendas [1]. However, in recent years there have been discernible shifts where both municipalities are increasingly supporting transformative or 'bouncing forward' approaches for furthering their respective green agendas and adaptive capacities [2,47–49]. For example, Ugu's Climate Change Response Strategy Draft [48] (p. 155) emphasises "transformative change toward a more resilient Ugu", and that "climate change can be transformed into an opportunity for governance innovation within the Ugu District" [45] (p. 14). Significantly, Roberts and O'Donoghue [2] (p. 314), who are two key municipal officials driving Durban's climate agenda, note, in comparison to 'bouncing back' interpretations of resilience, that "[m]ore useful and practical in the long run is the idea of "bouncing forward" or "transformation", which implies a more radical shift to a new mode of urban planning, management and governance".

Effective transboundary and multi-level governance is central to this strategic 'radical shift' to new modes of governance. The conceptual notion of multi-level governance "captures both the multiple levels at which governance takes place, and the myriad actors and institutions that act simultaneously across these levels" [23] (p. 29). Conventional views of environmental management are fundamentally hierarchical, whereas tackling climate change involves processes and institutions operating at multiple interlinked scales [23,25]. Both historically and currently, meaningful and sustained cross-scale climate change governance has been lacking. Initially principally rooted in studies of supra-national institutions such as the European Union (EU), there is an increasing body of literature and empirical research on multi-level or multi-scalar governance, with a focus on interconnectivity between and across government levels, particularly relating to multi-scale and cross-cutting environmental issues such as climate change [14,23]. Whilst recognising that the notion of governance is widely debated, we apply Moser's [50] (p. 315) definition: "the set of decisions, actors, processes, institutional structures and mechanisms, including the division of authority and underlying norms involved in determining a course of action". This naturally implies that governance incorporates all actors involved in decision-making, and is not restricted to institutions. It also brings into focus the dynamic interchanges between decision-makers within and across institutions and both vertical and horizontal boundaries, the nature (e.g., participatory or democratic extent) of actual decision-making processes, and other interconnected factors impinging on stakeholders and decisions [50]. In terms of a multi-level governance framework, it is important to consider at which level (e.g., local, provincial, national) decision-makers are situated, what their sphere of influence is, and through which mechanisms multi-level decisions are linked. Although the multi-level framework or concept itself is neutral, the incorporation of such diverse actors and institutions implies a collaborative approach to governance, and thus lends itself to participatory and co-production governance methods, but that is beyond the scope of this paper.

The paper now turns to an analysis of the evolving climate agendas in both municipalities, with a particular focus on inter-municipal collaboration.

5. Evolving Municipal Climate Change Agendas and Cross-Border Collaboration in Metropolitan Durban

The eThekwini municipality has a substantial urban core and therefore tax base, yet also has an immense rural hinterland. In developing country terms, Durban is a wealthy city with considerable infrastructure and capacity. Neighbouring Ugu municipality covers a larger area than eThekwini, but has a restricted tax base due to its smaller, predominantly rural population occupying relatively large land tracts (see Figure 1). As a financially under-resourced and under-skilled municipality,

Ugu has large tracts of under-developed and under-serviced rural hinterlands. Despite their differences, both municipalities and their citizens face similar challenges of high spatial segregation and social exclusion, extreme poverty, inadequate living facilities, unemployment, and water, sanitation and electricity backlogs. Both Ugu and eThekwini are signatories to the Durban Adaptation Charter (DAC) and Central KwaZulu Natal Climate Change Compact (CKZNCCC).

eThekwini is regarded as a world leading municipality for its anticipatory climate change actions, specifically its explicit focus on adaptation at the municipal and community scales [1–3]. With mainstreaming as an underpinning objective, the eThekwini Municipal Adaptation Plan (MAP) focuses on the water, health (including food security), and disaster management sectors [1–3]. eThekwini's climate agenda is led by the Environmental Planning and Climate Protection Department (EPCPD), and some major drivers for climate action in the city include a dedicated climate team, strong local leadership by key individuals and departments, and sustained local and international networking for knowledge sharing and ad hoc (yet critical) funding opportunities. In this context, it is noteworthy that eThekwini is a member of all four international membership organisations referred to in the Introduction, namely: ICLEI, UCLG, the C40, and Rockefeller 100 Resilient Cities. Its C40 agenda focuses on climate change adaptation and on waste and water, while its resilience strategy in the Rockefeller initiative aims at adapting its institutional structure and operations to create an integrated resilience framework in the context of considerable poverty and informality [51,52]. This work is led by Debra Roberts, the municipality's longstanding climate/environment champion and former head of the EPCPD. She is now Chief Resilience Officer and Head of the Sustainable and Resilient City Initiatives portfolio, as well as co-chair of Working Group II of the IPCC Sixth Assessment Report. This degree of expertise and international embeddedness contrasts sharply with that of smaller urban and district municipalities, as detailed below.

Indeed, while most of SA's seven other metropolitan municipalities (e.g., Cape Town and Johannesburg) have also initiated specific and progressive climate change initiatives (e.g., [53,54]), the remaining district and constituent local municipalities, such as eThekwini's neighbouring rural Ugu district municipality, lag behind to varying degrees. However, in order for eThekwini to adapt effectively to climate change impacts such as threats to food security and drought, strong, supportive, and sustainable linkages need to be established with rural municipal hinterlands.

While the Ugu (comprised of six smaller local municipalities) and eThekwini municipalities are spatially and functionally connected, they are starkly contrasted, not least regarding their climate and broader environmental agendas. These disparities stem largely from SA's historical and current inequitable political-economic complex and social ordering, which has given rise to municipalities with disparate resource capacities and development trajectories. Ugu's Environmental Department is comparatively understaffed, with weaker expertise and resource capacities for developing climate strategies. However, in a significant development, the Air Quality and Climate Change sub-unit was formed under the Environmental Department in 2015, although it remains under-resourced, with limited staff capacity. Despite some initial efforts, Ugu's six local municipalities generally do not have clear and coordinated objectives with regards to addressing climate change, and as it is not yet considered a core function, it does not receive allocated funding [49]; Interview 6 February 2018). Climate change awareness remains low within institutional structures, and according to Aurecon [49], none of the local municipalities has a dedicated climate change lead with clearly defined responsibilities endorsed by the IDP. Consequently, there is considerable reliance on the Ugu District and higher government structures for supporting climate resilience and transformation.

Climate change and environmental issues have begun to feature much more strongly on Ugu's governance agenda over the past ten years and since the research reported in Leck and Simon [14] and Leck and Crick [8]. Interviews with Ugu municipal officials revealed that this transition has been driven by several key factors, including provincial and national directives, growing awareness and leadership from a few key individuals within the municipality, and networking opportunities. Climate change was highlighted explicitly for the first time in the December 2011 Ugu IDP Revisions [55],

and has been increasingly recognised in subsequent IDPs. The revised December 2011 Ugu IDP [55] (p. 119) identifies health, agriculture, environment, and tourism as key vulnerable sectors that will "need to be assessed" as part of a "long-term initiative" to develop adaptation strategies. Significantly, the IDP [55] (p. 119) also underlines that this will be based on "lessons that will have been learnt from the forerunners". However, this policy rhetoric and the related intended climate change initiatives have yet to be implemented adequately. The 2017/2018–2021/22 IDP [56] recognises major gaps in the 2012 IDP regarding climate change and other environmental issues, and that this is partly being addressed through the development of the municipal climate change vulnerability strategy. Yet, curiously, there is no mention of collaboration or learning from neighbouring or other municipalities in developing these.

That said, in a very recent significant development, Ugu has established a draft Environmental Management Framework (EMF) Strategic Environmental Plan [57], where a short section (p. 117) highlights that EMFs developed for neighbouring municipalities will need to account for Ugu's EMF and their associated Management Guidelines, and that this "is particularly important for the collaborative management of environmental features that traverse multiple administrative boundaries (e.g., major rivers and associated catchments, mountain ranges, coastline, protected areas, threatened ecosystems)". Yet, there are no suggested provisions or recommendations for how to achieve in this in practice.

Further noteworthy developments since 2010 and the research reported in Leck and Simon [14] and Leck and Crick [8] include the development of the Ugu Climate Change Response Strategy (Ugu CCRS) [49], a growing focus on community-based adaptation [Interview, 14 December 2017], and increasing emphasis on networking and collaboration at multiple scales, particularly through the DAC and CKZNCCC. This is explored in further detail below. However, concrete and detailed adaptation and vulnerability reduction strategies are yet to be widely implemented, and despite these recent developments, many constraints to implementation persist, including inadequate funding and resources, weak inter-departmental collaboration, and a lack of political and legal backing (Interview, 14 December 2017; Interview, 13 December 2017) [49].

This is representative of the broader SA context where metropolitan municipalities with strong urban cores and resources have initiated comprehensive climate change plans ahead of their largely rural and less well-capacitated counterparts [58,59]. Weak horizontal collaboration between Ugu and eThekwini and other SA municipalities is a major restriction to learning from 'frontrunners', despite their similar adaptation priorities.

6. Barriers and Opportunities for Transboundary Governance in Metropolitan Durban

A key feature of eThekwini's climate change agenda is its emphasis on green infrastructure and developmental co-benefits, particularly through the Durban Metropolitan Open Space System (D'MOSS). This is a multipurpose network of open spaces (approximately 74,000 ha) of land and water, and a linked ecosystem-based adaptation approach which promotes 'green/natural' infrastructure as a means of providing key functions for climate change mitigation and adaptation through, for example, erosion control, and water supply and regulation [47]. Ecosystem-based adaptation (EBA) aims to "systematically harness the services of ecosystems to buffer communities against the adverse effects of climate change" [60] (p. 30). Should communities support this framing, it can create opportunities for enhancing community-level resilience to disasters as a result of ecosystem services being valued and maintained (e.g., restoring wetlands for moderating flood events).

However, as already alluded to, green agenda issues are not always well-received and supported within local communities, for whom employment, meeting basic needs, and other aspects of 'development' are sometimes seen as overriding priorities, and environmental issues still as something of a luxury (see [53] for a broader treatment in African contexts). Further, for more affluent individuals and communities, green agenda issues are sometimes seen as a barrier to furthering economic investments, and developments such as luxury coastal property developments. Tellingly, the establishment of green corridors and spaces—probably emulating D'MOSS—is also emphasised

in the Ugu IDP (2011/12) [55], as well as the opportunities that climate change offers for developing the green economy [55,56]. Yet, the importance of collaboration between the municipalities for enhancing such natural systems is not promoted or implemented strongly by either municipal body. In both municipal contexts, EBA, including community-based ecosystem adaptation, appears to have gained increasing support over the past decade, including from local communities as co-benefits for development are increasingly recognised. Durban's experience is well-documented in formal accounts [1–3,47], yet Ugu's remains more obscure in the literature (e.g., [61]), and is understood largely through personal communication (Interview, 13 December 2017 and 26 January 2018). There is considerable opportunity here for both municipalities to transform current approaches and collaborate in these initiatives through joined-up initiatives across the rural-urban municipal regions.

The need for all government spheres to collaborate and co-operate is a priority emphasised in both the Constitution and National Environmental Management Act (NEMA, 107 of 1998). Nevertheless, co-operative governance is challenged by SA's long history of centralized decision-making, inadequate inter-governmental collaboration, and power struggles over decision-making, funding, and responsibilities between different government levels, often underlain by apartheid-enforced racial politics [62]. While co-ordination bodies such as the South African Local Government Association (SALGA) and the Department of Co-operative Governance and Traditional Affairs (COGTA) exist, they are yet to reach their potential for facilitating collaboration, particularly in terms of addressing climate change [48]. This is attributable to institutional characteristics including lack of empowerment, insufficient dedicated and sustained financing mechanisms, and overlapping, poorly defined responsibilities and competences.

Furthermore, throughout the longitudinal research duration, key officials from both municipalities cited ambiguity over the role of such institutions, poor meaningful interaction and guidance on climate change issues, as well as ineffectiveness when describing them. Such issues were also highlighted in the recent Ugu CCRS [49]. That is but one more positive sign of growing strategic prioritization (see Section 7 below) that will hopefully soon herald action. To date though, vertical integration, collaboration, and information sharing remain weak, despite the existence of a well-established network of institutional and legal frameworks (e.g., the Intergovernmental Relations Framework (IGR), Act 13 of 2005, introduced to facilitate co-ordination between the three government spheres) for supporting collaboration. Additionally, many local-level authorities in both municipalities highlighted a prevalent lack of understanding at the provincial and national government scales about local-level realities and contextual considerations. This can also be attributed to inadequate upward—as opposed to only downward—information flow from local to higher government spheres. One eThekwini official noted that there *is* upward information flow, and implied 'bottom up' guidance, but this was usually instigated by higher government spheres as a way of tagging onto progressive local climate change ventures rather than necessarily providing benefit at the local level:

> We are guiding *them*, unfortunately; that is the way it is. They are not in the same boat as us in addressing climate change. But, then again, whenever we do an exciting or progressive project here they quickly register as stakeholders, so they can jump on the wagon and be seen in that light! (Interview, 22 April 2010)

Since this interview in 2010, there appears to have been recognition of efforts to address this, yet due to capacity, resource, and other constraints, there has been little noticeable change on the ground. For example, an Ugu environmental official explained,

> You know, there is definite recognition by higher government levels now of these issues and they are trying to integrate and learn from municipal level upwards, but it is a huge undertaking, we are all so different, facing different issues and the province and national government have their hands tied in many ways with mandates and lack of capacities and resources. (Interview, 14 December 2017)

This point is discussed in more detail below. Significantly, while eThekwini *municipality* is widely acclaimed for its climate and broader environmental change actions, it is important to understand that, in such a large and complex institution, it is specific departments (particularly the EPCPD) and a handful of key individuals who principally underpin and continue to drive the environmental change agenda. In other words, they operate as 'champions' [3]. In the case of Ugu, the environmental lead has been a major driver of the District's climate agenda over the past 10 years, and this well-established presence has been key to the development of the Ugu CCRS and other initiatives (Interview, 6 February 2017). However, as the literature on the role of climate change champions/leaders shows (e.g., [23,61,62]), individual or departmental champions do require wider institutional backing for sustained impact. While climate change efforts could certainly not have progressed without a certain degree of broader institutional support and acceptance, eThekwini's climate agenda still faces formidable barriers to becoming embedded in institutional cultures and practice because of persistent conservatism and adherence to traditional, technicist approaches in many quarters.

While Ugu and eThekwini's respective environmental departments have taken the lead in climate action, other municipal departments also have assigned environmental mandates. However, formal and sustained cross-departmental co-ordination remains weak, and neither municipalities' environmental policies mandate such collaboration [49]. This can be attributed partly to inadequate political will, understanding, and support for climate agendas [4,48,49].

Political will and election cycles have a significant influence on municipal climate action. Several informants explained that, in their efforts to implement immediately visible developmental results, frequently with the aim of securing votes, decisionmakers often overlook important adaptation needs. This example from a senior representative of eThekwini's Disaster Management unit captures the perspective effectively:

> "No politician puts money underground where you can't see it; that is where we need it though. They would rather build a clinic that is not even used than put underground furniture in place. They want that publicity, to be seen to be doing something, but our underground furniture is old and shaky and needs to be adapted". (Interview, 25 May 2011)

Reflecting similar sentiments, Breetzke [63] (p. 5) explains that the provision of services and social facilities "represent[s] the re-election 'ticket' for most political representatives". 'Underground furniture' in the interview quote refers to the installation and maintenance of critical physical infrastructure such as water pipes and storm water drainage that are not readily 'visible' in the same way as housing or prestige developmental projects, yet comprise essential foundations for supporting adaptation and sustainable development with and across municipal borders. Maintenance, as well as transformation, of this infrastructure to suit changing climatic conditions is essential for adaptation, yet is often taken for granted [64]. As a community leader from Ugu noted,

> "We are all caught in the middle of political games here; the politicians play us off. We only see the government people just before the elections and they promise us all sorts of things but, then we hardly see them again and nothing changes" (Interview, 3 March 2011)

Politically, administrative boundaries are also subject to realignment by the municipal demarcation board. This often occurs near or just after election periods. Thus municipal bodies can 'inherit' new land and communities or forego existing areas, thereby creating new challenges or opportunities to existing (or absent) community-based and municipal-led adaptation measures [14].

7. Shifting Perceptions and Approaches to Collaboration

The role of politics and political will in shaping climate change responses and collaboration at all scales is a dominant theme in climate change literature, and emerged strongly in empirical investigations for this paper [8,14]. As emphasized by others in the early years of this century in

relation to developing contexts [65,66], climate/environmental concerns often remained marginal to politicians and authorities compared with pressing concerns of resource allocation, livelihood, and food security, poverty, and service provision. These points noted that politicians are also led by public directives, and act according to perceived public priorities and demands. Thus, addressing climate/environmental change must be understood within the context of bi-directional state and non-state actor relations.

Despite the fact that the SA government launched its NCCR strategy almost a decade ago, climate change has not always received the necessary political prominence. Since this research commenced, most of our interviewees, from grassroots to government levels, have emphasised the importance of politicians for potentially driving climate/environmental change agendas and facilitating inter-governmental collaboration. Especially in 2008–10, most also expressed concern and a distinct lack of confidence in politicians and their involvement in addressing climate/environmental change. As a senior environmental consultant from the Ugu region noted then,

> "I think that the primary issue in this country is that it is all lip service, because the politicians haven't bought into this environmental care idea. Politicians have never and still are not accepting the huge role that the environment plays in the wellbeing of their people. So how can you expect co-operation between government if politicians are not driving it". (Interview, 22 January 2010)

However, since this interview and others from the same period cited above, as part of the research reported in Leck and Simon [14], there has been a discernible shift in perception and approaches to partnership and collaboration by both municipalities. From initial, somewhat ambivalent and even dismissive viewpoints, both municipalities and our individual interview respondents have begun to express viewpoints in strong favour of collaboration and partnering for climate change initiatives, and a willingness to adopt strategies to do so. This transformation has been influenced by several interconnected factors, such as growing involvement in international networks and social networks between municipal officials, and key individual champions driving the municipal climate agendas and the DAC [8,14].

The DAC has been a notable catalyst for change since the initial research was undertaken. It has provided the impetus for climate change learning exchanges between KZN municipalities, and underpins the development of the Central KZN Climate Change Compact (KZNCCC), to which both eThekwini and Ugu are affiliated. The KZNCCC is a partnership of regional and local municipalities that supports a 'network of cities' approach, and is an effective platform for municipalities to collaborate with and learn from each other. Respondents from the Ugu municipality expressed support for the KZNCCC, and recognised the benefits of being partners, particularly for experience and information sharing. Interestingly, in accordance with Durban's ongoing leadership status, it appears that eThekwini is largely leading the activities and co-ordination of the KZNCCC, particularly through the Durban Research Action Partnership (D'RAP), under the Urban Climate Change Research Network (UCCRN), Africa Hub [67].

Moreover, to date, the core focus appears to have been on learning exchange rather than developing joined-up practical adaptation, mitigation, or transformative initiatives, particularly across rural–peri-urban–urban boundaries. Specific recognition of the need for collaboration between adjacent municipalities, particularly across rural-urban zones in support of addressing long-standing inequalities, remains limited. For example, Ugu's CCRS [46] emphasises the importance of partnering and networking for addressing climate change, but does not explicitly recognise inter-municipal collaboration, particularly between those with shared boundaries. A notable recent exception is the eThekwini draft Municipal Spatial Development Framework (SDF) 2018–2019, which places considerable emphasis on 'cross-boundary engagements with neighbouring municipalities', particularly regarding strategic investments for integrated economic growth of the region [68]. The eThekwini Municipality has mapped the SDFs of the three neighbouring, predominantly rural district municipalities (Ugu, UMgungdlovu and Illembe), and assessed their interrelated implications.

This assessment revealed areas of both spatial alignment and misalignment, and significantly, it highlights "the need for the planning of municipalities to be more outwardly focused and to recognise and understand the functional linkages and interdependencies between different neighbouring municipalities" [68] (p. 74). Moreover, the SDF recognises the need to focus on cross-boundary climate change impacts and collaborative planning. However, this is challenged by the lack of spatial representation of climate change impacts across the three adjacent municipalities, and funding constraints. To improve integration, the report recommends the formation of a steering committee to co-ordinate consultative work among the three municipalities to support cross-boundary adaptation and include relevant sectors to support climate change projects [68]. Other recommendations based on inter-municipal meetings include the establishment of an inter-municipal communication and co-ordination platform, and a cross-border urban-rural management committee to address diverse issues, including climate change.

Despite increased willingness to collaborate, this is constrained in practice: the lack of a specific mandate within each municipality for such activity, formal agreements, and funding restrict collaboration beyond information sharing. Further impetus for collaboration can be driven by the support of elected representatives, policy guidelines, and champions in key departments taking initiatives. Using cross-boundary processes that are now increasingly agreed to be shared priorities provides a non-partisan tool for building bridges and coalitions within functional regions and tiers of government.

8. Concluding Reflections

The complex and layered challenges presented by climate/environmental change demand system-wide transformative thinking, planning and actions. Through a combination of mounting scientific evidence and everyday experience of damaging extreme events around the world linked to climate/environmental change, there has been greater commitment by national governments to agree to landmark global conventions, and to begin implementation domestically. Inherent to this is greater and more coherent multi-scalar governance, in which international, national, regional, and local government institutions collaborate to ensure complementarity and consistency of policy and practice in accordance with their respective powers and responsibilities. Such integration needs must not be only vertical, however, but also horizontal, working across politico-administrative boundaries at the same hierarchical level to encompass relevant watersheds, river basins, functional regions, including urban regions. This paper has addressed this challenge conceptually and empirically at the urban metropolitan level, with particular reference to the Durban metropole in KwaZulu-Natal, SA.

Similar to global trends, a distinct pattern is emerging in the South African context, where climate leaders (mostly metropolitan municipalities) are surrounded by 'followers'—municipalities struggling to get much beyond the starting blocks in terms of climate action. It is essential for this intra-provincial and national gap to be reduced to ensure that existing injustices and disparities between municipalities and their citizens—the fundamental structure of which reflects the apartheid legacy—are not intensified. Greater inter-municipal collaborative governance can serve as an important trigger for this, and there is clear evidence of growing support by both the eThekwini and Ugu municipalities for increased collaboration. However, as pointed out by our municipal interviewees, many obstacles exist, such as diversity in core municipal features and functions, unequal skills and technical capacity, complex governance structures, and weak political support, especially if different political parties control the respective municipalities. Greater vertical integration and collaborative governance between local, provincial, and national government can potentially help break down obstacles to collaboration. However, many initial climate change initiatives implemented by local government have been undertaken autonomously, in the absence of adequate provincial or national leadership and support.

Local government in SA has considerable decision-making power over local policies, development decisions, and resource allocations for driving the country's transformation, which ultimately

influence local climate/environmental change adaptation prospects and barriers. However, maximum effectiveness is likely to be achieved only when collaborative governance is both horizontal and vertical, in order to ensure that transboundary issues are adequately addressed, and that complementary skills and resources from all relevant local, regional, and national institutions are deployed in that process. Transformation from agenda-setting and information exchange between adjacent municipalities to the implementation of collaborative adaptation measures is a significant current challenge that will require more innovative approaches. From both a policy and practice perspective, greater clarity of respective local, regional, and national powers and responsibilities for climate/environmental agendas is required in order to avoid overlap and gaps relating to these issues. Such a governance transformation can also help to create collaborative mentality as an institutionalised norm, rather than an exception to be done by 'champions'. This will require addition supportive mechanisms, such as dedicated funding and well-established platforms and procedures.

With reference to particular examples of indifference, resistance, and apparent recent progress in the eThekwini and Ugu municipalities within metropolitan Durban, we have argued that these shifts can be facilitated by thinking transformationally about borders, and by placing the focus on the benefits of 'transformative' adaptation. As discussed, transformational adaptation and governance are concerned with fundamental change through tackling the root causes of vulnerability, opening up opportunities for revision, and the replacement of existing, unsustainable development paths, as well as by encouraging innovation while protecting existing good practice such as inclusive modes of governance already. Such an approach can help to ensure that adaptation measures are sustainable, and account for prevalent social and environmental injustices across borders.

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References

1. Roberts, D. Prioritizing climate change adaptation and local level resilience in Durban, South Africa. *Environ. Urban.* **2010**, *22*, 397–413. [CrossRef]
2. Roberts, D.; O'Donoghue, S. Urban environmental challenges and climate change action in Durban, South Africa. *Environ. Urban.* **2013**, *25*, 299–319. [CrossRef]
3. Leck, H.; Roberts, D. What lies beneath: Understanding the invisible aspects of municipal climate change governance. *Curr. Opin. Environ. Sustain.* **2015**, *13*, 61–67. [CrossRef]
4. Rosenzweig, C.; Solecki, W.D.; Romero-Lankao, P.; Mehrotra, S.; Dhakal, S.; Ibrahim, S.A. *Climate Change and Cities: Second Assessment Report of the Urban. Climate Change Research Network*; Cambridge University Press: Cambridge, UK, 2018.
5. Bahadur, A.V.; Tanner, T. Policy climates and climate policies: Analysing the politics of building urban climate change resilience. *Urban Clim.* **2014**, *7*, 20–32. [CrossRef]
6. Yildrim, S.; Bostanci, S.H.; Erdoğan, S. Environmental sustainability in local governments: A case of Turkish municipalities. *J. Geogr. Reg. Plan.* **2017**, *10*, 330–339.
7. Boyd, E.; Ensor, J.; Broto, V.C.; Juhola, S. Environmentalities of urban climate governance in Maputo, Mozambique. *Glob. Environ. Chang.* **2014**, *26*, 140–151. [CrossRef]
8. Leck, H.; Crick, F. Beyond urban-rural boundaries: Encouraging inter-municipal collaboration for climate change adaptation in KwaZulu-Natal, South Africa. In *Planning Across Borders in a Climate of Change*; Steele, W., Alizadeh, T., Eslami-Andargoli, L., Serrao-Neumann, S., Eds.; Routledge: London, UK, 2014.

9. Haarstad, H. Climate Change, Environmental Governance and the Scale Problem. *Geogr. Compass* **2014**, *8*, 87–97. [CrossRef]
10. Steele, W.; Sporne, I.; Dale, P.; Shearer, S.; Singh-Peterson, L.; Serrao-Neumann, S.; Crick, F.; Choy, D.; Eslami-Andargoli, L. Learning from cross-border arrangements to support climate change adaptation in Australia. *J. Environ. Plan. Manag.* **2014**, *57*, 682–703. [CrossRef]
11. Gore, C. The limits and opportunities of networks: Municipalities and Canadian climate change policy. *Rev. Policy Res.* **2010**, *27*, 27–46. [CrossRef]
12. Dannevig, H.; Hovelsrud, G.K.; Husabø, I.A. Driving the agenda for climate change adaptation in Norwegian municipalities. *Environ. Plan. C Gov. Policy* **2013**, *31*, 490–505. [CrossRef]
13. Municipalities of South Africa. KwaZulu Natal Municipalities Map. 2018. Available online: https://municipalities.co.za/provinces/view/4/kwazulu-natal (accessed on 18 July 2018).
14. Leck, H.; Simon, D. Fostering multiscalar collaboration and co-operation for effective governance of climate change adaptation. *Urban Stud.* **2013**, *50*, 1221–1238. [CrossRef]
15. Altieri, K.; Trollip, H.; Caetano, T.; Hughes, A.; Merven, B.; Winkler, H. Achieving development and mitigation objectives through a decarbonization development pathway in South Africa. *Clim. Policy* **2016**, *16*, 78–91. [CrossRef]
16. Simon, D. Urbanisation and global environmental change: New intergenerational challenges. *Int. J. Green Econ.* **2007**, *1*, 299–306. [CrossRef]
17. Ziervogel, G.; Pelling, M.; Cartwright, A.; Chu, E.; Deshpande, T.; Harris, L.; Hyams, K.; Kaunda, J.; Klaus, B.; Michael, K.; et al. Inserting rights and justice into urban resilience: A focus on everyday risk. *Environ. Urban.* **2017**, *29*, 123–138. [CrossRef]
18. Simon, D. Reconciling development with the challenges of climate change: Business as usual or a new paradigm? In *The Political Economy of Environment, Development and Conflict in a Globalised World; Exploring the Frontiers, Essays in Honour of Nadarajah Shanmugaratnam*; Kjosavik, D., Vedeld, P., Eds.; Papir Academic Press: Oslo, Norway, 2011; pp. 195–217.
19. Pieterse, E.; Van Donk, M. Developmental local government: Squaring the circle between policy intent and impact. In *Consolidating Developmental Local Government: Lessons from the South African Experience*; Van Donk, M., Swilling, M., Pieterse, E., Parnell, S., Eds.; UCT Press: Cape Town, South Africa, 2008; pp. 51–75.
20. Robinson, J. Continuities and discontinuities in South African local government. In *Consolidating Developmental Local Government: Lessons from the South African Experience*; Van Donk, M., Swilling, M., Pieterse, E., Parnell, S., Eds.; UCT Press: Cape Town, South Africa, 2008; pp. 27–50.
21. Challinor, A.J.; Adger, N.; Benton, T.; Conway, D.; Joshi, M.; Frame., D. Transmission of climate risks across sectors and borders. *Philos. Trans. R. Soc.* **2018**, *376*, 1–23. [CrossRef] [PubMed]
22. Seto, K.; Boone, C.; Branislav, O.; Fragkias, M.; Haase, D.; Langanke, T.; Marcotullio, P.; Munroe, D.; Reenberg, A.; Simon, D. Urban land teleconnnections and sustainability. *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 7687–7692. [CrossRef] [PubMed]
23. Bulkeley, H.; Betsill, M. *Cities and Climate Change: Urban. Sustainability and Global Environmental Governance*; Routledge: London, UK, 2003.
24. McKendry, C. Cities and the challenge of multiscalar climate justice: Climate governance and social equity in Chicago, Birmingham, and Vancouver. *Local Environ.* **2015**, *21*, 1354–1371. [CrossRef]
25. Castan Broto, V. Urban Governance and the Politics of Climate Change. *World Dev.* **2017**, *93*, 1–15. [CrossRef]
26. Republic of South Africa, Department of Environmental Affairs. National Climate Change Response Policy White Paper (NCCRP) 2011. Available online: https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf (accessed on 20 May 2018).
27. Republic of South Africa, Department of Environmental Affairs. National Adaptation Draft Strategy 2016. Available online: https://www.environment.gov.za/sites/default/files/docs/nas2016.pdf (accessed on 20 May 2018).
28. Harrison, P. The origins and outcomes of South Africa's Integrated Development Plans. In *Consolidating Developmental Local Government: Lessons from the South African Experience*; Van Donk, M., Swilling, M., Pieterse, E., Parnell, S., Eds.; UCT Press: Cape Town, South Africa, 2008; pp. 321–337.
29. Roberts, D. Thinking globally, acting locally-institutionalizing climate change at the local government level in Durban, South Africa. *Environ. Urban.* **2008**, *20*, 521–537.

30. McDonald, D. What is environmental justice? In *Environmental Justice in South Africa*; McDonald, D., Ed.; Ohio University Press: Athens, Greece; University of Cape Town: Cape Town, South Africa, 2002; pp. 1–48.
31. Patel, Z. Environmental Justice in South Africa: Tools and Tradeoffs. *Soc. Dyn.* **2009**, *35*, 94–110. [CrossRef]
32. Leck, H.J.; Sutherland, C.; Scott, D.; Oelofse, G. Social and cultural barriers to adaptation implementation: The case of South Africa. In *Overcoming Barriers to Climate Change Adaptation Implementation in Southern Africa*; Masters, L., Duff, L., Eds.; Institute for Global Dialogue: Pretoria, South Africa, 2011.
33. Leck, H.J. Rising to the Adaptation Challenge? Responding to Global Environmental Change in eThekwini and Ugu Municipalities, South Africa. Ph.D. Thesis, Royal Holloway, University of London, London, UK, 2012.
34. Pelling, M. *Adaptation to Climate Change: From Resilience to Transformation*; Routledge: London, UK, 2010.
35. Cutter, S.L.; Barnes, L.; Berry, M.; Burton, C.; Evans, E.; Tate, E.; Webb, J. A place-based model for understanding community resilience to natural disasters. *Glob. Environ. Chang.* **2008**, *18*, 598–606. [CrossRef]
36. Modica, M.; Zoboli, R. Vulnerability, resilience, hazard, risk, damage, and loss: A socio-ecological framework for natural disaster analysis. *Web Ecol.* **2016**, *16*, 59–62. [CrossRef]
37. Simon, D. Independence and social transformation: Urban planning problems and priorities for Namibia. *Third World Plan. Rev.* **1985**, *7*, 99–118. [CrossRef]
38. Kruijer, G.J. *Development through Liberation: Third World Problems and Solutions*; Macmillan: London, UK, 1987.
39. Sidaway, J.; Simon, D. Geopolitical transition and state formation: The changing political geographies of Angola, Mozambique and Namibia. *J. S. Afr. Stud.* **1993**, *19*, 6–28. [CrossRef]
40. IPCC (Intergovernmental Panel on Climate Change). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, Special Report of the Intergovernmental Panel on Climate Change*; Cambridge University Press: Cambridge, UK, 2012.
41. Davoudi, S.; Shaw, K.; Haider, J.; Quinlan, A.; Peterson, G.; Wilkinson, C.; Fünfgeld, H.; McEvoy, D.; Porter, L. Resilience: A Bridging Concept or a Dead End? *Plan. Theory Pract.* **2012**, *13*, 299–333. [CrossRef]
42. Park, S.E.; Marshall, N.A.; Jakku, E.; Dowd, A.M.; Howden, S.M.; Mendham, E.; Fleming, A. Informing adaptation responses to climate change through theories of transformation. *Glob. Environ. Chang.* **2012**, *22*, 115–126. [CrossRef]
43. Pelling, M. Resilience and transformation. In *Climate Change and the Crisis of Capitalism*; Pelling, M., Manuel-Navarette, D., Redclift, M., Eds.; Routledge: London, UK, 2012; pp. 51–65.
44. Pelling, M.; O'Brien, K.; Matyas, D. Adaptation and transformation. *Clim. Chang.* **2015**, *133*, 113–127. [CrossRef]
45. Ribot, J. Vulnerability before adaptation: Towards transformative climate action. *Glob. Environ. Chang.* **2011**, *21*, 1160–1162. [CrossRef]
46. Kates, R.; Travis, W.; Wilbanks, T. Transformational adaptation when incremental adaptations to climate change are insufficient. *Proc. Natl. Acad. Sci. USA* **2012**, *109*, 7156–7161. [CrossRef] [PubMed]
47. Roberts, D.; Boon, R.; Deiderichs, N.; Douwes, E.; Govender, M.; Mcinnes, A.; Mclean, C.; O'Donoghue, S.; Spires, M. Exploring ecosystem-based adaptation in Durban, South Africa: "learning by doing" at the local government coal face. *Environ. Urban.* **2012**, *24*, 1–29. [CrossRef]
48. Aurecon. Development of a Climate Change Response Strategy for the Ugu District Municipality, Prepared by Aurecon for Ugu District Municipality. 2016. Available online: http://ugu.gov.za/Documents/Other/Ugu%20CCRS%20complete%20draft_20161115.pdf (accessed on 10 May 2018).
49. Aurecon. Climate Change Response Strategy for the Ugu District Municipality, Prepared by Aurecon for Ugu District Municipality. 2017. Available online: https://drive.google.com/file/d/0B98u4HJRN5rrTzZlWlZQbTNKemdQaUZnOF95MmpqWGowTXVR/view (accessed on 10 May 2018).
50. Moser, S. Whether our levers are long enough and the fulcrum strong? Exploring the soft underbelly of adaptation decisions and actions. In *Adapting to Climate Change: Thresholds, Values, Governance*; Adger, W.N., Lorenzoni, I., O'Brien, K., Eds.; Cambridge University Press: Cambridge, UK, 2009; pp. 313–334.
51. C40 Cities. Available online: https://www.c40.org/cities (accessed on 30 May 2018).
52. 100 Resilient Cities. Available online: https://www.100resilientcities.org/cities/durban/ (accessed on 30 May 2018).
53. Simon, D. Climate and environmental change and the potential for greening African cities. *Local Econ.* **2013**, *28*, 203–217. [CrossRef]

54. Parnell, S.; Ziervogel, G. South African coastal cities: Governance responses to climate adaptation. In *Climate Change and the City Scale: Impacts, Mitigation and Adaptation in Cape Town*; Cartwright, A., Parnell, S., Oelofse, G., Ward, S., Eds.; Earthscan: London, UK, 2012; pp. 223–243.
55. Ugu District Municipality. *Ugu District Municipality Integrated Development Plan. (IDP), 5 Year Plan: 2007/08 to 2011/12, as Revised in the 2011/12 IDP Review*; Ugu District Municipality: KwaZulu Natal Province, South Africa, 2011. Available online: http://ugu.gov.za (accessed on 4 April 2018).
56. Ugu District Municipality. *Ugu District Municipality 2017/2018–2021/22 Integrated Development Plan. (IDP)*; Ugu District Municipality: KwaZulu Natal Province, South Africa, 2011.
57. Ugu District Municipality. Environmental Management Framework (EMF) Strategic Environmental Plan. 2018. Prepared by Nemai Consulting. Available online: https://www.nemai.co.za/documents/10623-20180116-Ugu-DM-EMF-SEMP_Draft.pdf (accessed on 26 June 2018).
58. Pasquini, L.; Cowling, R.; Ziervogel, G. Facing the heat: Barriers to mainstreaming climate change adaptation in local government in the Western Cape Province, South Africa. *Habitat Int.* **2013**, *40*, 225–232. [CrossRef]
59. Pasquini, L.; Ziervogel, G.; Cowling, R.; Shearing, C. What enables local governments to mainstream climate change adaptation? Lessons learned from two municipal case studies in the Western Cape, South Africa. *Clim. Dev.* **2015**, *1*, 60–70. [CrossRef]
60. Wamsler, C. Mainstreaming ecosystem-based adaptation: Transformation toward sustainability in urban governance and planning. *Ecol. Soc.* **2015**, *20*, 30. [CrossRef]
61. Walingo, N. Community Based Adaptation in a Municipal Context. Presentation at International Centre for Climate Change and Development (ICCCAD) Short Course. 2015. Available online: https://locs4africa.iclei.org/wp-content/uploads/2015/10/Climate-response-reality-in-Africa_-a-tale-of-Ugu-DM.pdf (accessed on 4 April 2018).
62. Berrisford, S.; Kihato, M. Local government planning legal frameworks and regulatory tools: Vital signs? In *Consolidating Developmental Local Government: Lessons from the South African Experience*; Van Donk, M., Swilling, M., Pieterse, E., Parnell, S., Eds.; University of Cape Town Press: Cape Town, South Africa, 2008; pp. 377–404.
63. Breetzke, K. From conceptual frameworks to quantitative models: Spatial planning in the Durban Metropolitan Area, South Africa—The Link to Housing and Infrastructure Planning. Available online: http://www.unhabitat.org/ghrhs/2009 (accessed on 8 April 2018).
64. Bulkeley, H. Cities and Governance. In *Urban Climate Change Crossroads*; Plunz, P., Paulo Sutto, M., Eds.; Ashgate: Aldershot, UK, 2010.
65. Markandya, A.; Halsnaes, K. Climate change and sustainable development: An overview. In *Climate Change and Sustainable Development: Prospects for Developing Countries*; Markandya, E., Halsnaes, K., Eds.; Earthscan: London, UK, 2002.
66. Adger, N.; Huq, S.; Brown, K.; Conway, D.; Hulme, M. Adaptation to climate change in the developing world. *Prog. Dev. Stud.* **2003**, *3*, 179–195. [CrossRef]
67. Urban Climate Change Research Network. Africa Hub. Available online: http://uccrn.org/african-hub/ (accessed on 24 May 2018).
68. eThekwini Municipality. Municipal Spatial Development Framework 2018–2019. Draft Report 2018. Available online: http://www.durban.gov.za/City_Services/development_planning_management/Pages/Strategic-Spatial-Planning-(Framework-Planning)-2.aspx (accessed on 8 May 2018).