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Exploring the Factors and Actors that Contribute to the Co-Production of Climate Adaptation Plans: a comparison of three municipalities in the Western Cape Province, South Africa

MSc specializing in Climate Change and Sustainable Development

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DECLARATION OF AUTHORSHIP

I have read and understood the regulations governing the submission of an MSc dissertation, as contained in the rules of this University. I know the meaning of plagiarism and hereby declare that all of the work presented in this minor dissertation, save for that which is properly acknowledged, is my own.

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ABSTRACT

Local governments are increasingly responding to climate change by developing formal institutions for adaptation. However, given the relative novelty of the adaptation planning field, there is insufficient practice-related research to inform these processes. The aim of this dissertation is therefore to assess the factors and actors that affect climate adaptation planning at the municipal level. Whilst numerous studies have identified the barriers to and opportunities for adaptation, less is known about what the underlying institutional, political and social conditions are that cause these factors to arise. This dissertation adopts a place-based perspective to comparatively analyse the adaptation planning processes that were undertaken in the Bergrivier, Drakenstein and Eden Municipalities between 2012 -2013, under sponsorship from the Western Cape Government's Climate Change Municipal Support Programme (CCMSP). The CCMSP upholds an ethos of participation and multi-stakeholder engagement, and the theoretical concepts of knowledge co-production and collaborative governance are therefore drawn on as a framing device to guide the analysis.

The results highlight the various factors that can inhibit the success of collaborative adaptation planning in municipalities, as well as the multiple opportunities that exist to overcome or avoid these barriers. The barriers that emerged most strongly included: the prioritisation of local socio-economic development needs, restricted financial and human capacity resources, information and time constraints, an absence of mandatory legislation, a lack of political will to prioritise adaptation, limited cross-sectoral integration, poor representation and continuity at multi-stakeholder workshops, unclear employee roles within an organisation, strong power dynamics and misrepresented perceptions around compound environmental, climate change and development issues.

The most prominent opportunities that were found for overcoming these barriers included: sound leadership from driven local champions, locating champions in departments other than, or in addition to, environmental departments, the presence of political will and support for the adaptation agenda, drawing on and/or building relationships and networks to co-explore and co-produce knowledge and policy, embracing experimentation and innovation, using informal communication channels, finding alternative devices through which to frame climate change and mainstreaming adaptation into overall municipal planning. Whilst some of the barriers and opportunities that were identified were common across the three case studies, others were specifically related to causes internal to the municipal environment and were thus highly context-specific. In light of these findings, the dissertation concludes that future municipal adaptation planning processes should focus on addressing the need for strong political will and effective local leadership, remain cognizant of the municipal context, call attention to the invisible factors that influence municipal climate governance, capitalize on opportunities for partnership-building, view adaptation as an iterative process rather than an end-point and embrace a flexible, 'learning by doing' approach.

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LIST OF ACRONYMS

ACDI – African Climate and Development Initiative

BRM – Bergrivier Municipality

CCMSP – Climate Change Municipal Support Programme

CoCT – City of Cape Town

COP – Conference of the Parties

CSAG – Climate Systems Analysis Group

CSIR – Council for Scientific and Industrial Research

CWDM – Cape Winelands District Municipality

DEA – Department of Environmental Affairs

DEAT – Department of Environmental Affairs and Tourism

DEA & DP – Department of Environmental Affairs and Development Planning

DMA – Disaster Management Act

DM – Drakenstein Municipality

EDM – Eden District Municipality

EGS – Environmental and Geographical Science

EPWP – Expanded Public Works Programme

GRI – Garden Route Initiative

ICLEI - International Council for Local Environmental Initiatives

IPCC – Intergovernmental Panel on Climate Change

IDP – Integrated Development Plan

LAB – Local Action for Biodiversity

NAP – National Adaptation Plan

NCCRWP – National Climate Change Response White Paper

NEMA – National Environmental Management Act

NEMAQA – National Environmental Management: Air Quality Act

SALGA – South African Local Governments Association

SER – Socio-Ecological Resilience

UCT – University of Cape Town

WCCCRS – Western Cape Climate Change Response Strategy

WCG – Western Cape Government

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Chapter 1. Introduction

Local communities around the world are increasingly exposed to the hazards of climate change and variability (e.g.: Kerdsuk and Chinvanno, 2012; Shackleton *et al.,* 2015), with the impacts thereof being inequitably distributed (Mearns and Norton, 2010). In response, governments have progressively recognized that building the longer-term adaptive capacity of vulnerable communities depends significantly on the presence of an enabling institutional environment (Agrawal *et al.,* 2008; Kiragu, 2010; Ayers, 2011; Berman *et al.,* 2012), as the efficacy of autonomous, short-term coping strategies may be limited or undermined by divergent values, conflicting political worldviews, strong power relations and path-dependent social processes (Adger *et al.,* 2009; Wise *et al.,* 2014). In this light, climate change policy discourses are beginning to place substantial weight on the formalisation of adaptation measures (Vogel and Henstra, 2015), with the 2015 Paris Agreement (UNFCCC, 2015) requiring both developed and developing country parties to submit national adaptation plans (NAPs).

Up until this point, global and national adaptation planning has largely been delayed or subdued by a longstanding bias toward mitigation (Pielke *et al.,* 2007). In the interim, however, various cities and municipalities around the world have demonstrated a pioneering and innovative attitude, undertaking to develop formal adaptation responses irrespective of the international mandate to do so (Anguelovski and Carmin, 2012; Carmin *et al.,* 2012b). This task has followed an uneven pathway underscored by various constraints, including resource shortages and an absence of any existing institutional frameworks to guide adaptation responses. Such challenges ring particularly true at the local governance level, in which decision makers operate in multi-stressor environments (O'Brien *et al.,* 2009; Roberts and O'Donoghue, 2012; Anguelovski *et al.,* 2014). Nonetheless, through experimentation and ongoing, adaptive processes of social learning[1]; evidence has increasingly surfaced of the potential opportunities that exist for local government leaders to successfully drive the institutionalisation of adaptation (e.g.: Broto and Bulkeley, 2013; Leck and Simon, 2013; Pasquini and Shearing, 2014; Broto *et al.,* 2015; Ziervogel *et al.,* 2016).

The barriers and opportunities that arise from these planned adaptation processes have been documented by various scholars (e.g.: Moser and Ekstrom, 2010; Biesbroek *et al.,* 2013; Eisenack *et al.,* 2014). Yet, less is known about their underlying sources and complex interactions, which are generally highly specific to the local context, despite being embedded in broader social, institutional and political settings (Lehmann *et al.,* 2015; Dilling *et al.,* 2015). Moreover, many of these studies have focused on the formal institutional requisites for policy development whilst failing to acknowledge what Leck and Roberts (2015) call the 'shadow spaces' or 'invisible aspects' of institutional processes. These

[1] Reed *et al.* (2010) define social learning as "a change in understanding that goes beyond the individual to become situated within wider social units or communities of practice through social interactions between actors within social networks."

comprise the inner workings and informal relationships or systems that occur within an organisation, which usually remain unnoticed by outsiders but which actually play a significant role in local political decision making and social learning (Biesbroek *et al.,* 2015). This gap in knowledge is identified by Moser (2010) and reiterated by Baker *et al.* (2012: 128), the latter of whom state that "there is a deficit in practice-relevant research to support the development of local adaptation plans." Biesbroek *et al.* (2015) explain that, in order for research frameworks to become more robust and practical for decision makers, they must not reduce adaptation planning to simple 'input-output' models that identify adaptive barriers and provide solutions (e.g.: Moser and Ekstrom, 2010). Instead, it is critical for researchers to open up what the authors refer to as the 'black box' of adaptation decision making, so as to understand the inherently complex, socio-ecological environment in which adaptation occurs (Biesbroek *et al.,* 2015).

Growing this research base to inform more effective processes of planned adaptation is imperative, given the large and growing pool of scientific evidence indicating that anthropogenic climate change is both an indisputable and unavoidable reality that will occur irrespective of mitigation commitments (Matthews and Caldeira, 2008; IPCC, 2014a), and that will have increasingly more frequent and severe consequences in the decades ahead (Rosensweig, 2008; Stocker, 2014). Those most susceptible to the impacts of this change are the poor and marginal populations of developing countries, whose contribution to the problem is negligible in comparison to their industrialised counterparts, yet who have the least capacity to adapt (Mearns and Norton, 2010; Lemos *et al.,* 2013; Shackleton *et al.,* 2015).

The Western Cape Province of South Africa is no stranger to these circumstances, being a high risk region in terms of both climate impacts and socio-economic vulnerability (WCG, 2014a; Ziervogel *et al.,* 2014). Over a period of just a few years, the Cape has experienced recurrent storm surges, flooding and wildfires, which have resulted in direct damage costs that stretch into the billions of Rands (RADAR, 2010; Santam *et al.,* 2011). Currently, South Africa in the grips of a severe and prolonged drought, with 2015 being the driest year on record since 1904, according to national weather service data (Stoddard, 2016). These conditions have a momentous bearing on the economy of the Western Cape and the country as a whole (WCG, 2015a; Willemse *et al.,* 2015), placing added stress on crucial water resources, food security, biodiversity and ecosystem services, and having dire consequences for human health, infrastructure and overall national development (RSA, 2012; Ziervogel *et al.,* 2014). The shocks felt by these climate-related impacts are aggravated by underlying vulnerabilities, including high levels of poverty and inequality, as well as issues of social and political instability that constrain the realisation of more effective adaptation responses (Patel, 2009; Saito, 2012; Newell and Mulvaney, 2013; Turok, 2014).

In this context, and in line with the obligations of the 2015 Paris Agreement, the South African government has undertaken to develop a National Adaptation Plan (NAP) (Mbanjwa, 2014; Gilder and Rumble, 2016), which builds on the foundations of the National Climate

Change Response White Paper (NCCRWP) (DEA, 2011). This national-level response follows adaptive action that has already been taken by proactive provinces and municipalities in the country, who have been led by forward-thinking individuals to develop novel adaptation solutions (e.g.: Roberts, 2008). This dissertation finds its basis in the Western Cape Government's (WCG's) Climate Change Municipal Support Programme (CCMSP), an ongoing initiative that assists municipalities in developing place-based climate change response plans. Looking comparatively at the adaptation planning processes undertaken in the Bergrivier, Drakenstein and Eden Municipalities between 2012 – 2013, the study aims to grow the existing understanding of the various conditions that support and constrain local governments from realizing appropriate adaptation planning pathways. In light of the nature of the CCMSP, which seeks to align with the principles of participation and multi-stakeholder engagement, the study is framed from the perspective of knowledge co-production and collaborative governance (Emerson *et al.,* 2012; Hegger *et al.,* 2012).

The following section provides a brief explanation of a number of key concepts that are present in the adaptation literature and which are used throughout this study. A clear statement of the overall aim and objectives is then given, followed by a more thorough background to the research. This background *(a)* situates the study in relation to the broader ASSAR (Adaptation at Scale in Semi-Arid Regions) project of which it is a part and *(b)* describes the institutional context for responding to climate change in South Africa and the Western Cape, providing a detailed account of the CCMSP. Subsequently, the relevant literature is reviewed thematically, followed by a description of the study sites and the methodology used. Chapter 4 provides the results of the empirical research by presenting the three municipal case study 'stories' individually, and Chapter 5 comparatively analyses the case study outcomes in a thematic discussion. In conclusion, the dissertation highlights the main results of the study and situates them in relation to the findings of the broader adaptation literature. It further suggests potential opportunities that might enable the CCMSP to be undertaken more effectively in the future, and proposes relevant directions for future research on local adaptation policy and planning.

1.1. Defining key concepts: adaptation, vulnerability and adaptive capacity

Adaptation in the context of climate change is explained by the Intergovernmental Panel on Climate Change (IPCC) to mean: "*the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects*" (Field *et al.,* 2014: 5). Adaptation is multi-dimensional in nature, it may require shifts in practices, processes or structures (including institutions) and may be aimed at meeting goals in addition to those present in the climate change sphere (Fussel, 2007; Moser and Ekstrom, 2010). Adaptation may occur autonomously (Malik *et al.,* 2010) or be purposefully planned. Planned adaptation to climate change requires that various information is drawn on "to review the suitability of current and planned practices, policies, and infrastructure" (Fussel, 2007: 268), and is

therefore "*the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state*" (IPCC, 2007: 869).

Successful adaptation planning depends, as a prerequisite, on the identification of a system's underlying vulnerability, which may exist in relation to various environmental, social, economic or political sensitivities. Vulnerability is thus a measure of the various stresses in society that have the potential to turn a hazard into a disaster (Gaillard, 2010), and can be defined as *"the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt"* (Adger, 2006: 268). Reducing vulnerability through successful adaptation is thus highly dependent on a system's adaptive capacity, defined by the IPCC (2007: 896) as *"the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences."* A society's capacity to adapt to climate change depends not only on its autonomous ability to implement adaptation measures, but on its access to resources and the degree to which it is empowered to do so through an enabling institutional environment. Fair and effective governance systems informed by usable policies are therefore a crucial element of planned adaptation to climate change (Gaillard, 2010; Levin *et al.,* 2012; Vogel and Henstra, 2015).

1.2. Aim and Objectives

The **aim** of this dissertation is to assess the factors and actors that affect the development of climate adaptation plans in three Western Cape municipalities.

In order to meet this aim, the research **objectives** are as follows:

1. To document the institutional, political and social conditions that aid climate adaptation planning in municipalities
2. To explore the role of key stakeholders in the co-production of climate adaptation plans
3. To unpack the challenges that arise during municipal climate adaptation planning processes
4. To identify the barriers to and opportunities for climate adaptation planning at the municipal scale

1.3. Background to the Study

1.3.1. Contextualisation within the ASSAR project

This research forms part of 'phase 2' (2015 – 2017) of the Adaptation at Scale in Semi-Arid Regions (ASSAR) research project. The ASSAR project aims to deepen the understanding of climate vulnerability and adaptation in semi-arid regions of Africa and Asia, where millions of people are highly vulnerable to climate-related impacts and risks.

The overarching research objective of ASSAR is to use insights from multiple-scale, interdisciplinary work to improve the understanding of the barriers, enablers and limits to effective, sustained and widespread adaptation in the medium-term (out to the 2030s). Importantly, ASSAR takes a 'research into use' approach. This means that is seeks to put its work into practice by, for example, ensuring that ASSAR projects align with the needs and realities of local people and building meaningful and long-lasting relationships with a wide spectrum of stakeholders (for more information see http://www.assar.uct.ac.za/).

This study contributes to the research of the Southern African ASSAR team, and is situated within the context of local level climate change governance. The outcome of this research will contribute to filling the key knowledge gap identified in the regional diagnostic study[2] phase around the effectiveness of policy, specifically with regards to the planning and development of climate change adaptation strategies (Spear *et al.,* 2015).

1.3.2. Institutional context for responding to climate change in South Africa

Included expressly in section 24 of South Africa's Constitution is the progressive mandate for government to address environmental concerns (RSA, 1996). Stemming from this has been the enactment of a number of policies in support of environmental stewardship, with the overarching piece of legislation being the National Environmental Management Act (NEMA, No. 107 of 1998). Despite its enactment, however, this environmental legislation is largely viewed as a 'nice to have' when juxtaposed with the often more pressing mandate of meeting basic socio-economic development needs (Koch *et al.,* 2007; Patel, 2009; Leck, 2011). This is particularly true at the local government level, where environmental affairs have been inadequately infiltrated into planning processes, thus failing to provide strategic direction with regards to managing complex environmental and developmental trade-offs (Taylor *et al*., 2014; Spires, 2015).

Compounding the difficulties associated with such compromises is the growing pressure for South Africa to respond to climate change, particularly in light of the country's carbon-intensive economy and consequential emissions profile, which is alarmingly high when viewed in relation to the size of its economy and population (Winkler, 2007). Whilst an ambitious pledge has been made to adopt a 'peak, plateau and decline' (PPD) emissions trajectory (DEAT, 2007; RSA, 2013), the climate change agenda has, in reality, been largely side-lined as government leaders struggle to prioritize future benefits over immediate development gains (Newell and Mulvaney, 2013; Lethoko, 2015). This is despite the expected high cost implications if action is anything but immediate (Stern, 2006). Moreover, climate change is commonly perceived as being a 'green' issue, in spite of the complexity of the problem and its fundamental link to social and economic concerns (Etkin and Ho, 2007;

[2] The regional diagnostic study was the initial 'scoping' phase of ASSAR. The overarching objective of this phase was to develop a systematic understanding of climate change trends, impacts, vulnerabilities, adaptation strategies and barriers and enablers to effective adaptation in the study regions. This was important for identifying key knowledge gaps so as to inform the next phase of the ASSAR project, as well as for providing a system scale perspective for researchers (Spear *et al.,* 2015).

Taylor *et al.,* 2014). Yet, it has failed to be included in any binding environmental legislation in South Africa. This is particularly true in relation to adaptation responses, as mitigation has held at least some bearing at the national scale in legislation such as the National Environmental Management: Air Quality Act (NEMAQA, Act No. 39 of 2004, amended 2014).

The lack of formal institutions for climate adaptation is, however, becoming a more visible and pressing policy issue. In part, this is due to the greater tangibility and immediacy with which climate change impacts are being felt (Ziervogel *et al.,* 2014), which serves as a progressive illustration of the threat posed by climate change to the country's important natural resource base, and the associated costs to sustainable development, economic growth and the quality of life of the nation's population (Molewa, 2011; Nel *et al.,* 2014). In this light, and in accordance with a renewed international emphasis on resilience-building in both the long and short-term (Sharma and Tomar, 2010; Preston *et al.,* 2011; UNFCCC, 2015), South Africa has begun to balance national mitigation imperatives with strategies that address adaptation.

A recognition of the need to respond to climate change with adaptation action originated sub-nationally, with cities such as Cape Town (Mukheibir and Ziervogel, 2006) and Durban (Roberts, 2008 and 2010) being among the first to pave the way toward a more holistic climate change response. Following suit was a national effort, with the NCCRWP (DEA, 2011) being published in time to coincide with the 17th Conference of the Parties (COP17), hosted in Durban in 2011. The NCCRWP gave notable accord to adaptation (section 5) prior to its discussion of mitigation (section 6), stating as a strategic imperative the prioritisation of *"near- term adaptation interventions that address immediate and observed threats to the economy, ecosystem services and the health and well-being of South Africans"* (DEA, 2011: p14). In addition, the national Disaster Management Amendment Act (DMAA, Act No.16 of 2015) was recently approved, expressly giving effect to climate change adaptation by requiring institutional role-players to *"provide measures and indicate how* [they] *will invest in disaster risk reduction and climate change adaptation, including ecosystem and community-based adaptation approaches"* (amendment of section 24 of Act 57 of 2002).

The publication of South Africa's climate change policy and the inclusion of adaptation in the DMAA demonstrates institutional progress in transitioning to a climate-resilient and lower-carbon economy and society. However, whilst these obligations are situated at the national policy level, the NCCRWP acknowledges that the efficacy of the country's climate change response is dependent on the efforts of all spheres of government. It is therefore a formal call for provincial and local governments to mainstream climate change adaptation into their sector-specific and departmental agendas. In doing so, provinces are obligated by schedule 4 and 5 of South Africa's Constitution (RSA, 1996) to monitor, support, regulate and supervise municipalities in exercising their roles and responsibilities. This provincial mandate is further expressed in legislation such as the Municipal Structures Act (Act No. 117 of 1998), the Municipal Systems Act (Act No. 32 of 2000), as well as the Intergovernmental Relations Framework Act (Act No. 13 of 2005), the latter of which governs how the three

spheres of government should assist and support each other and share information, so as to coordinate their efforts and align with the nation's pursuit of 'a better life for all'.

Chapter 2. Literature Review

2.1. Climate change adaptation: an emerging policy domain

Natural variability in climatic conditions means that human societies have always employed diverse adaptation techniques to cope with change and maintain or improve their livelihood strategies (Adger, 2003; Dovers and Hezri, 2010; Goudie, 2013). However, the complexity and uncertainty of anthropogenic climate change has necessitated that more formalized adaptation approaches are adopted to assist and coordinate societal adaptation efforts (Berman *et al.,* 2012; Dombkins, 2014). Effective and efficient governance has thus increasingly become a crucial component of responding to climate change (Anguelovski and Carmin, 2011; Massey *et al.,* 2015) and various methods of governing have been employed by different actors to contribute to both mitigation and adaptation action (Knieling and Filho, 2013). Such methods have proven highly difficult to carry out due to the 'wicked' nature of the climate change problem, which has a tendency to defy traditional ecological, economic and social boundaries (Biesbroek *et al.,* 2009; Knieling and Filho, 2013). In addressing this compound challenge, however, Levin *et al.* (2012) highlight the relevance of policy, which they consider to be an essential component of mobilising climate-responsive action. The authors explain that because human-induced climate change can be attributed, in part, to the policies and technologies that have enabled a high-carbon development path, the first step in counteracting the problem is to nurture policies that promote and enable a more climate-compatible development trajectory.

In this light, discourses around climate change governance have increasingly advocated the development of climate adaptation policies - "courses of action designed to reduce the vulnerability of populations, assets, and operations to climate-related risk" (Vogel and Henstra, 2015: 110). This demonstrates a shift away from the predominantly mitigation-biased global climate change agenda which has, to date, placed a strong emphasis on preventing dangerous global temperature rise by targeting a reduction in the emission of greenhouse gases (GHGs) (Burton *et al.,* 2002 and 2006; Pielke *et al.,* 2007; IPCC, 2014b). Whilst adaptation was noted in early policy discussions, it received little attention in comparison to mitigation, and was in fact perceived as a somewhat 'lazy' response that suggested a disregard for the underlying causes of the problem (Thompson and Rayner, 1998; Ayers and Dodman, 2010). A contemporary shift in the approaches taken to dealing with climate change has seen adaptation re-emerge as an important strategy to complement mitigation (Pielke *et al.,* 2007) as well as development, with policy discourses increasingly advocating the realization of double or triple 'wins' (Stringer *et al.,* 2014; Suckall *et al.,* 2015). Preston *et al.* (2011) argue that this renewal of the adaptation agenda can be attributed to three major factors: (1) mounting scientific evidence signalling an anthropogenic influence in recent climate regime shifts and extreme climatic events (Barnett *et al.,* 2005; Rosensweig *et al.,* 2008; Christidis *et al.,* 2011), (2) a growing awareness of the vulnerability of both human and natural systems to this climate variability (Adger *et al.,* 2007; Heltberg *et al.,* 2009) and (3) the realization that at least some level of climate change is inevitable, even with a strong commitment to mitigation (Mheel *et al.,* 2007).

A culmination of the proceedings undertaken thus far to advance the global adaptation agenda was observed at COP21, which took place in Paris in December 2015. The outcome

of this latest round of negotiations saw the establishment of the Paris Agreement (UNFCCC, 2015), which recognizes that adaptation to climate change is equally as important as mitigation, particularly for vulnerable developing countries. Whilst this decision indicates a more concrete recognition of the important complementary role played by adaptation, the degree to which such international policy rhetoric has translated into formalized adaptation measures in the past has been questionable (Burton *et al.,* 2002; Jordan and Huitema, 2015).

Nevertheless, the visibility of the adaptation imperative is expected to grow considerably as countries begin to align with the new obligations of the Paris Agreement, which commits all signatories to develop and implement National Adaptation Plans (NAPs) (UNFCCC, 2015). Moreover, whilst there has been a relative absence thus far in formally institutionalized adaptation planning at the national level evidence thereof is increasingly being demonstrated at the sub-national scale in countries of both the global north and south (e.g.: LCCP, 2006; Roberts, 2010; Rosenzweig and Solecki, 2010; Carmin *et al.,* 2012a). Bulkeley *et al.* (2011: 125) further note that, in addition to an increase in adaptation planning among global and megacities, "the predominant focus on mitigation is giving way to the emergence of municipal climate policy in which both mitigation and adaptation are considered significant", indicating the importance of local government in initiating and directing adaptation responses (Baker *et al.,* 2012).

2.2. Local responses to a global problem

"*Although the Earth's warming is a phenomenon that covers the whole planet, neither its causes nor its effects are felt globally: they assume very different forms and take place within a context-specific spatial framework of conditions and interactions*" (Garrelts and Lange, 2011:201). Thus, whilst a problem of global magnitude, "climate change issues need to be rooted in local realities that centre on avoiding or limiting impacts … brought about by climate change" (Roberts, 2008: 521). Robert's (2008) concept of 'local realities' suggests that adaptation responses must remain cognizant not only of a region's geographic characteristics and biophysical vulnerabilities to climate, but also of the local socio-political, economic, cultural and institutional environment in which adaptation is taking place (Prutsch *et al.,* 2014; Stringer *et al.,* 2014; Dilling *et al.,* 2015; Adger, 2016). Eriksen *et al*. (2011) explain that these non-climatic factors can contribute to the overall vulnerability of a community, with climate change being only one of multiple stressors that serves to exacerbate existing sensitivities to change (e.g.: Ziervogel and Taylor, 2008; Oven *et al.,* 2012; Crane, 2013). Under these circumstances, multiple interacting factors serve as informants of the 'decision context' and thus work in various ways to "influence climate decision makers' willingness and ability to use climate information, particularly for adaptation" (Dilling *et al.,* 2015: 6).

Identifying such context-specific conditions, understanding the interactions between them and situating 'local realities' in relation to the broader picture of vulnerability is thus essential if adaptive measures are to be sustainable, and if maladaptation is to be avoided (Roberts, 2008; Eriksen and Brown, 2011; Eriksen *et al*., 2011; Prutsch *et al*., 2014). Local governments are increasingly seen as key institutions in developing these linkages, as it is at

this level that the risks and opportunities associated with climate change manifest, and where the close tie between adaptation and development decisions is realized (Lemos *et al.,* 2007; Deri and Alam, 2008; Ayers and Dodman, 2010; Hunt and Watkiss, 2011; Lethoko *et al.,* 2015). Furthermore, their geographic proximity to (and thus first-hand awareness of) local climate change and adaptation issues means that local governments are an important source of knowledge that can be used to inform policy processes at provincial and national scales (Agrawal, 2008 and 2010). In addition to vertical institutional integration, the diverse and multi-sectoral nature of local government mandates means that they are well positioned to horizontally align and integrate adaptation processes within their jurisdictions (Winter *et al.,* 2010; Giordano *et al.,* 2011).

The growing importance of local government entities in enabling adaptation responses demonstrates a paradigm shift away from the traditional notion that 'global problems require global solutions' (Wiener, 2007), toward the mantra of 'think globally, act locally' (Di-Chiro, 2011; Roberts, 2008; Devine-Wright, 2013). However, the place-based and context-specific challenges of adaptation require that unique and creative approaches are taken in order to build the resilience of local communities (Evans, 2011; Rodima-Taylor, 2012). This is particularly important if one considers the various challenges that are faced at the local government level, which may pose barriers to adaptation or reduce the degree to which local governments are willing or able to respond to climate change. For example: poor political leadership, corruption, a lack of policy coherence or integration, a lack of understanding of (or interest in) climate change adaptation issues or options, and skills and resource scarcity, which are some of the adaptive barriers identified in the literature (Roberts, 2010; Measham *et al.,* 2011; Baker *et al.,* 2012; Pasquini *et al.,* 2013). When such issues prevent local governments from adapting effectively, they may require assistance from provincial or national government bodies, or from non-governmental or private sector organisations (Baker *et al.,* 2012).

2.3. Adaptation planning as an experimental learning process

The shift from viewing climate change as solely a global affair to one that is more localized in nature mirrors the shift from a mitigation bias toward the inclusion of adaptation in policy responses (Preston *et al*., 2011). Leading the way to the adoption of new climate response pathways has been nations of the developed world (Rayner and Jordan, 2010; Massey *et al.,* 2015) and, increasingly, such responses are emerging in the global South (Anguelovski *et al.,* 2014; Chu, 2016 and Chu *et al.,* 2016). Carmin *et al.* (2009, 2012) conceptualise these leaders as the 'early adopters' of formal adaptation responses. They argue that, rather than being pressured or motivated by exogenous forces such as international regulations or targets (as is common for mitigation planning and policy), the adaptation responses of early adopters are largely driven by endogenous forces such as the intent of strong local environmental champions (e.g.: Roberts, 2008).

However, whilst climate adaptation is a burgeoning policy field (Massey and Huitema, 2016), it remains less developed than that of mitigation, the latter of which is largely guided

by pre-established frameworks and models for best practice (e.g.: Aldy *et al*., 2009). In this context, advancing adaptive action requires that governments find innovative ways of adjusting their current institutional frameworks to ensure that decision-making processes effectively accommodate the novel agenda of adaptation (Carmin *et al.,* 2012a). The nascency of the adaptation planning field means that these processes have largely been underwritten by experimentation and 'learning by doing', with hybrid approaches to adaptation being continuously tested and revised (Tschakert and Dietrich, 2010; Evans, 2011; Broto and Bulkeley, 2013). Planning for climate change in this way has shown to be particularly salient in the developing-country context, in which challenges such as resource and capacity constraints, a lack of political will and competing development objectives have compelled governments to find creative ways of driving the adaptation agenda without compromising their primary mandates, or failing to meet local development needs (Roberts *et al.,* 2012; Rodima-Taylor, 2012; Anguelovski *et al.,* 2014).

Such challenges tend to inform the context-specific conditions under which local climate adaptation occurs and, depending on the particular issues that arise during planning, adaptation may be found to link closely with areas such as natural resource or water demand management, city planning, poverty reduction or disaster risk preparedness (Fussel, 2007). These contextual factors, coupled with variations in internally-driven priorities, have resulted in the emergence of a multiplicity of approaches being taken to institutionalise adaptation (e.g.: Ahmed, 2004; Deppisch and Hasibovic, 2013). For example, adaptation planners in some cases (e.g.: Kerdsuk and Chinvanno, 2012) have drawn on various methodologies to assess vulnerability and categorize areas of sensitivity to climate, whilst others have embarked on adaptation planning from a disaster risk reduction standpoint (e.g.: Gero *et al.,* 2011). Differences have also shown to arise in relation to a range of other variables, for example actor diversity, type of stakeholder engagement and expected deliverables (Anguelovski *et al.,* 2014).

Despite their inconsistency, all adaptation planning processes hold some similarity in that they are affected, to varying degrees, by issues of uncertainty and complexity (Wilby and Dessai, 2010; Swilling, 2012). This demands that municipalities engage with and plan for adaptation in a flexible manner, whereby decision-making processes evolve and upgrade to accommodate new needs, circumstances or information (Haasnoot *et al.,* 2013; Anguelovski *et al.,* 2014; Jones *et al.,* 2014). To further deal with conditions of complexity in adaptation planning, Deppisch and Hasibovic (2013) explore the use of a 'bridging concept'. In this regard, the researchers use socio-ecological resilience (SER) thinking[3] (Berkes *et al.,* 2003) to manage issues such as ambiguity or uncertainty in climate projections. They achieve this by drawing on the notion that complex systems (and, by association, complex policy problems) (Dombkins, 2014) do not operate in equilibrium, but instead organize around multiple

[3] SER is a theory emerging from complexity thinking (Cilliers, 2000), in which systems demonstrate characteristics of panarchy (Gunderson and Holling, 2002; Allen *et al*., 2014). It thus acknowledges the coupling of social and ecological systems across hierarchical levels, and the ability of these linked systems to withstand disturbances in the face of unpredictability and sudden shocks (Berkes *et al.,* 2003).

possible states of stability (Holling, 1973; Poli, 2013). Different margins, ranges and alternative futures are thus incorporated into the adaptation planning process, and the potential for unknown or surprising disturbances is recognized in ways such as including 'wild cards' in scenario-planning activities (Deppisch and Hasibovic, 2013).

Citing McGray *et al.* (2007), Tschakert and Dietrich (2010: 12) articulate such experimental types of adaptation planning as being iterative processes of "'learning as we go,' checking and rectifying possible maladaptation, exchanging information, and making trade-offs based on public values." In this light, the goal "is not to be well adapted but to adapt well" (*ibid.*12). In doing so, however, it is imperative to understand what successful adaption means for the various actors involved.

2.4. Collaborative adaptation planning

Climate change adaptation is acknowledged as a compound policy problem (Jones, 2011; Dombkins, 2014) in which a wide and multi-level array of actors, sectors and disciplines are inevitably entangled (Buizer *et al.,* 2011; Eriksen *et al.,* 2011; Carmin *et al.,* 2012a). In this light, the practice of adaptation planning has increasingly been matched with discourses around collaborative governance, in which stakeholder participation and knowledge co-production are key (Ansell and Gash, 2008; Clarke *et al.,* 2013, Evers *et al.,* 2016). According to Emerson *et al*. (2011: 2), collaborative governance can be broadly defined as "the processes and structures of decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished".

A shift toward this more participatory and collaborative paradigm of policy and planning is representative of a greater understanding of the natural and human world not as separate entities but as a linked socio-ecological system (Berkes *et al.,* 2003). Complexity theory maintains that such systems are made up of multiple, interacting parts which on their own are simple and unable to affect change. Instead, it is the relationship between these parts that makes a system complex and dynamic (Cilliers, 2000; Poli, 2013). Approaching adaptation planning from this perspective demonstrates a departure from the traditional conduct of top-down, linear authority, in which decision-making is highly centralised rather than being democratic and participatory (Lidskog and Elander, 2010; Leck and Simon, 2013). Within this conventional paradigm, the basis for policy and planning is founded in user-demanded or producer-supplied information (Dilling and Lemos, 2011), a common feature of which is the privileging of scientific data as the inherent 'meta-truth', wherein 'good' and 'more' science is perceived as the trigger for eliciting successful policy formulation (Beck and Forsyth, 2015).

Conversely, collaborative governance processes recognize the value not only of science but of alternative bodies of knowledge, including traditional, local, lay and practitioner knowledge systems – what Cornell *et al*. (2013) label a 'knowledge democracy'. Tengo *et al*.

(2014) advocate this multiple evidence-based (MEB) approach, explaining that because information is manifested differently in parallel knowledge systems, it is essential to draw on a broader foundation of evidence to inform decisions and "contribute to an enriched picture" (i*bid*. 580). Importantly, these different sources and types of knowledge, rather than being transferred to decision makers via a one-directional 'highway' (Vogel *et al.,* 2007; Kasperson and Berberian, 2011), are jointly produced and exchanged amongst diverse stakeholder groups (Hegger *et al.,* 2012). Kasperson and Berberian (2011: 9) analogise this approach with 'communal spider webs' in which there are "multiple spiders and a dynamic web of linkages", a metaphor that represents the connectivity and complex exchanges that occur when adaptation planning processes are undertaken collectively.

In this sense, knowledge is seen as the 'currency' that enables collaborative transactions to occur (Swilling, 2014). Appreciating this system of exchange requires that *knowledge* is distinguished from *information*, the latter of which is generally explicit and data-driven (Roux *et al*., 2006). Whilst unarguably an essential component of decision-making for climate change adaptation, information can "merely inform or confuse" (Groff and Jones, 2012: 3). By contrast, knowledge is fundamentally tacit – it is deeply rooted in the personal experiences, values, cultures, attitudes and interests of an individual, and knowledge thus guides behaviour (*ibid.*). In this light, scholars (e.g.: Ansell and Gash, 2008, Emerson *et al.,* 2009; Luyet *et al.,* 2012) maintain that the degree to which collaborative policy and planning processes are successful is largely dependent on the consideration of *who* the participating stakeholders are and which organizations they represent. This is because each actor's voice is reflective not only of his / her mandate and expertise, but also of the tacit knowledge that he / she possesses (Ericksen *et al*., 2005). Hence, including and engaging with a diverse group of the 'right' people is valued "not only as [a] normative organizing principle but also for instrumental reasons – [it gives a] voice to multiple perspectives and different interests, allowing the development of more thoughtful decisions that take a broader view of who will benefit or be harmed by an action" (Emerson *et al.,* 2011: 11).

Drawing on Reed (2008), Sherman and Ford (2014) maintain that decisions around stakeholder selection and inclusion should afford primary attention to all major decision makers, actors and sectors that have the potential (either negative or positive) to affect, or be affected by, the decision outcome in question. They further assert that the multi-scalar nature of climate change (both in terms of its drivers and impacts) necessitates that stakeholder groups are representative of multiple levels of state and society (Amundsen *et al.,* 2010; Sherman and Ford, 2014). The imperative of multi-level structures for climate change governance[4] is highlighted by Juhola and Westerhoff (2011), who explain that stakeholder and policy coordination at national and regional levels is required to ensure that local level climate change adaptation is not restricted by the higher-level institutional

[4] Lidskog and Elander (2010: 38) explain that multi-level governance can mean either "the multiple tiers at which governance takes place, typically differentiating between administrative units (e.g. cities, states, countries) where governments are the central governing authority", or else a governance system that is "dominated by networks between public and private actors across levels of social organizations."

processes in which they are embedded (Mukheibir *et al.,* 2013). Failing to achieve coordination between these different scales may result in maladaptation and increased vulnerability due to conflicting goals, decisions or actions (Juhola *et al.*, 2016). Galarraga *et al.* (2011) and Bauer and Steurer (2014) note that provincial government bodies play a crucial role in achieving this coordination, as they are well-positioned to mediate between national and local levels of government, and can thus realize locally-specific adaptation needs and establish alignments between national and local policy domains.

Developing such a collaboratively-derived mode of knowledge and policy production, in which a "plurality of legitimate perspectives" (Failing *et al*., 2007: 48) is recognized, enables opportunities to be created for novel insights into climate-related issues, which in turn may give rise to innovative adaptation options (Picketts *et al.,* 2013). Lang *et al.* (2012) and Swilling (2014) note that this approach should be shaped by various actors in a way that is not only *inter*disciplinary but *trans*disciplinary - it is generated not *for* but *with* society, and thus extends "beyond what any one entity or sphere could accomplish individually by generating synergy and leveraging resources" (Emerson and Murchie, 2010: 141). Swart *et al.* (2014) explain that transdisciplinary research endeavours build the resilience of decision-making outcomes as they 'co-define' problems, 'co-create' the knowledge that is necessary to solve these problems, and result in 'co-learning' amongst actors who engage in the process.

Deppisch and Hasibovic (2013) note the difficulties around translating a transdisciplinary approach into practical terms. They question specifically how different disciplines, knowledge systems, research methods and 'thought horizons' can be integrated to facilitate climate adaptation planning in a way that does not overwhelm the process, or render it impractical. In answer to this query, the authors (*ibid.*) again draw on SER thinking as a bridging concept, in this instance to practically coordinate the union between separate fields of knowledge. They demonstrate the role played by a core stakeholder group in co-establishing a 'common language' around SER. Using this shared language, stakeholders from multiple different backgrounds, and with variable 'ways of knowing,' are able to enter into an adaptation planning process with a mutual understanding of factors such as uncertainty and the presence of multiple, interacting variables. Establishing such a vernacular could thus allow "collaboration partners [to] develop a shared sense of purpose and a shared theory of action for achieving that purpose" (Emerson *et al.,* 2011: 11).

In their account, Deppisch and Hasibovic (2013) highlight the fact that a significant degree of learning is required for all stakeholder groups to grasp and apply the language of SER thinking to climate adaptation. Such processes of social learning are acknowledged to be at the core of climate adaptation (Preston *et al.,* 2011), as no single party has clear access to or understanding of the issue, nor of the answers or means needed to resolve it (Collins and Ison, 2009a and 2009b). Moreover, social learning is seen as highly beneficial in that it raises community awareness around relevant issues and allows relationships and networks to be formed (Picketts *et al.,* 2013). In this way, complementarities can be found across sectors

and scales, which increases the likelihood of finding robust solutions (Swilling, 2014) because decisions become jointly constructed, mutually beneficial and thoroughly representative of all stakeholder needs and interests (Emerson and Murchie, 2010).

However, embracing this paradigm of participation (Kapoor, 2001; Luyet *et al.,* 2012) means recognizing that collaborative, transdisciplinary approaches to adaptation planning are less straightforward than their top-down, decision-taking counterparts (Deppisch and Hasibovic, 2013) as they are typically underwritten by strong relational dynamics, which may lead to either conflict or cooperation (Ansell and Gash, 2008; Andres, 2013). Nevertheless, adaptation is increasingly understood as being an iterative process rather than a definite end-point (Pelling, 2011; Taylor *et al.*, 2014), and in fact Armitage *et al.* (2011) argue that collaborative processes of knowledge and policy co-production are in themselves a crucial form of adaptation, as they are underpinned by social learning.

2.5. Barriers to planned adaptation

The recent escalation in policy and planning for climate change adaptation has prompted an upsurge in the scholarly analysis of these processes, and the multiple dynamics that influence their practical effectiveness (e.g.: Roberts, 2008; Carmin *et al.,* 2012a and 2012b; Massey and Huitema, 2013; Chu*,* 2016 and Chu *et al.*, 2016; Sova *et al.,* 2016). Examples from both practice and research have demonstrated that the courses of action undertaken to develop and implement formal adaptation plans and policies are far from being absent of challenges, and are instead fraught with various ongoing and interacting barriers (Biesbroek *et al.,* 2014; Shackleton *et al.,* 2015; Cuevas, 2016). There is common agreement around the fact that *barriers* are distinct from *limits* (Hulme *et al.,* 2007; Moser and Ekstrom, 2010; Biesbroek *et al.,* 2013) the latter of which are insurmountable within a given time horizon (Dow *et al.,* 2013; Klein *et al.,* 2014). In contrast, barriers to adaptation are less restrictive and do not necessarily mean that a goal is unachievable (Eisenack *et al.,* 2014). Hence, barriers are understood as being "obstacles that can be overcome with concerted effort, creative management, change of thinking, prioritization, and related shifts in resources, land uses, institutions, etc." Moser and Ekstrom (2010: 22027).

There exists an abundance of literature on barriers to adaptation, with a broad array of barriers being commonly reported in a variety of empirical case studies (for reviews on barriers see, for example, Biesbroek *et al.,* 2013, Eisenack *et al.,* 2014 and Klein *et al.,* 2014). Given the nature of barriers, which are "surmountable with effort" (Barnett *et al.,* 2015: 5), scholars have increasingly begun to assess the potential conditions that may enable these challenges to be overcome (Burch, 2010; Serrao-Neumann, 2015). Much of this work has taken the approach of organising adaptive barriers and enablers into logical categories or frameworks for diagnosis (e.g.: Jones, 2010; Eisenack and Stecker, 2012; Spires, 2015). In their 2013 review, Eisenack *et al.* critique the standardisation of these factors, arguing that "any kind of categorisation is rather arbitrary and signals our lack of understanding what barriers really are" (p.1123), and in particular of how or why they emerge. However, given that barriers are context-specific and interrelated (Klein *et al.,* 2014), the authors recognize

that categories can be a valuable heuristic for guiding scientific research and for enabling the identification of management options and opportunities to overcome the various obstacles that may arise (Eisenack *et al.,* 2013).

Thus, in the broadest sense, one can distinguish barriers to adaptation that occur in relation to a number of major themes, including those such as resource constraints, institutional or organizational hurdles and socio-cultural barriers (Haiden, 2014). Lehmann *et al*. (2015) focus particularly on the challenges faced during the formative stages of adaptation planning (i.e.: the process of preparing and adopting adaptation plans or policies). In this context, they argue that barriers (as well as opportunities or enablers) can be distinguished in a two-tier framework, where first-tier variables (which include information constraints, resource availability and the decision maker's incentive to act) are the emergent properties of a set of second-tier variables. The latter set are considered the underlying sources of adaptive barriers (or opportunities), and include stakeholder-specific values and intrinsic characteristics, the natural and socio-economic environment, as well as the institutional context in which adaptation planning takes place.

At the local government level, municipalities commonly cite resource constraints (a 'first-tier' variable) (Lehmann *et al.*, 2015) to be a primary concern when attempting to pursue an adaptation goal (Measham *et al.,* 2011; Spires, 2015; Cuevas, 2016). Resources in this regard pertain not only to the financial means needed to adapt effectively, but also to those such as technology, expertise and human capacity (Klein, 2014). Resource barriers are particularly salient in the developing-country context, wherein competing development objectives may be perceived as a more urgent priority than climate change adaptation (Patel, 2009; Chambwera and Stage, 2010; Ziervogel *et al.,* 2010). In some cases (e.g.: Burch, 2010; Lawrence *et al.,* 2013), resource barriers are related not to a shortage in quantity or a lack of access to resources, but rather to the inefficient or inappropriate use or allocation of existing resources. Resource deficiencies can therefore be either real or perceived (Klein *et al.,* 2014).

The customary approach to overcoming resource-related barriers has, to date, largely been geared toward the provision of 'more' or 'different' technology, information or funding (Shackleton *et al.,* 2015). However, whilst such resources remain important for realizing adaptation goals, they alone are unlikely to lead to equitable or effective adaptation, particularly in contexts where institutional or socio-cultural obstacles are the underlying factors (or 'second-tier' variables) of adaptation deficits and poor adaptive capacity (Biesbroek *et al.,* 2013; Lehmann *et al.,* 2015; Biesbroek *et al.,* 2015; Leck and Roberts, 2015). In this light, the subject of academic inquiries has increasingly demonstrated a shift (albeit to varying degrees of depth) toward acknowledging the barriers that arise from the dynamics of institutional and social systems (e.g.: Koch *et al.,* 2007; Biesbroek *et al.,* 2009; Lawrence *et al.,* 2015). These studies have highlighted that formal institutional barriers can arise as a result of various conditions, including legal constraints and a lack of national or provincial policy to motivate and guide action at local government levels (Carmin *et al.,*

2012a; Lehmann *et al.,* 2015). Weak vertical or horizontal institutional networks, and contradictory or fragmented cross-sectoral policy and planning are also a reason for insufficient adaptation, and may even lead to maladaptation if the goals of different administrative departments are misaligned (Ekstrom and Moser, 2014; Henstra, 2015; Juhola *et al.,* 2016).

Barnett *et al.* (2015) find that many of these institutional barriers are driven by path dependency, whereby actors or organizations are resistant to change. A lack of political will or an absence of proactive leadership to drive change can mean that adaptation objectives become side-lined (Anguelovski *et al.,* 2014) and institutional pathways continue to align with the status quo (Barnett *et al.,* 2015). The authors (*ibid.*) explain that, because current decisions are shaped by history, the chosen pathway is inherently linked to the specific way in which decision makers perceive risk (e.g.: Duncan, 2016), and vulnerability is thus a socially constructed concept (Adger *et al.,* 2009). For many decision makers, particularly those working in a multi-stressor context (e.g.: Roberts, 2008; O'Brien *et al.,* 2009; Laros, 2012), "global environmental problems such as climate change tend to be rather remote from our direct experience or, in other words, they are epistemologically distant" (Deppisch *et al.,* 2013: 118). This distance may stem from perceptions around timing and scale, whereby actors see climate change as a remote and abstract threat (Taylor *et al.,* 2014; Lethoko, 2015) or even a myth (Carter, 2007; Dunlap, 2013); or whereby the magnitude of the global problem rouses feelings of powerlessness to 'make a difference' (Swim *et al.,* 2009). According to Biesbroek *et al.* (2009: 10), "if policy makers feel disempowerment and despair or no sense of urgency and disbelief about future changes, the motives to start adapting will be low."

Biesbroek *et al.* (2015) and Leck and Roberts (2015) agree that internal and iterative dynamics such as these are highly influential in decision making processes, yet they are an essential component of adaptation practice that has largely been overlooked. Instead, barrier-related research (even that which acknowledges what Lehmann *et al.* (2015) refer to as 'second-tier' variables) has conformed to a more linear or functionalist framework in which the understanding of decision making processes is bound by the notion that, in the absence of barriers, adaptation adjustments will automatically occur (e.g.: Moser and Ekstrom, 2010). In reality, however, these processes are far more complex and uncertain than is suggested by conventional 'black box' (input-output) models (Biesbroek *et al.*, 2015), and require that decision makers identify and leverage opportunities for overcoming adaptive barriers (Ziervogel *et al.,* 2016).

2.6. Enablers of planned adaptation

Adger (2016) recognizes that adapting to climate change necessarily means dealing with uncertainty and complexity. He suggests that to overcome the underlying social and institutional barriers associated with these conditions (such as a lack of political will, climate change scepticism or no sense of urgency to implement adaptation options), one needs to 'bring climate change home.' The author (*ibid.*) argues that adaptation priorities are shaped

by shared values of place, well-being and fairness, and therefore proactive behaviour can be influenced by giving specific meaning to climate change by relating it to the context in question.

Adger's (2016) argument can be related to Wise *et al.'s* (2014) observation that the nature and effectiveness of climate change responses and decision implementation are strongly affected by the analytical framing of adaptation initiatives. The chosen frame will affect how the issue is perceived by actors, who filter the same information differently according to their personal or organisational worldviews (Etkin and Ho, 2007; Dow *et al.,* 2013). Whilst incongruent perspectives, values and attitudes can trigger strong power dynamics that may result in conflict (O'Brien *et al.,* 2007; Pohl *et al.,* 2010), so too can these variances lead to social learning (Collins and Ison, 2009a; Reed *et al.,* 2010). Funfgeld and McEvoy (2014: 606) thus reason that "if one acknowledges that values and associated degrees of subjectivity lie at the base of any adaptation process, a first step towards improving the efficacy of local adaptation policy could be to gain a better understanding of these underpinning ideas."

Increasingly, the framing of climate change adaptation has been centred on issues of vulnerability (McGray *et al.,* 2007; Dupuis and Knoepfel, 2013; Gasper *et al.,* 2013). This frame, rather than focusing primarily on climate change impacts, emphasizes current development needs and works at tackling the underlying factors (e.g.: poverty or degraded land) that increase the exposure and sensitivity of communities to climate-related risks (Horstmann, 2008; Pelling, 2011). Such an outlook enables decision makers to better understand the potential for climate change to drastically undermine development goals across sectors and spheres (Lebel *et al.,* 2012), and thus inspires a more integrated planning approach that calls for adaptation to be 'mainstreamed' (integrated or embedded) into existing policy domains (Pasquini *et al.,* 2015, Rauken *et al.,* 2015).

Mainstreaming acknowledges the transversality of climate change and attends to the non-climatic challenges already experienced by local governments, thereby increasing the likelihood of an overall reduction in risk and vulnerability (Stringer *et al.,* 2014). Moreover, this approach is a way in which to heighten the efficiency of financial and human resource use (Uittenbroek *et al*., 2013), and also to address the problem of boundary definition (Henstra, 2015), which arises in relation to the fact that many public actions taken to build system resilience may be done for reasons other than explicit adaptation to climate change (Tompkins *et al*., 2010). Expected benefits of mainstreaming further include averting policy conflicts, as well as the potential to leverage greater amounts of funding for adaptation programmes in comparison to financing them independently (Lebel *et al.,* 2012).

Reframing climate change adaptation in a way that promotes mainstreaming allows the effort of stakeholders to be directed towards "*doing something different* or *in a different way*" (UNEP, 2012: 47), as opposed to adaptation responses being seen as an additional mandate. Pelling (2011) calls this approach *transitional* adaptation, and explains it to involve the 'tweaking' or fine-tuning of existing practices, as opposed to operating in a radically diverse way (*transformational* adaptation). Transitional adaptation thus endeavours to meet

full societal and environmental rights within the existing governance system, whilst shifting iteratively from resilience (maintaining the status quo) to transformation (a 'well-adapted' society) (*ibid.*).

In practice, transitional adaptation is an ongoing and evolving process that requires actors to be open to change and embrace a paradigm of flexibility and 'learning by doing' (Taylor *et al.,* 2014). Lonsdale (2012) explains that fostering a 'learning organisation' is critical for effective and lasting adaptation, particularly in light of the tendency for complexity and uncertainty to pose a significant barrier in decision making processes (Wise *et al.,* 2014; Lourenco *et al.,* 2015). Doing so involves building relationships and networks of people that support and engage in learning activities (Bidwell *et al.,* 2013). This means drawing holistically on different systems of knowledge and engaging in knowledge 'exchange' (as opposed to 'transfer'), which is enabled through multi-stakeholder collaborations that promote the co-exploration and co-generation of knowledge (Hegger *et al.,* 2012; Steynor *et al.,* 2016; Turner *et al.,* 2016). Lonsdale (2012) highlights various indicative features of an organisation with a learning culture. These include, for example: welcoming or actively seeking novel ideas, including those from outside of the organisation or place; creating (possibly informal) spaces that enable experimentation and collaborative engagement in a way that stimulates debate rather than conflict; and maintaining an ethos of professional development that supports proactive individuals who act as 'agents of change' by championing the adaptation agenda.

The presence of an environmental or climate change champion has shown to be a significant enabler of adaptation in a growing number of case studies (e.g.: Roberts and O'Donoghue, 2012; Carmin *et al.,* 2013; Pasquini *et al.,* 2015). Crosby and Bryson (2010: 219) define a champion to be "a person who is a tireless, process-savvy organizer and promoter of the change effort." Such a person can hold various positions and may be a politician, a public official, an industry or academic expert, or even a representative from an NGO or civil society interest group (Ziervogel *et al.,* 2010; Meijerink and Stiller, 2013). Champions emerge most strongly amongst individuals who are passionate about and committed to resolving an issue, proactive about identifying and leveraging opportunities, are optimistic, insightful and able to supress the need to be an expert authority (Lonsdale, 2012; Leck and Roberts, 2015; Ziervogel *et al.,* 2016). In addressing complex policy problems such as climate change (Dombkins, 2014), it is necessary that these individuals play an 'integrative leadership'[5] role to unite diverse actor groups across sectoral boundaries to achieve a common goal (Crosby and Bryson, 2010: 211). Moreover, the novelty of the adaptation policy field calls for climate change champions who are 'policy entrepreneurs', in that they pioneer new problem solving techniques, coordinate and resolve collective action problems

[5] Crosby and Bryson (2011: 211) define integrative leadership as "bringing diverse groups and organizations together in semi-permanent ways, and typically across sector boundaries, to remedy complex public problems and achieve the common good".

(Meijerink and Stiller, 2013) and realise that uncertainty is not an insurmountable barrier (Street and Nilsson, 2014).

The work of influential individuals who champion the adaptation agenda is one indicator of the fact that, whilst the barriers to adaptation are numerous and complex, these are equally matched by opportunities for enabling effective adaptation. Capitalising on key adaptation opportunities (particularly those with development co-benefits) (Roberts, 2010; Suckal *et al.,* 2015) is essential if more sustainable and climate-compatible pathways are to be realized (Stringer *et al.,* 2014; Fazey *et al.,* 2016). In so doing, it is important that all parties take ownership of the adaptation challenge (Moser and Ekstrom, 2011; Anguelovski *et al.,* 2014) whilst remaining cognizant of the fact that, in a multi-stressor environment, for adaptation responses to be considered successful they do not necessarily have to be transformational (Pelling, 2011). Rather, any deliberate demonstration of the intention and effort to shift away from a 'business-as-usual' approach to decision-making is indicative of adaptive progress (Armitage *et al.,* 2011; Taylor *et al.,* 2014). However, this effort must be persistent, collaborative and evolve with the changing context in which climate change adaptation takes place (Haasnoot *et al.,* 2013; Plummer and Baird, 2013).

Chapter 3. Context and Methodology

3.1. Study site

3.1.1. Overview of the Western Cape Province (WCP)

This study is based in the Western Cape Province of South Africa, with the focal points being the Bergrivier, Drakenstein and Eden Municipalities (Fig.1). The Province is situated in the South West of the country and forms one of nine provinces, its borders being shared with the Northern and Eastern Cape provincial areas. The WCP is the fourth largest in South Africa, with a spatially diverse area of 29,462km² (Wesgro, 2011) and a population estimate of 6 116 300 people, which makes up approximately 11% of the national population (Stats. SA., 2014a). The provincial area is divided into 6 districts, including the metropolitan municipality of Cape Town and 5 rural district municipalities, these being the Central Karoo, Eden, Overberg, Cape Winelands and West Coast Districts. In turn, these districts are subdivided into 24 category B municipalities, which are considered to be the arm of government closest to civil society and are thus expected to serve as the 'voice' of the local people (Paradza *et al.,* 2010).

This local population originates from a multiplicity of cultural backgrounds, with diverse demographic and linguistic patterns being linked to centuries of trade and immigration, made possible by the Cape's location at the southernmost region on the African continent (Beck, 2013). This geographic positioning means that the trade sector has remained one of the most productive in the Province, with wholesale and retail trade, catering and accommodation achieving the second highest growth rate between 2010 - 2014, after the general government sector. Finance, community Services, manufacturing, agriculture, construction and tourism are also key sectors supporting the Western Cape's economy (WCG, 2015a). Whilst the Province's economic growth has regularly outpaced that of the national economy (Davids, 2015; WCG, 2016), the distribution of resources remains vastly unequal. The government is therefore tasked with the challenge of prioritizing inclusive economic development that is both socially and environmentally sustainable (Cronwright and Southworth, 2013).

3.1.2. Biophysical environment of the Western Cape

A geographically variable topography and climate contributes to the Cape's remarkably high levels of biodiversity, with over 13 000 endemic plant varieties and a broad array of faunal species making it one of the most biodiverse regions in the world (Cowling and Lombard, 2002; Turner, 2012). Similarly linked to the unique geography of the Province, which has a Mediterranean climate and is thus typified by a winter rainfall regime, is the occurrence of a variety of distinct agricultural zones that yield export-grade products ranging from fruit and vegetables to wool and meat (Conradie *et al*., 2009). The species-rich cold southern Benguela ocean current on the West Coast of the Province also contributes to a productive fishing industry that supports both commercial and small-scale fishing sectors (Sowman and Cardoso, 2010).

Increasingly, human-related pressures such as population growth, urbanization and land degradation are threatening the Cape's rich biodiversity and associated ecosystem services which, in turn, has significant adverse implications for the wellbeing of the population and economy (Meyer and Maree, 2013). This is a mounting concern due to the significantly high rate of existing poverty (Stats. SA., 2014b), which sits in stark contrast to the Province's mega-rich natural diversity. Compounding this challenge and augmenting existing vulnerabilities is the current and expected impacts of climate change. Projections for the region indicate a significant warming and drying trend, with reduced overall rainfall being punctuated by more intense rainfall events (Midgely *et al*., 2005). The occurrence of extremes such as drought, floods, wildfires and coastal storm surges is also on the rise and the WCG thus recognizes the urgent need to respond to climate change in a "transversal, bold and pioneering manner" (WCG, 2014: 1).

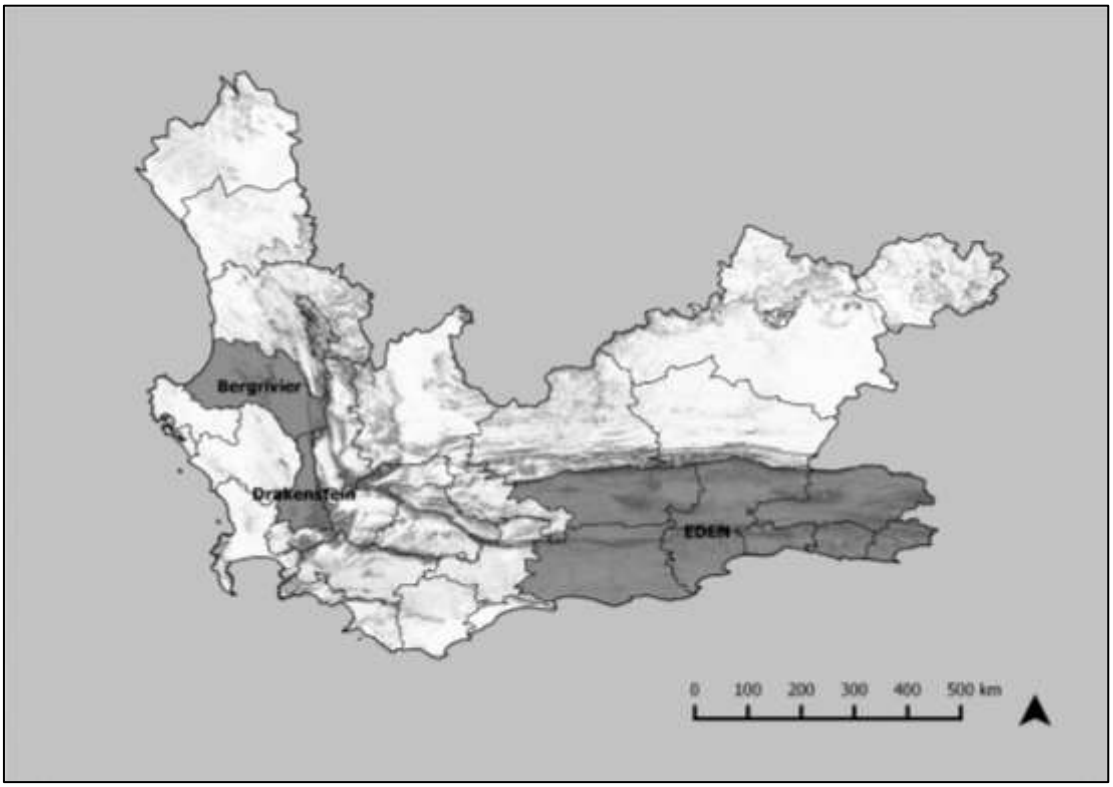

Figure 1: Map of the Western Cape Province showing the location of the Bergrivier, Drakenstein and Eden Municipalities (Source data: QGIS Development Team, 2016).

3.1.3. Bergrivier Municipality (BRM)

Bergrivier is a B-Municipality in the Western Cape Province that falls within the West Coast District Municipality and covers an area of 4407 km2. The Municipality is comprised of nine built settlements, with the town of Piketberg being the main administrative seat. An extensive rural area, combined with 40km of coastline, mean that the Municipality's economy is largely dependent on agricultural and fishing activity. However, whilst these sectors were previously the dominant source of employment in the region, a steady decline in natural-resource based industries has resulted in a sectoral shift towards wholesale and

retail trade, catering and accommodation; which became the leading local economic sector in 2009 (BRM, 2015).

Data from the 2011 national census indicates BRM's population to be 61 897, and ongoing migration to the area explains the population growth rate of 2.8% per annum. A high percentage of this population lives in poverty, with 22% of all households being classified as indigent (i.e.: the combined monthly income of the household is below the value of two state-granted pensions, plus 10%) (BRM, 2011). This poverty rate is linked to a lack of access to tertiary education and training facilities, and the high level of unemployment is a contributing factor to various social problems such as crime, substance abuse and underage pregnancy. In this light, local economic development (LED) is a policy priority for the Municipality, although the importance of addressing other cross-cutting issues is also recognized, with the 2015/16 IDP revision listing biodiversity conservation and climate change responsiveness as key development imperatives (BRM, 2015).

Climate data indicates that the already water-stressed region is set to experience an overall warming and drying trend, coupled with an increase in rainfall and wind intensity, a higher incidence of heatwaves and shifts in seasonal patterns (BRM, 2014). Whilst these expected future conditions are somewhat reflective of the provincial climate change projections (Midgely *et al.,* 2005), downscaled data for the municipal region is relatively ambiguous. The Municipality therefore needs to be prepared for a range of climate change scenarios, which is particularly important in light of its considerable economic dependence on agriculture (Peterson, 2013; BRM, 2015).

3.1.4. Drakenstein Municipality (DM)

Drakenstein Municipality covers a relatively small municipal area of 1,538 km^2, and forms one of five category B municipalities in the Cape Winelands District Municipality. The District is wholly landlocked, being situated between the coastal areas of the West Coast and the Overberg. This is one of the most fertile farming regions in the province, and the wine and grape industry have long been a significant source of livelihood for the region (CWDM, 2012). However, whilst agriculture continues to form the 'backbone' of the District's economy and DM is regarded as an agricultural centre (MEGA *et al.,* 2015), this sector has demonstrated an annual decline in recent years. Conversely, the finance, insurance, real estate and business services sector has grown substantially, along with the electricity, gas and water sector as well as the manufacturing and services sector. This diverse economic structure is a strength for the Municipality as it offers a broad set of employment and development opportunities for the population (DM, 2012).

The main urban centres that fall within the Drakenstein Municipality's borders are the towns of Wellington and Paarl, with the latter of these being the main administrative seat. Data from Census 2011 estimates that there are 251 262 people living in the Municipality, which makes its population density significantly greater than the BRM. This population is growing at a rate of 2.56% annually which, coupled with its economic growth rate of 3% per annum, makes it the third fastest growing municipality in both the District and the Province as a whole (WCG, 2014b). However, whilst the presence of tertiary education and training

facilities in the area has supported a relatively high level of skills development, much of the population lives in poverty, with the number of indigent households in the Municipality accounting for over half of those in the District. This suggests that the benefits associated with the improvement in economic conditions have been slow in filtering down to the broader local population, and in fact "economic development has by far been raised as one of the top priorities of the wards" (DM, 2012 :103).

Whilst the Municipality emphasizes the importance of economic development in its planning, it simultaneously recognizes its mandate to address environmental sustainability issues and lists environmental management as a key focus area of its IDP (DM, 2013a). A major aspect of this is related to managing water scarcity, which is a growing concern due largely to pressures from population growth and development. Placing further pressure on this important natural resource is the increasingly warmer and drier conditions associated with climate change and climate variability in the region. Projections for DM indicate a reduction in rainfall and a heightened duration of dry spells, particularly during the summer months (CSAG, 2013). This trend has negative implications for various interrelated sectors in the Municipality, including both water and agriculture, which remain essential to the growth of the local economy and the wellbeing of the population.

3.1.5. Eden District Municipality (EDM)

In contrast to BRM and DM, which are category B municipalities, Eden is a district (category C) municipality that forms one of 5 rural districts in the Western Cape. EDM is situated on the southern coast of the Cape and covers an area of 23 331km². Based on Census 2011 data and projections from Quantec, the District was estimated to have a population of 607 161 people in 2013 (WCG, 2013), making it the second largest in the Province after the Cape Winelands District Municipality. This population, which saw a 2.3% growth rate between 2001 – 2011 (Stats. SA., 2012), extends across seven category B municipal areas, with George representing the main municipal seat for the District.

EDM has vibrant towns and beautiful beaches set against the backdrop of the Outeniqua Mountains. The area between the mountains and the coast forms part of what is known as the 'The Garden Route,' which has major tourism significance for the WCP (Retief-Neil, 2010). The value of the tourism industry is evidenced by its contribution to local employment, as well as by the significantly high input to the regional economy made by the wholesale and retail trade, catering and accommodation sector, which is second only to the finance, insurance, real estate and business services sector (WCG, 2013). These sectors, along with those such as construction and the transport, storage and communication sector, have contributed to the District's high economic growth rate of 4.6% per annum over the last decade (WCG, 2015b).

However, whilst the economy of Eden District is strong in comparison to the smaller municipalities of Bergrivier and Drakenstein, EDM is not without ongoing challenges. In fact, the very natural environment that sustains the region's economy and population is a source

of serious risk (EDM, 2014), with costly natural disasters occurring on an increasingly regular basis (Santam Group *et al.,* 2011). Many of these disasters are related to extremes in climate and weather patterns, with flooding, wildfires, coastal inundation and drought being just some of the impacts to hit the region in recent years, the direct damage costs of which have amounted to hundreds of millions of Rands over the last decade alone (Santam Group *et al.,* 2011; EDM, 2014; Nel *et al.,* 2014). This has caused repeated setbacks to the District's development progress, which is a concern in light of the existing vulnerability of local communities, many of whom lack adaptive capacity. This inability to cope is partly a consequence of the highly unequal distribution of wealth (which reflects the provincial and national profile of inequality), coupled with unemployment and insufficient access to basic services, the delivery of which has declined in recent years (WCG, 2014c).

Local economic development and basic service delivery therefore form key objectives for the District, as is such with BRM and DM. However, the contribution of climate change to EDM's vulnerability is increasingly recognized, with the region being particularly predisposed to shifts in climatic regimes due to its location in a transition zone between winter and summer rainfall areas (Ginsburg *et al.,* 2014; Nel *et al.,* 2014). Changes to regular climate patterns are already being noted in relation to increasing annual temperatures, greater absolute rainfall coupled with drier winters overall, as well as a notable increase in extreme climate-related events. Whilst there is some uncertainty as to how climate change will impact the region in the future, these observed conditions are expected to continue and possibly worsen (Nel *et al.,* 2014). A systems-wide approach to building adaptive capacity and resilience is therefore noted as a parallel priority for the District (EDM, 2014).

3.2. Methodological approach

The methodology of this study is based on a qualitative and comparative approach to case study research. Qualitative research methodologies are useful for social science contexts, in which in-depth processes and descriptive interactions form the basis for inquiry (Marshall and Rossman, 1999). The study draws on several disciplines including understandings of the physical science basis of climate change, as well as various social theories on concepts such as vulnerability, adaptation and adaptive capacity. However, the empirical component of the research involves interactions with people and their formal and informal institutions, and can thus be considered to fall within the broad domain of social science. Moreover, the study is concerned about the way in which policy planning processes were carried out across scales in different places and contexts, and the various actors and factors influencing the interactions and outcomes thereof. This speaks to Pelling's (2011) observation that adaptation is driven by four questions: (1) what to adapt to? (2) who or what adapts? (3) how does adaptation occur? and (4) what are the limits to adaptation? This line of enquiry is further consistent with Ritchie (2013), who explains that qualitative research design is concerned with 'what', 'why' and 'how' questions, rather than 'how many'.

The place-based (as opposed to sector-based) nature of the research further draws on the question of 'where'. Measham *et al.* (2011: 890) explain the term 'place-based' to mean "a

spatially distinct group of bio-physical and social conditions, which can, in principle, occur at any scale but tend to focus at local and regional scales where global and local drivers manifest themselves in particular ways." This aligns with the understanding that, whilst climate change is a global issue, the impacts thereof converge at the sub-global scale and are experienced primarily at the grassroots level, and thus adaptation responses are necessarily local (Turner *et al.,* 2003; Kiragu, 2010). Moreover, a place-based framing is relevant to the analysis of municipal climate change response planning, where decision making occurs in a multi-stressor context rather than one led by sectorally-specific data (O'Brien *et al.,* 2009; Corburn, 2009; McCubbin *et al.,* 2015).

The consideration of the actors involved in these planning processes highlights a final question around 'who' (Pelling, 2011). This is relevant with regards to the role of knowledge co-production in collaborative adaptation planning processes, as well as in terms of the importance of gaining insight into cross-sectoral vulnerabilities in each place (Emerson *et al.,* 2012; Serrao-Neumann *et al.,* 2015). Reflecting on stakeholder involvement is further salient in light of the necessity of having buy-in from political and administrative heads and good leadership 'on the ground' to ensure that the process is driven from within the municipality (Pasquini *et al.,* 2015). The emergence of relationships, networks and dynamics of power are also linked closely to which individuals were involved, as these outcomes were strongly character-based. This illustrates the importance of considering not only the external drivers of adaptation but the intrinsic factors that affect policy development and implementation (Carmin *et al.,* 2012a; Biesbroek *et al.,* 2015).

3.3. Theoretical framing

The theoretical concepts of collaborative governance and knowledge co-production are used as a framing device to guide an inductive analysis of the three municipal adaptation planning processes. This frame is adopted in response to the participatory, transdisciplinary approach to adaptation planning that is advocated by the Province in its CCMSP (Ziervogel *et al.,* 2016). At the local scale, decisions are influenced by both non-climatic and climate-related factors (Taylor *et al.,* 2014) which affect, and are in turn affected by, a variety of stakeholder groups, each of which has a role to play in solving a common problem. Drawing on the notion of collaborative governance (Emerson *et al.,* 2011), one can reason that participatory policy and planning processes hold a greater chance of securing buy-in from diverse actor groups and benefiting from multiple 'ways of knowing' than their centralised, 'decision-taking' counterparts (Hage *et al.,* 2010; Pohl *et al.,* 2010).

Such collaborative planning processes, in which knowledge is co-produced and exchanged amongst multiple stakeholders, have received some criticism in light of factors such as the time and resources required to constructively engage a diverse set of actors (Ghose, 2005; Green, 2007). Moreover, despite the various perceived benefits of collaborative approaches, a number of limitations have arisen in practice. This has led to questions being raised around the degree to which multi-stakeholder participation is actually successful in enabling more democratic policy processes and improving the quality of information inputs and

decision outcomes. Reed (2008) note some key limitations in this regard, including the following:

- Stakeholder participation does not occur in a 'power vacuum[6]' and therefore does not necessarily lead to the evasion or reduction of conflict, nor to an increase in equity or empowerment;
- 'Dysfunctional consensus[7]' may occur due to stronger or more vocal actors suppressing the views of minority groups;
- If stakeholders are continuously requested to participate in consultations, yet the expected benefits of their effort is not realized, then 'consultation fatigue[8]' may develop; and
- Difficulties may arise in terms of the degree to which stakeholders are able to meaningfully engage in debates that are highly technical in nature.

Koontz and Newig (2014) thus argue that collaborative approaches to policy planning and implementation should sit on a continuum between top-down and bottom-up decision-making structures. Moreover, the inclusion of stakeholders should not be uniform but rather determined based on their particular interest in, and relevance to, different stages of the engagement process. Bradley (2015) highlights four levels of stakeholder engagement in this regard (as described by the International Association for Public Participation). These include the following:

- **Inform –** Keep the stakeholder group informed with relevant information that is balanced and objective.
- **Consult -** Keep the stakeholder group informed, listen to and acknowledge concerns and aspirations, and provide feedback on how the stakeholder group's input has influenced the decision.
- **Involve -** Work with the stakeholder group to ensure that the group's concerns and aspirations are directly reflected in the alternatives developed, and provide feedback on how their input influenced decisions.
- **Collaborate -** Work together with the stakeholder group to formulate solutions, and incorporate advice and recommendations into the decisions to the maximum extent possible.

[6] A 'power vacuum' occurs when there is no longer an identifiable central authority and a void is left that usually becomes rapidly filled by powerful stakeholders. Thus, where there is no power vacuum (i.e.: in participatory processes), the empowerment of previously marginalised actors may result in unexpected conflict with existing power structures (Reed, 2008).

[7] 'Dysfunctional consensus' (Cook, 2001) refers to situations where an agreement is reached, but it is not a true reflection of all stakeholder perspectives. This occurs when group dynamics act to reinforce existing inequalities by overpowering the views of minority participants and / or discouraging weaker voices from being expressed (Reed, 2008).

[8] 'Consultation fatigue' refers to a lack of enthusiasm and energy from stakeholders who are constantly asked to participate in collaborative processes. This may result in the absence of stakeholders at collaborative engagements, particularly those which are not well planned or poorly facilitated (Reed, 2008).

By finding this balance, facilitators can achieve more effective results from multi-stakeholder engagements, whilst still ensuring that multiple voices are heard and resources are collectively shared amongst actors from public, private and civic spheres, and across all levels of government. In this way, opportunities are provided for various stakeholders to combine and align information, share different forms of knowledge and understanding, engage in cross-disciplinary expertise, and even pool more tangible resources such as data or tools for improved planning, in a more meaningful and appropriate manner (Haiden, 2014). This approach has particular value in the context of responding to climate change due to the complexity of the issue and its tendency to defy traditional boundaries (Biesbroek *et al.,* 2009; Pelling, 2011). Moreover, by working in collaborative environments, opportunities are created for social learning, growth, trust building and sharing, which are considered essential components of adaptive capacity building (Lebel *et al.,* 2006; Pahl-Wostl, 2009).

In this light, the analysis of the adaptation planning processes undertaken in the Bergrivier, Drakenstein and Eden Municipalities is less concerned with the specific content of the adaptation plans and the implementation outputs thereof. Rather, the focus is around the manner in which they were produced, the role and influence of different actors and their voices in informing these plans, and the various exogenous and endogenous factors both driving and sustaining the municipalities' adaptation responses.

3.4. Methods

3.4.1. Inception meeting

On 5 November 2015, a meeting was held between the student and members of the WCG Climate Change Directorate's adaptation steering committee, including the provincial initiator for the CCMSP, the current head of the adaptation committee and one of her colleagues. Also in attendance at the meeting was an academic researcher from UCT who had been involved in the design and facilitation of the Bergrivier Municipality's adaptation planning process. The meeting contributed to realizing objective 1: "*to document the institutional, political and social conditions that aid climate adaptation planning in municipalities*." The overall aims of this initial consultation were as follows:

- To gain a general understanding of the background to and purpose of the CCMSP, as well as the process through which it was initiated and carried out.
- To discuss the major objectives of the project and brainstorm possible approaches to conducting the research.
- To gain access to important documents that had been used in the CCMSP and produced during and after the programme.
- To attain the details of key stakeholders who had been involved in the programme in each municipality.

This meeting was also important in light of the intention to observe the 'research into use' approach that is at the core of the overall ASSAR project, to which this study is linked. As the

CCMSP is an ongoing programme that continues to support Western Cape municipalities in responding to climate change, the analysis of the three adaptation planning processes conducted in this study provides a valuable opportunity for the WCG to better understand what worked in each case, what did not work and why. Therefore, the meeting was used as a platform to discuss how the study would best be situated to ensure that the Directorate would receive the information required to inform and improve future climate change response planning processes that will take place through the CCMSP.

3.4.2. Stakeholder identification

The second objective of this study is *"to explore the role of key stakeholders in the co-production of climate adaptation plans."* In meeting objective 2, the selection of interview participants was aimed at being as inclusive as possible, so as to gain a more in-depth perspective of the role played by different actors and networks in each adaptation planning process. Key stakeholders were identified by the WCG CCMSP team at the inception meeting, and later via email correspondence. The team identified key stakeholders to be those who had played a significant role in planning and / or facilitating the adaptation planning processes, and those who had been thoroughly engaged throughout the process or who had had a meaningful impact on the process in some way. These stakeholders included the municipal climate change champions from each municipality, certain municipal and provincial officials, the academic researchers and scientists who had been involved in the BRM process, as well as the provincial director of climate change whose role it is to develop, implement and co-ordinate the CCMSP.

Potential respondents were contacted by email to arrange interviews, and these initial correspondences were then followed up via telephone conversation. A snowball sampling technique (Barbour, 2008) was also employed once the interviews were underway, with respondents suggesting other important stakeholders and assisting in contacting them on short notice. Overall, 14 stakeholder interviews were arranged. Four of these were with representatives from the BRM adaptation planning process, three were from the Drakenstein Municipality process, four from the Eden District and three from the WCG.

3.4.3. Interviews

Interviews were conducted with stakeholders over November and December 2015 in various locations around the province, which were chosen based on their level of convenience for the interview respondents. All interviews, which lasted approximately one hour on average, were conducted in person and were recorded by dictaphone. The interviews were semi-structured in nature, with the questions (Appendix A) being subject to change depending on the person being interviewed. The aim of employing a more flexible and open-ended questioning technique was to guide the discussions and enable participants to think about and elaborate upon the issues that are relevant and salient to them, rather than having the agenda of the interviews be predetermined by the interviewer's interests or perceptions (Barbour, 2008).

The interview questions were related to various issues that aimed to meet objectives 1 and 2, as well as objective 3: *"to unpack the challenges that arise during municipal climate adaptation planning processes*" and objective 4:*"to identify the barriers to and opportunities for climate adaptation planning at the municipal scale.*" Questions were thus formed around the following:

- The factors that motivate and sustain a local climate change response
- The role of different actors and the voices that they brought in to the planning process
- The degree of support that was provided from political / administrative leaders
- The role of relationships, networks and power dynamics in these adaptation planning processes
- The overall challenges of and benefits derived from each process

These questions, whilst adapted throughout the interview process, were initially developed in relation to the knowledge that been gained from the inception meeting, and were further informed by advice provided by the provincial initiator.

3.4.4. Document analysis

Data from a range of documents were analysed and drawn on throughout the study in order to supplement an understanding of the three adaptation planning processes considered, and to verify the information that was provided by interview respondents. The documents that were used included, amongst others, the following: the WCG's invitation to municipalities to take part in the CCMSP, their responses and letters of acceptance from the WCG, meeting minutes, workshop presentations, the final or draft adaptation plans from each municipality, blog posts and articles that were written on the processes, and policy documents such as provincial and municipal Integrated Development Plans (IDP's). The use of such material served to converge the data gathered in the inception meeting and via the semi-structured interviews, and contributed to meeting objectives 1 and 3. This analysis process was not carried out systematically, but in an ad-hoc manner according to the information that was needed at the time. However, it later became more structured around the themes that emerged from the interview responses.

3.4.5. Data analysis

All interview recordings were transcribed electronically using Microsoft Word and were supplemented by written notes taken during the interviews. An archive of all data was compiled, which included the interview questions, recordings and transcriptions, as well as the documents used for analysis. The interview transcriptions were examined using manual coding techniques (Basit, 2003), beginning with a rudimentary assessment of the data and moving toward a more in-depth analysis of the emergent themes. Saldanha (2015: 23) observes that "we seek patterns as somewhat stable indicators of human's ways of living and working … they become more trustworthy evidence for our findings since patterns demonstrate habits, salience and importance in people's daily lives." In this light, the coding

process was conducted by searching for patterns that suggested commonalities or irregularities in factors such as stakeholder's ideas, approaches, visions, understanding and worldviews. These coded patterns were clustered into broad themes that were refined throughout the process by combining, dividing or eliminating certain elements (see Table 1). The final four themes were then used as a basis to conduct a comparative analysis of the case studies. Following Ward (2010) and Taylor *et al*. (2014), the comparative approach used was relational across the three municipalities, as opposed to evaluating each case in terms of its degree of conformance to a universal ideal.

Table 1: Broad ideas, theories and/or patterns that emerged during the data analysis process were used to inform four final themes.

Theme:	**1. Perceptions of climate change & the environment / development divide**	**2. Leadership & the importance of climate change champions**	**3. Collaboration & knowledge co-production for climate adaptation planning**	**4. 'Learning by doing' for adaptation to climate change**

Broad ideas, theories and / or emerging patterns:	- The role of individual or organisational values & worldviews (Adger *et al.,* 2009) - Historically-defined mental models (Barnett *et al.,* 2015) - Path dependent social & institutional processes (*ibid*.) - Institutional location of the environmental / climate change function (Taylor *et al.,* 2014) - Making trade-offs between environmental concerns & development needs (Patel, 2008 & 2009) - Mainstreaming adaptation (Rauken *et al.,* 2014) - Institutional requirements for climate change adaptation planning in SA municipalities (Giordano *et al.,* 2011) - Lack of mandatory legislation for environmental / climate change governance (Dannevig *et al.,* 2013) - Climate change scepticism & scientific uncertainty (Whitmarsh, 2011) - Framing devices used in communicating climate change (McEvoy *et al.,* 2013)	- Political will to plan for adaptation (Anguelovski *et al.,* 2014) - The role of social capital in collaborative planning processes (Adger, 2003) - Factors motivating municipalities to undertake adaptation planning (Anguelovski & Carmin, 2011) - Incentive (or lack thereof) for stakeholders to participate (Ansell & Gash, 2008) - The importance of local-level climate change champions (Pasquini *et al.,* 2015) - Nature of individual climate change champions (Crosby & Bryson, 2010) - Local leadership across sectors for horizontal integration / goal alignment (Winter *et al.,* 2010) - The role of a provincial representative to drive the process & enable vertical integration across government spheres (Bauer & Steurer, 2014) - The importance of 'integrative' leadership for bringing multiple stakeholders together (Crosby & Bryson, 2010)	- Complexity & socio-ecological systems theory (Cilliers, 2000; Berkes *et al.,* 2003) - Climate change complexity & realizing complex policy (Deppisch & Hasibovic, 2013; Dombkins, 2014) - Paradigm of participation (Kapoor, 2001; Luyet *et al.,* 2012) - Knowledge 'co-exploration' & joint / co-production of knowledge (Hegger *et al.,* 2012; Steynor *et al.,* 2016) - Multi- & transdisciplinary research (Lang *et al.,* 2012; Swilling, 2012) - Collaborative governance (Emerson *et al.,* 2012) Multi-level governance (Lidskog & Elander, 2010) - Partnerships & networks as a policy strategy for climate change (Boto *et al.,* 2015) - Stakeholder identification, diversity & participation (Sherman & Ford, 2014) - Different forms of stakeholder engagement (Anguelovski *et al.,* 2014) - Power dynamics & conflict (Pohl *et al.,* 2010) - Social learning & relationship building through knowledge co-production (Armitage *et al.,* 2011)	- Climate adaptation planning as an emerging policy field (Carmin *et al.,* 2012a) - Global problem, local solutions (Di Chiro, 2011) - Context of place, place-based research (Measham *et al.,* 2011) - The role of 'policy entrepreneurs' (Meijerink & Stiller, 2013) - Experimentation & innovation in adaptation planning (Bulkeley & Broto, 2013) - Diverse approaches to adaptation (Anguelovski *et al.,* 2014) - Flexibility & 'adaptive co-management' (Plummer & Baird, 2013; Jordan & Huitema, 2014) - Fostering a learning organization (Lonsdale, 2012) - Informal knowledge exchange & institutional 'shadow spaces' (Biesbroek *et al.,* 2015; Leck & Roberts, 2015) - Leveraging opportunities (Ziervogel *et al.,* 2016) - Barriers to & enablers of climate adaptation planning (e.g.: Klein *et al.,* 2014)

3.5. Limitations

Although the stakeholder selection process aimed to include as many stakeholders as possible and to ensure a sufficient representation of participants from each Municipality (a minimum of three in each case), certain constraints such time and resource limitations

prevented consultations with a broader actor network. Thus, whilst the 'key' stakeholders (as identified by the WCG) were interviewed in each case, it was not possible to engage with groups who were further removed from the decision-making arena or not as closely or thoroughly involved in the adaptation planning processes. For example, members of civil society (e.g.: farmers) who had attended the workshops were not included when selecting interviewees, nor was it possible to meet with representatives from all of the B-municipalities in Eden District. Given time and resource constraints, it was not considered essential to meet with these participants as, in general, there was a lack of continuity in their attendance at the workshops. In other words, most did not attend or engage in all three workshops and therefore would only have been able to provide limited information or insight into the planning process if they had been interviewed.

The time of year at which the interviews took place was also challenging as it was near the date at which government is closed to business for the year, and thus some officials and all politicians were unavailable to be interviewed. Again, it was ensured that the 'key' officials were interviewed in each case. Politicians were not considered to be as essential in terms of stakeholder selection as they had only been present at the initial inception meetings of each adaptation planning process (except for the Bergrivier Municipality, where the Mayor attended one of the workshops). Tensions surrounding a municipal restructuring process in the Drakenstein Municipality also meant that gaining access to stakeholders was difficult in this case, and strong ownership of the process by the climate change champion served as an obstacle to accessing other potential interview respondents.

The impact of such limitations on the results of the study was minimized by ensuring that all available respondents (particularly the officials from the WCG, who had been involved in all three planning processes from beginning to end), were interviewed as thoroughly as possible. In this regard, respondents were asked to elaborate on any topics that the interviewer felt had not been explained clearly, and to comment as far as possible on the role played by other participants and / or stakeholder groups who had been (or should have been) involved in the adaptation planning processes.

3.6. Ethical considerations

In accordance with the ethics policy of the University of Cape Town (UCT), the consent of all participants was gained prior to conducting any interviews. The WCG provided a letter of support for the research (Appendix B), which motivated the study and encouraged the participants to engage in the interview process openly and transparently. The letter explained that "this research will help us to collectively raise the bar in future climate change response plan development with municipalities and in enhancing and strengthening your own processes and revisions into the future." The letter was attached to all initial emails that were sent to request interviews with the stakeholders.

In conducting the interviews, the aim of the study and purpose of the meeting was reiterated, and participants were invited to ask any questions before and / or during the

interview. Permission was gained to audio-record the discussions and to detail the occupational position of the respondents (e.g.: ‘Municipal Official’, ‘Strategic Manager’) and / or the name of the organisations to which they belong, in the final dissertation. It was also made clear to the respondents that their names would not be provided.

Chapter 4. A tale of three municipalities

4.1. Supporting municipal-scale climate adaptation in the Western Cape Province

The Western Cape Climate Change Response Strategy (WCCCRS, 2008, reviewed 2014) observes its obligation to support municipalities in responding to climate change, recognizing that there is little capacity or funding at the local level to commit to mitigation and adaptation projects that are additional to existing portfolio functions (WCG, 2014). In this light, the WCG's Climate Change Directorate, a sub-directorate of the Department of Environmental Affairs and Development Planning (DEA & DP), initiated the Climate Change Municipal Support Programme (CCMSP). The CCMSP aims to assist municipalities in mainstreaming and implementing climate change responses at the local level, through the planning and development of sustainable energy and adaptation plans, as well as frameworks for their implementation. A provincial official from the Directorate explained in an interview that the CCMSP was born in 2012, following the COP17 negotiations held in Durban the previous year. Prior to this, the provincial Climate Change Directorate had undertaken an awareness raising campaign to share information about climate change in general, along with the specific objectives of COP17, with municipalities. This 'municipal climate change roadshow' prompted calls from some municipal authorities, who realized their need for support in addressing the challenge of climate change, a request heeded to by the province through its initiation of the CCMSP (Respondent A, WCG).

As the programme is not a compulsory function of the province or of the municipalities that it aims to support, an invitational letter and application form detailing the purpose and process of the CCMSP was sent to all of the municipalities in the province, excluding the City of Cape Town (CoCT) Metropolitan Municipality which had already demonstrated exceptional progress in responding to climate change (e.g.: Taylor *et al.,* 2014): "*we don't work with the City, they're just so far ahead in what they're doing*" (Respondent H, WCG). Of the 29 municipalities requested to express their interest in the programme, 12 responded positively. Recognizing the limited capacity of its team, the provincial Climate Change Directorate committed to supporting only eight of these, half of which would be supported in adaptation planning processes whilst the remainder would receive assistance in developing sustainable energy plans. The criteria on which municipalities were chosen was based on the responses provided in their initial applications. Those showing existing effort and progress in responding to climate change were preferred, as the province felt that municipalities that were stronger in this area would demonstrate a higher chance of success, both in response planning and in the implementation of projects. This is shown in a statement by one of the provincial officials, who explained that, due to their limited capacity, "*we were rather working with people who wanted to work with us than the people who were not as enthusiastic"* (Respondent H, WCG). Upon reviewing all of the applications to the CCMSP, the Directorate decided to engage with just three Municipalities in the first year of the programme to develop climate adaptation plans, these being the Bergrivier, Drakenstein and Eden Municipalities.

South Africa's constitution (RSA, 1996) provides for three types of municipalities, each of which are defined by various conditions related to size, power and function. Category 'A' municipalities are the large metropolitan cities such as Cape Town which are comprised of more than 500 000 voters and are responsible for service delivery in the entire area. Category 'B' municipalities, such as the Bergrivier and Drakenstein Municipalities, are the smallest sphere of local government and are located outside of major metropolitan areas. A number of B-municipalities (usually around 4 – 6) make up one district (category 'C') municipality, and development and service delivery in the area is a shared function of both. Eden Municipality is a category C municipality that includes the B-municipalities of George, Knysna, Mossel Bay, Hessequa, Oudsthoorn, Bitou and Kanneland. Whilst both B and C municipalities are classified under the local government sphere in South Africa (in contrast to the provincial or national spheres), the former are commonly referred to as local municipalities whilst the latter are known as district municipalities. The initial aim of the CCMSP was to engage directly with local or B municipalities in the Western Cape. However, the application by Eden Municipality for support in developing a district level climate adaptation plan was seen by the Province as an excellent opportunity to extend its influence across a broader spectrum. By working at the district scale, ongoing support could be filtered down to local municipalities, thus inspiring a more powerful climate change response in the region.

The adaptation planning component of the CCMSP was primarily driven by one individual in the WCG Climate Change Directorate, hereafter referred to as the 'provincial initiator' (following Ziervogel *et al.,* 2016). She had a strong tie with the national climate change department due to having worked with them on various projects in the past, for example the Long Term Adaptation Scenarios Flagship Research Programme (LTAS). However, despite the background and experience of the provincial initiator and the other members of the WCG team, the Climate Change Directorate had not undertaken a programme such as the CCMSP in the past. The novelty of the process therefore meant that no template existed for successful adaptation planning, and instead the programme was one underwritten by experimentation and 'learning by doing'. Under such circumstances, and in light of the limited capacity of provincial team, the CCMSP was designed to be carried out in a highly participatory manner that promotes multi-stakeholder input, cross-disciplinary engagement and partnership-building. As the province plays only a supportive role in such processes, its mandate being at the policy and government level, it was important for the ownership of the adaptation planning process to reside with the municipalities themselves, as it is at the local level that the responsibility of project implementation sits. In this regard, a key element of the CCMSP was the identification of a climate change 'champion' from each municipality, whose role it is to drive the climate change agenda from the local level.

Once the participating municipalities had been chosen and accepted, an inception meeting[9] was held with members of each municipality's council, so as to secure political and administrative buy-in. These initial engagements made clear the purpose of developing an adaptation plan, gave an overview of the proposed approach, outlined the key responsibilities of the various role players and served to ensure that there was an overall agreement on the process going forward. In general, this process was structured to include a series of workshops, in which three major themes were covered:

1. The identification of *all* existing vulnerabilities and risks within the municipality (i.e.: not limited to climate change), and the key drivers thereof
2. A prioritisation of the hazards associated with these key drivers of vulnerability, and an assessment of the role played by climate change therein
3. An identification and prioritisation of adaptation interventions, based on the current and potential future impacts of climate change and variability for the region

Whilst the content of the workshops were essentially very similar in each municipality, their structure and outcomes of the overall programme were unique in each case. In spite of these differences, however, a core impetus of the CCMSP was to aid the municipalities in mainstreaming climate change into key municipal line functions. This objective is in accord with the NCCRWP (DEA, 2011), a strategic priority of which is "the mainstreaming of climate change considerations and responses into all relevant sector, national, provincial and local planning regimes" (p.14). Mainstreaming climate change allows adaptation imperatives to be aligned with the priorities of existing government policies (Pasquini *et al.,* 2015), and is achieved when climate adaptation is imbedded in strategic documents such as local and district level Integrated Development Plans (IDPs), Spatial Development Frameworks (SDFs) and Disaster Management Plans (DMPs). This is important not only because of the financial and capacity constraints that prevent a dedicated climate change response at the municipal level, but also because it is these master planning documents which hold legislative force. Consequently, the inclusion of climate change in such plans heightens the chance of proposed adaptation projects being considered in annual budget allocations, thereby driving forward the imperative of meeting implementation objectives in reality (Pasquini *et al*., 2013; Lethoko, 2015), the responsibility for which resides with the municipalities.

4.2. Case Studies

4.2.1. Bergrivier Municipality (BRM)

The Bergrivier Municipality Climate Adaptation Plan was approved in 2013 and adopted by local council in 2014 (BRM, 2014). The Municipality's adaptation planning process was carried out in four main stages, including a preliminary meeting between key

[9] Note that the three adaptation planning processes took place in 2012 and 2013, whereas the research for this thesis only began in 2015. The student was therefore not in attendance at the inception meetings and workshops that were held during the adaptation planning processes. Results are solely based on the information gathered during the stakeholder interviews that took place in November and December of 2015.

representatives from the BRM and the CCMSP team, followed by three workshops which also included various stakeholders and interest groups from the Municipality. Participants at the workshops included the Mayor, the Municipal Manager, local and district municipal officials, the local Director of Tourism and Disaster Manager, officials from the conservation sector and private sector representatives, as well as local residents including farmers and a group of Rastafarians. Although not every one of these stakeholder groups attended all three workshops, an average of between 20 – 35 people was maintained throughout. These engagements took place in Piketberg, the seat of the municipal council, and ran from August 2012 through to January 2013, when the third and final workshop was held. The initial inception meeting confirmed buy-in to the adaptation planning process by the municipality's Mayoral Committee and administrative leaders, including the Municipal Manager and the Manager: Strategic Services, the latter of whom had been identified as the local climate change champion.

The adaptation planning process undertaken by the BRM was unique in that a number of timely opportunities emerged for partnerships to be formed with academic and research institutions. One such opportunity presented itself when a researcher from the Council for Scientific and Industrial Research (CSIR), in collaboration with an academic from UCT's Environmental and Geographical Science (EGS) department, approached the WCG Climate Change Directorate about the possibility of working with a municipality to look at how climate information might be used at the local level. In an effort to avoid duplication of adaptation work and potential 'workshop fatigue' among municipal officials and stakeholders, as well as to capitalize on the opportunity for building the skills base of the CCMSP team, CSIR/EGS were included in the BRM process. This partnership was valuable in that the two researchers had significant experience in addressing climate adaptation and vulnerability in the development context, and were thus able to provide significant input to the design and facilitation of the adaptation planning workshops.

A second opportunity arose in relation to an existing connection between the provincial initiator and the Climate Systems Analysis Group (CSAG) from UCT. CSAG had originally played a fairly straightforward role as a climate science service provider, having done a small amount of consultancy work for the WCG in the past, and responding voluntarily to requests for information to inform the CCMSP. However, this role was enhanced when a CSAG representative became more closely involved in the BRM process, engaging directly with stakeholders at the workshops. Particular value was added to the existing skill set by the CSAG representative's climate science background and previous experience in working with the United Kingdom Climate Information Portal, an initiative that aims to support society in adapting to climate change (McKenzie Hedger *et al.,* 2006). The launch of the CCMSP process in the BRM also coincided with a parallel request from UCT's African Climate and Development Initiative (ACDI) for opportunities to engage in transdisciplinary, applied climate research at the local level. This research interest overlapped with the objectives of the CCMSP, and the ACDI thus became involved in the Bergrivier process.

The convergence of opportunities for partnership building transformed the nature of the Bergrivier's adaptation planning team from one of limited size and skill to one of multidisciplinarity and dynamism. The combination of various skills and experience allowed for flexibility in response to context-specific situations or needs and emergent information. For example, when one of the workshop activities was found not to be working in the way that the facilitators had hoped, they were able to use their knowledge and experience gained from other workshopping processes to adjust the activity to one more suited to the context. The incorporation of multiple disciplines into the BRM planning process was not a function of its original design but rather a consequence of existing relationships and networks, which merged with timely opportunities to facilitate and enhance a conducive working environment. Key to this was not only the presence of longstanding links among team members, but also the effect of individual work ethic, mutual trust and a genuine desire for successful adaptation outcomes, evidenced not least by the fact that the team's researchers committed their time and energy to the process on an entirely voluntary basis, without compensation from the WCG: *"it was really out of interest – there was no monetary value for us, it was just so that we could gain some knowledge on how local government works and how we can infiltrate our knowledge into development plans"* (Respondent C, researcher).

The benefits of having a multidisciplinary team were further enhanced by the presence of a willing and receptive municipal environment. Fundamental to this was strong political support and an enthusiastic municipal climate change champion who had a strong passion for the environment. The Municipality's climate change champion, who demonstrated outstanding enthusiasm and a humble nature, came to be viewed by the CCMSP team as essential to the success of the adaptation planning process and was described as *"this amazing thing … a very unique individual"* (Respondent D, researcher). The champion was able to recognize her own limitations in terms of her climate knowledge, and instead apply her skills as a facilitative leader to organize and drive the process, also acting as an English / Afrikaans translator in cases where language barriers became an issue. This is shown in the statement that *"she wasn't the one who knew all about climate change and was taking it forward, she recognized that she didn't know … she was like 'come I'll help' - she would always get the meeting ready, she would make sure it happened. She would draw on us because she saw us as the experts, so she didn't feel this need to dominate. She was such a person who facilitated everything, without her it couldn't have happened - but she didn't try and take over the process, so she was amazing like that"* (Respondent D, researcher).

Importantly, the local champion understood clearly her responsibility in terms of publicizing the adaptation workshops. She succeeded in drawing an array of stakeholders into the planning process, and thus also displayed 'integrative' leadership ability, which Crosby and Bryson (2010: 211) define as "bringing diverse groups and organizations together in semi-permanent ways, and typically across sector boundaries, to remedy complex public problems and achieve the common good." These various stakeholders provided valuable

input at the workshops, voicing their experiences and concerns around climate change, vulnerability and adaptation. However, it was felt by some members of the CCMSP team that a better representation from the private business sector, as well as from a broader civil society group, would have been beneficial. A diverse and continuous representation from stakeholders is important in order to avoid having certain issues prioritized over others, which may lead to maladaptation (Juhola *et al.,* 2016). In the BRM process, the water sector had very strong attendance at the workshops and therefore a significant percentage of the discussion was centred on the points raised by this stakeholder group: *"water was very vocal – especially around concerns regarding infrastructure. So we ended up focusing on water a lot, because they were the people who were in the room and dominated the process … there were some arguments and the person who argued the most got their way"* (Respondent C, researcher).

Given the significantly agricultural nature of the local economy, it was felt that there was not enough representation from local farmers in comparison. This was largely attributable to the timing and location of the workshops, which took place near the peak of the agricultural season in Piketberg. These conditions prevented some of the farmers from taking extensive leave from their farms to travel to and participate in the workshops. This was however difficult to plan around due to the varying times at which different agricultural produce is harvested, as well as the rural location of many of the farms. A second factor that could possibly have contributed to the absence of some of the farmers was a still-strained relationship between the agricultural sector and the local government, owing to a constitutional court case regarding the failure by farmers to pay municipal rates and taxes.

This case lasted ten years, from 2003 – 2013, and whilst many farmers have made arrangements with the Municipality to pay their debt over time, there remains some tension that requires ongoing work if the relationship is to be completely restored. The lengthy court case also contributed to significant fiscal constraints being placed on the Bergrivier Municipality by the provincial and national government, as it was forced for some time to accept a 'worst case scenario' budget in light of the insecure income from local sources. This factor contributed to the vulnerability of the Municipality, as a restricted financial situation means that the local government has little room to manoeuvre in the face of uncertainties, particularly in a context where there is huge social and economic risk over and above the risk of climate impacts (BRM, 2015). Whilst a healthier budget is currently received, there is still little financial capital to allocate to areas outside of mandated municipal functions such as service delivery and local economic development.

Climate change adaptation is seen as one such additional functional, and the absence of any significant budgetary allowance for the implementation of adaptation measures means that it is imperative for the climate change agenda to be mainstreamed into master planning documents. This is particularly true in relation to the Municipality's IDP, as budget allocations are based on the information provided in this document. Hence, *"if it's not in* [the IDP]*, it's not going to be implemented – because that's basically the municipality laying*

their annual programme on the table and saying this is what we're going to be investing in. Obviously if it's not there then there's no budget and it's not going to happen" (Respondent A, WCG). Mainstreaming was therefore identified in the BRM Climate Adaptation Plan (BRM, 2014) as one of the key areas for adaptation intervention in the Municipality, the approach being to consider climate compatibility as fundamental to the Municipality's development planning rather than as an added extra. This is illustrated in a municipal official's statement that "*climate change is not an 'add-on', it is the way in which we do our work"* (Respondent E, BRM).

In this light, it was arranged that the finalization of the BRM Climate Adaptation Plan (in April 2013) coincided with that of the Municipality's latest IDP (in May 2013). This allowed for some of the proposed adaptation projects to be included in the IDP, thereby bringing the BRM a step closer to making adaptation the "lens through which the Municipality views its functions" (BRM, 2014: 21). The benefit of appropriate timing was enhanced by the fact that, in the absence of a dedicated environmental department, environmental matters in the Municipality fall under the responsibility of the strategic manager. The Manager of Strategic Services in the BRM is further responsible for the local IDP, a functional arrangement that proved to be beneficial because she was also the local climate change champion.

The simultaneous emergence of various opportune conditions, and the capitalization thereof, led to the BRM being able to develop a climate adaptation plan and integrate it into its IDP in a relatively short space of time. Whilst such smooth outcomes are somewhat uncharacteristic of policy development processes (Measham *et al.,* 2011), it is important to note that the plan is viewed not as an end product but as one component of successful adaptation, the achievement of which is an ongoing exercise that requires continuous work. This in turn is dependent on the degree to which the adaptation agenda is driven from the local context, as the outcome of the plan is closely linked to the value afforded to it by those in leadership positions who are expected to own its implementation: *"I strongly believe that the people below management give attention to those areas where management is interested, because all people want to be accepted … And when this thing* [the adaptation planning process] *started, we just said 'this is important'"* (Respondent E, BRM). At the time that the adaptation planning process was underway, the strategic manager afforded great importance to climate adaptation, as it was a personal interest. However, since this time, a new strategic manager has taken over and the focus of the Municipality has shifted significantly in the direction of local economic development, which is in line with both the current needs of the Municipality and the natural abilities of the successor. It is explained by one of the BRM representatives that such a shift is normal, and is not an indication of a lack of passion for environmental issues, but instead *"just the way the pendulum swings … it is not right or wrong, it is a specific focus that we need now"* (Respondent E, BRM).

Whilst the Municipality has faced some difficulties in implementing the climate adaptation plan, it was felt by most of the stakeholders that engaging in the adaptation planning

process itself was highly valuable. The experience resulted in a significant degree of learning, not only for the officials and local people involved, but for the provincial representatives and the academics and researchers who were able to bridge the interface between science and policy in a most constructive way: *"it's a 'win-win' situation – we are able to learn so much about things from a government / policy perspective, and can then feed this into our work"* (Respondent C, researcher). Moreover, the process led to the foundation of new networks among the participants, as well as to the strengthening of existing relationships between those who had worked together in the past.

4.2.2. Drakenstein Municipality (DM)

The Drakenstein Municipality's adaptation planning process was carried out in Paarl, the municipal seat, from October 2012 through to February 2013. This process began with an initial inception meeting between the provincial CCMSP team and various key representatives from the Municipality, followed by a stakeholder workshop. The workshop was attended by a group of around 16 participants who were primarily municipal officials from various different line functions, including those such as Community Services, Financial Services, Civil Engineering Services, the Department of Environmental Management and the Department of Water Services. Emerging from the consultations with these stakeholder groups was a variety of sector-specific interests, which had considerably divergent objectives. Thus, whilst the workshop was originally planned to include participatory group discussions, the outcome was instead a number of targeted inputs that saw the identification of a very broad range of vulnerabilities to climate. In this context, it was decided that the most practical way to continue the adaptation planning process would be to hold focus group meetings as opposed to workshops.

Key to the success of an adaptation planning process, and to the implementation of adaptation interventions beyond the development of a plan, is the identification of a local champion (Pasquini and Cowling, 2015; Pasquini *et al.,* 2015). In the case of DM, the climate change champion was identified as being the Municipality's Senior Engineer, who at the time was concurrently responsible for issues related to environmental management. He has a personal interest in environmental affairs and, in recognition of the direct impact that engineering has on the natural environment, he played a key role in the inclusion of environmental management into the Municipality's existing functions. Moreover, the champion had been involved in workshops to develop the province's initial (2008) climate change response strategy, and had sat on the PSO (Provincial Strategic Objective) workgroup for energy and climate change (for more information see: http://eadp.westerncape.gov.za/doing-our-business/energy). The Municipality thus had an existing awareness of climate vulnerability and risk, and was engaged in discourse around climate change even prior to being involved in the CCMSP. This meant that climate change was not a novel concept or practice: *"for us it wasn't something new that we thought 'gee wizz bang', it was just a progression of the integrated environmental management that we try and practice in Drakenstein"* (Respondent F, DM).

However, despite the Municipality's cognizance of environmental issues and climate change, there were a number of barriers that inhibited an optimal adaptation planning process from occurring, a consequence of which was that the plan was not fully completed. One of the biggest difficulties in this regard was that at the time of undertaking the CCMSP process, the Municipality was undergoing a significant restructuring, having recently come under new administrative management. Whilst the environmental unit sat previously within engineering and thus under the responsibility of the climate change champion, it was moved during the restructuring process to form part of the Directorate of Planning and Economic Development. A government official from the Municipality explains that this organizational shift was based on the perception of environmental management as a 'soft' function, and consequently insufficient value was attributed to its operational component (Respondent G, DM).

The changes also caused problems in terms of gaining access to various stakeholders in the Municipality, as some of the original participants who had been working with the provincial CCMSP team were moved to different sections in various departments. These problems are expressed in the statement that "*it was a difficult period for Drakenstein at that stage, because they were going through a big restructuring process. So people who we were working with had been moved to different sections, and our main contact was no longer really the right person to really drive the process … we only had the one contact and it was very difficult to get access to anyone else*" (Respondent H, WCG). One official also expressed concern due to communication breakdowns between the departments, particularly with regards to the lack of timely engagements around engineering projects which have a direct environmental impact. The disorder caused by these changes is illustrated in the statement that "*this is now what the big fight is about – how are we going to separate the planning portion of environmental management from the operational? Personally, I can't see how that can be done*" (Respondent G, DM).

A further barrier to the process was that the stakeholder group participating was primarily composed of government officials, many of whom occupied junior positions within their respective departments. Whilst it is important in such a process to have representation from various sectors and departments, there was a significant absence felt from stakeholder groups such as senior management, industry, civil society and non-governmental organizations (NGOs). The diversity of stakeholders involved in the participatory engagements did improve towards the later stages of the adaptation planning process. However, it seems that there was an initial misunderstanding in terms of who was expected to attend, and what the imperatives of the adaptation plan were, despite the discussions that took place with the Municipality prior to commencing the process. One of the workshop facilitators felt that this was somewhat due to officials in the Municipality having 'traditional' perceptions where environmental awareness is seen as being in opposition to developmental needs. Hence, "*there is still the paradigm of 'environment vs. development,*

vs. engineers, vs. disaster management … so there was hardly anyone at the first workshop" (Respondent B, WCG).

The process also lacked sufficient buy-in from political and administrative heads. Although there was no top-down resistance to developing an adaptation plan for the Municipality, the general perception of climate change is as a somewhat 'green' issue and it thus lacks emphasis in relation to more immediately pressing concerns such as unemployment, crime and housing shortages. This problem was expressed by a government official, who observed that the climate change champion *"…tries, but I don't think he gets the same ... either political or senior administration ear, you know – the people holding the purse strings, they 'rule the roost'. So he tries his best but I don't think it actually translates into projects, which is what he wants. So I don't think that climate change is seen as a priority"* (Respondent A, WCG). Some of those who were involved in the adaptation planning process also recognized that there is a relatively high level of climate change scepticism within the Municipality, and that it often requires impacts such as drought and elevated temperatures to be manifested before broader acceptance of the issue occurs. The engrained perceptions of climate change as solely an environmental issue, combined with scepticism and the challenges of trying to shift the learned ways in which people think and act, meant that the climate change arena became a difficult space to work in.

However, despite the absence of a formal plan to respond to climate change, it is inaccurate to say that the DM is not responding to the issue at all, and in fact there are various instances in which mitigation and adaptation actions are fundamental to the way that it operates. For example, the Municipality has had a Water Demand Management Programme in place since the mid-nineties (DM, 2013c). This programme was designed in order to respond to a water crisis that arose in relation to a significant annual increase in water demand, and was highly successful in conserving water with a real savings in water consumption of over 15% and around R700 million (drakenstein.gov.za, 2013). The Municipality also carefully considers its purchases, for instance the official vehicle fleet is chosen in relation to the fuel efficiency of vehicles in their class. Whilst this is done in order to increase fiscal savings, it has concurrent repercussions in terms of emissions reductions. Similarly, by choosing to fit streetlights and traffic lights with LED lightbulbs, the Municipality saves on electricity costs and reduces maintenance demands due to the increased lifespan associated with these energy-saving lights. It is projects such as these, among numerous others, that led the Municipality to winning the 'Greenest Municipality Competition' in 2012, an initiative run by the Western Cape DEA & DP to foster the concept of sustainability within the sphere of Local Government (DEA & DP, 2012). Whilst many of these initiatives are related to energy efficiency, which suggests a bias toward mitigation over adaptation, they are nonetheless indicative of positive progress in responding to climate change.

The challenges experienced in the DM's adaptation planning process can therefore not be attributed to a lack of awareness about climate change or an unwillingness to implement

response projects. Rather, many of these challenges are related to what the actual drivers of or reasons for responding to climate change are, and the way in which the specific actions are framed. This is commonly from a perspective of disaster management or economic efficiency as opposed to climate change adaptation or mitigation: *"a lot of the things that are potentially climate-change based or linked, we've been doing for other reasons. I mean with the water example – the Western Cape has never had enough water, since Van Riebeek hit the beaches, we've been battling with water! So that has been a driver, but it is climate change linked … we just had to make those linkages …* [but] *the main drivers sort of come out of the social impacts from a disaster management perspective"* (Respondent F, DM). This is a useful observation, as the framing of an issue can significantly affect an audience's perception of the problem, hence leading to changes in their cognitive and behavioural action (Nisbet, 2009). Framing climate change as a disaster risk response or local economic development imperative is advantageous due to the fact that these are mandated functions in the Municipality, whereas climate change continues to be perceived as an unfunded (and therefore less urgent) responsibility to attend to.

In this light, one could argue that the DM is advanced with regards to mainstreaming the climate change agenda into sector-specific operations, with one official explaining that it "*is so interwoven into our whole existence that as a municipality it is going to be difficult to actually go and implement 'climate change' projects … it's all part and parcel of what we're doing*" (Respondent F, DM). The suggestion in this regard was that, rather than having an overarching plan or a paragraph on climate change in the IDP, the issue should be devolved down to individual business units. This again raises the issue around the institutional placement of the climate change agenda, with the above official arguing that it should in fact fall directly under the Municipality, akin to an IDP audit.

Despite the difficulties experienced during the adaptation planning process, which were aggravated by resource, time and capacity constraints; there was a significant degree of learning that occurred during the course of the CCMSP. This was demonstrated through the realization of the transversal nature of climate change impacts, which affect and are affected by many different sectors in the Municipality. The outcome of these perceptual changes was an evolution in the approach being taken, with a major realization being the interconnected nature of climate change adaptation and mitigation and the need to practice these response types simultaneously. This learning curve was one not only for the Municipality but for the provincial team working on the CCMSP as well. Through its engagements with the various municipalities, and in particular with DM, the Climate Change Directorate was able to appreciate the overlaps between adaptation and mitigation that occur at the local level: "*as we were working through the whole thing we realized that there is so much overlap between adaptation and mitigation at a municipal level. If you do a mitigation project there, generally there are adaptation co-benefits attached to that*" (Respondent H, WCG). Adopting a merged approach would also help in overcoming the

capacity constraints of the provincial team, whose members were split between separate adaptation and sustainable energy planning processes.

Going forward, DM therefore aims to shift toward a more holistic climate change response strategy that incorporates both adaptation and mitigation. In the time since developing the plan, the Municipality has also come to see the need to produce a response strategy that is highly adaptive, due to the dynamic nature of climate change and its associated impacts: *"your policy has got to be a dynamic policy, it can never be static. And as things change, we are going to* [review] *it … this is why I don't think that policy will ever be finished, it will always be a draft"* (Respondent F, DM). However, whilst flexibility is a vital attribute of climate response planning (Jordan and Huitema, 2014), it is equally important to move the final document beyond a draft status. Formalizing the plan and ensuring its political approval will strengthen the possibility of climate response strategies being incorporated into master planning documents and therefore being allocated a portion of the annual budget. A significant consequence in this regard was a missed opportunity to mainstream the agenda of the draft adaptation plan into the 2014/2015 update of the Municipality's Spatial Development Framework. Nevertheless, an additional opportunity exists in light of the upcoming IDP review, which is set to be released in 2017.

4.2.3. Eden District Municipality (EDM)

Despite being a district rather than a local municipality, EDM was accepted as one of the municipalities to be supported by the province in developing a climate adaptation plan. This process was initiated in August 2012 when an introductory meeting was held in the municipal seat of George. In light of the district scale at which this process was to be carried out, it was vital to secure sufficient buy-in to the programme not only from the administrative and political district heads but also from the B-municipalities, whose input into the planning process and subsequent implementation of the adaptation plan is crucial to affecting institutional change (Leck, 2011). The initial meeting, held on 15 August 2012, was well attended by a range of key stakeholders including the mayor, local councillors and various municipal officials, and it was agreed that three subsequent adaptation planning workshops would be held. Significant input at these workshops was provided by the participants, for whom climate change impacts manifest in reality: *"for some people, climate change is already here. And fortunately we understand and appreciate this. For us, climate change is not something that we read about in text books – it's in our face, we experience it first-hand"* (Respondent I, EDM).

Following the three core stakeholder engagement sessions, an additional round of workshops was held with some of the individual B-municipalities in order to verify, deepen and extend the adaptation commitments made during the planning process. These more focused engagements were deemed necessary due to the context-specific concerns of the various local municipalities, which caused a degree of divergence during the workshops in terms of what areas were considered as being priorities for adaptation intervention. For example, one municipality was most concerned about the degradation of wetlands and the

associated loss of ecosystem services, whereas another felt that the most pressing issue in its area was the poor location of low-cost housing, which was being constructed on slopes and thus adding to the existing vulnerability of the inhabitants. Establishing this more direct channel for engagement with B-municipalities allowed for improved communication between the different levels of government, which assisted in placating some of the tension that arose due to dynamics of power. This is illustrated in a district official's observation that "*there were huge power dynamics involved in the process – it's a hierarchy. The B-municipalities don't really like to be told what to do, and the district doesn't like to be told what to do from them ... But if you develop a civil rapport with them, you can understand their frustrations and ask them what they need and what the district can help with ... If this communication occurs then they are more becoming and start to engage better*." (Respondent J, EDM).

The workshops in EDM were facilitated primarily by the provincial initiator, with little assistance being provided by the WCG Climate Change Directorate due to a lack of capacity within the organisation. A shortage of support in this regard made the process challenging to manage due to the district-wide scale of the programme. However, the enthusiasm and strong leadership present on the ground made for a highly receptive working environment in which significant learning and growth occurred. The adaptation planning process was driven from the Municipality's side by the EDM Environmental Manager, who was identified as the climate change champion for the region. In accordance with one of his responsibilities under the CCMSP, the champion drew on his existing networks and relationships with the B-municipalities to engage stakeholders from various government departments as well as from NGOs and institutions such as SANParks and Cape Nature. This broad stakeholder base allowed for heightened interactions and good dialogue to occur amongst the participants. Whilst the number of representatives at the workshops waned slightly toward the end of the process and there was a lack of representation from sectors such as engineering and industry, the overall process saw the emergence of robust engagements which had been absent in the past.

To date, the EDM Climate Adaptation Plan is still in draft status. However, it is recognized as being the first step toward building the resilience of the Municipality by creating an institutional environment that enables a co-ordinated climate change response across the district. Such co-ordination is important, as although the District has long been responding to climate impacts in various ways, there has been insufficient integration among various role players, with many plans and interventions occurring independently: "*You would find, for example, that the fire section would plan a controlled burn. But then we would see that Working for Water*[10] *is actually doing some work in that area too … but they are all working in pockets*" (Respondent K, EDM). One of the biggest links that were missing in this regard

[10] Working for Water is a national programme introduced in 1995 by the Department of Water Affairs and Forestry (now the Department of Water Affairs) that seeks to control invasive alien plants in South Africa. In doing so, it seeks to protect a range of ecosystem services (most notably water resources), protect biodiversity and create employment opportunities (van Wilgen and Wannenburgh, 2016).

was between the Environmental and Disaster Management units, which for a long time had been at loggerheads with regards to the prioritization of issues and the approaches being taken to address climate-related impacts. However, after the occurrence of disasters such as the severe floods in 2007 and the 2009 – 2011 drought, the need for improved collaboration between the departments was realized. The adaptation planning process under the CCMSP served as a significant catalyst in strengthening the relationship between the two spheres. This occurred on a planning level, as "*for the first time you've got a matrix that displays what everyone is busy with*" as well as on a cognitive level, with officials realizing that "*we are all trying to reach the same goal ... to maximize the net result*" (Respondent K, EDM).

Having worked with both EDM's Environmental and Disaster Managers on various projects and forums in the past, the provincial initiator became a key architect in enriching the interactions between the two departments. The stronger relationship that was formed resulted in the District's Disaster Manager emerging as an unofficial co-champion of the climate adaptation agenda. A sturdy and dynamic link between these sectors is essential not only in light of the disaster-prone nature of the Eden District, but also in terms of the legislative requirements around climate change and disaster risk reduction in South Africa, with only the latter of these being a compulsory obligation for municipalities. In this regard, the champions were able to highlight the applicability of the DMA (Act 57 of 2002, amended 2015) to climate adaptation. Whilst the Act had not yet been amended at the time of undertaking the adaptation planning process, the proposals to do so were under consideration by the relevant national and provincial committees. This provided the champions with a more official channel through which to influence adaptive action in B-municipalities, as the DMAA (2015) is legislated, whereas documents such as the NCCRWP (DEA, 2011) and the Western Cape Climate Change Response Strategy (WCG, 2014) are not.

The operationalisation of adaptation projects is recognized as being the next phase of EDM's climate change response. This will require budgeting for climate-related risks in the face of uncertainty, both in a monetary sense as well as in terms of raising awareness about the issue. This is important as there seems to be a lack of understanding about climate change, which results in it being overlooked in budget allocations: *"a lot of the money within the Eden budget is not directed toward priority areas … I don't think people understand the real underlying causes of global warming and climate change scenarios – they just do things because they feel it's the right thing to do. Many municipalities do this too – they see environmental awareness as an 'add-on' not an 'add-in'. They perceive it as an extra workload … but through a bit of creative management and innovation, you can actually achieve a lot"* (Respondent J, EDM). For example, by being proactive about applying for financial grants from external organisations, the Municipality has managed to run various climate change-related initiatives (such as fundraising for the installation of solar water heaters, distributing 'Wonderbags'[11] for electricity saving, running awareness-raising

[11] A 'Wonderbag' is a non-electric bag that retains heat through its insulated cushioning. It was designed in South Africa to reduce the amount of fuel needed to cook and heat food, and is therefore aimed at poorer

campaigns around water usage and waste reduction and partnering with projects such as SmartAgri[12]) (as described by Respondent L, EDM).

An innovative approach is often necessary in terms of securing financial support for climate adaptation projects, which are commonly side-lined in favour of socio-economic development imperatives. This is due not only to the problem of climate change being an unfunded mandate in most municipalities (Spires, 2015), but also in light of various socio-cultural barriers that emerge among different members of the population: *"Trying to convince people that what you are dealing with is actually climate change is very difficult, especially in the older population. There is a little bit of scepticism around it … they are a bit suspicious* – [they ask] '*what are you trying to sell us, what are you going to do with 2 or 5 million Rand'?"* (Respondent I, EDM). Different belief systems were also quoted as being a challenge in this regard, as "t*he Judaeo-Christian, Calvinist nature of our society doesn't help much*. [People believe that] *there is this 'sky-God' that is punishing us. So to confront this and to deal with it and to negotiate, is very difficult."* Moreover, "*there is … the indigenous population that hasn't plugged in to the western science-based beliefs around climate. They tell you that this has been happening for thousands of years,"* and whilst this rich indigenous knowledge is seen as valuable, *"you can't use this on a funding application"* (*ibid.*).

One innovative means of helping to overcome such barriers is to change the way in which climate change is framed, so that planning processes lead not only to re-engineering outcomes (i.e.: new technological designs or reinventions of the way a management process is conducted), but to appropriate behavioural change (McEvoy *et al.,* 2013). In light of the abovementioned barriers, concerns about 'climate change' per se do not always achieve this outcome and climate change may therefore need to be called something different: *"what helps is if you change the wording. You shift it to call it what it is – rock slips or landslides or whatever – you don't call it climate change, this is what gets you the money"* (Respondent I, EDM). However, even with funding, there needs to be a high degree of support in order to ensure that development projects remain cognizant of climate change, particularly in instances where environmental legislation may cause delays in development progress: *"The environmental people are still seen as a handbrake in some areas. For example, if you are going to 'build back better' after a disaster – we get funding and we say ok we've got a year to spend it. But to build back better you have to do a full EIA* [Environmental Impact Assessment] *and that alone can take 18 months, and then we don't get to spend the budget. So what do they do? They just build back what there was. So we are not adapting. This is one of the problems that we have flagged and we have said to* [the Minister] … *give us guidelines, but help us to build back better"* (Respondent J, EDM).

populations in developing countries for whom fuel is expensive or labour-intensive to collect. It is considered to be a 'green' (environmentally-friendly) design as it can produce significant savings in electricity and reduce the consumption of firewood (thereby potentially reducing deforestation and carbon emission levels).

[12] For information on SmartAgri see: http://www.acdi.uct.ac.za/research/smartagri.

Building and drawing on relationships and networks is a key aspect of effecting a valuable climate change response, particularly in terms of garnering the support that is needed to implement projects that take climate change into account. This was demonstrated at the district scale by improved collaborations between the environmental and disaster management units. This was also expressed by some of the interview participants from local municipalities for whom relationships mean greater access to knowledge and experience, and the ability to combine efforts and affect a more robust outcome. In this regard, informal knowledge channels such as text message groups are seen as being highly useful for extracting and sharing information, which in turn can lead to more effective climate change response planning and action. Similarly, it was found that building closer relationships with individuals in different departments is important for achieving outcomes at the local level, as it "*helps to be friends with the guy … when you add something more to the professional relationship then you know you are getting something richer and more solid … a personal relationship helps to enhance the final product that you are trying to achieve"* (Respondent I, EDM). The adaptation planning process in EDM served as a platform through which climate change could be addressed not only hierarchically (from provincial down to district and local level) but across different sectors and departments. However, whilst the process itself was valuable, it remains important to finalize the draft adaptation plan so as to ensure that it is suitably mainstreamed into the planning activities of both the District as a whole, and the B-Municipalities in need of support.

Table 2 provides a comparative summary of the major variables related to the specific adaptation planning processes in the three municipalities.

Table 2: Summary of key variables related to the adaptation planning processes in the Bergrivier, Drakenstein and Eden Municipalities

	Bergrivier Municipality	**Drakenstein Municipality**	**Eden Municipality**
Municipal scale:	Local	Local	District
Institutional location of climate change:	Office of the Municipal Manager: Directorate of Strategic Services (included under 'environmental management' function)	Included in environmental management function under Directorate of Planning & Economic Development and Department of Civil Engineering (separation of planning and operational components of EM)	EDM Department of Environmental Management and Department of Disaster Management
Status of adaptation plan:	Finalized and approved in 2013, adopted in 2014	Incomplete draft	Final draft completed in 2014
Networks and key partners involved:	WCG, BRM, UCT (EGS), CSIR, CSAG, ACDI	WCG, Drakenstein Municipality	WCG, EDM, B-municipalities, SALGA, GRI
Climate change champion:	Manager: Strategic Services	Senior Engineer	Environmental Manager, Co-

	Has a passion for matters related to the environment (background in horticulture and environmental law). Played the role of a facilitative and integrative leader. Key in driving the adaptation planning process Has since left the Municipality	Has a personal interest in environmental management (concerned about environmental impact of engineering). Played a key role in establishing an environmental management function in the Municipality. Main point of contact for access to other stakeholders – became a challenge due to departmental restructuring	championed by Disaster Manager Passionate about environmental sustainability and biodiversity conservation. Drew on existing networks and strong relationships with B-municipalities, as well as organizations in the environmental / conservation sector Co-champion enabled cross-sectoral (horizontal) integration. N.B. due to disaster-prone nature of EDM
Adaptation planning process:	Inception meeting and three multi-stakeholder workshops	Inception meeting, one multi-stakeholder workshop and one workshop session of targeted focus group interviews	Inception meeting, three multi-stakeholder workshops (inclusive of all B-municipalities) and multi-stakeholder workshops with four individual B-municipalities
Participation at workshops:	20 - 35 Participants Broad stakeholder representation, including the Mayor, Municipal Manager, local and district municipal officials, the local Director of Tourism and Disaster Manager, officials from the conservation sector, private sector representatives, local residents including farmers and a group of Rastafarians Greater representation from private businesses, civil society groups and farmers would have been beneficial	12 - 16 Participants Mainly junior municipal officials from various different line functions, including Community Services, Financial Services, Civil Engineering Services, the Department of Environmental Management and the Department of Water Lack of input from senior management, industry, civil society and non-governmental organizations (NGOs) Stakeholder diversity improved toward later stages of adaptation planning process	9 - 16 Participants Stakeholder representatives included the Mayor, Eden District Disaster Management, Department of Water Affairs, various officials from B-municipalities, CapeNature, SANParks, Gouritz Cluster Biosphere Reserve, GRI Number of participants waned toward end of adaptation planning process and there was a lack of representation from sectors such as engineering, industry and civil society
Political and administrative buy-in:	Good buy-in from Mayoral Committee and administrative leaders, including the Municipal Manager. Partially due to	No top-down resistance to adaptation planning, but lack of sufficient buy-in from political and administrative leaders	Good support from political and administrative leaders due to existing awareness of climate

	previous exposure to climate-related issues through participation in ICLEI-LAB programme in 2010 Willing and receptive municipal environment enabled effective climate adaptation planning process Involvement of climate scientists helped with credibility around climate change New (2015) Manager: Strategic Services tasked with shifting focus of Municipality towards local economic development. Resultant lack of emphasis on environmental issues (including climate change) has impeded implementation of adaptation plan	Climate change perceived as 'green' issue, lacks emphasis in relation to more pressing socio-economic concerns: persistence of 'environment vs. development' paradigm Significant degree of scepticism around climate change Increasing immediacy of climate-related impacts such as drought continually leading to greater acceptance of climate change as a priority issue	change in the District (N.B.: 2009 climate change summit and signing of declaration of intent to combat climate change) Buy-in linked closely to frequent occurrence of natural disasters and high financial and social costs thereof Buy-in and commitment from B-municipalities was varied – only four of the six local municipalities engaged in individual workshops at the end of the process
Mainstreaming of adaptation agenda:	Mainstreaming of climate change prioritised as key adaptation intervention Finalization of BRM Climate Adaptation Plan (April 2013) coincided with IDP update (May 2013). Some of the proposed adaptation actions therefore included in the IDP Climate change champion responsible for both the adaptation plan and the IDP and was therefore able to ensure mainstreaming of adaptation agenda No opportunity for broader public comment on adaptation plan prior to its adoption	Incompletion of plan resulted in missed opportunity to mainstream climate adaptation agenda into 2014/2015 update of the Municipality's SDF Climate change mitigation and adaptation already being addressed indirectly through various projects, suggesting that mainstreaming already exists. Lack of emphasis on climate change relates to projects being framed through the lens of disaster management or economic efficiency rather than climate change response Upcoming opportunity to mainstream climate change response into 2017 IDP review	Climate Change included in EDM master planning documents prior to adaptation planning process – challenge is in mainstreaming climate change agenda in local-level IDPs Presentation by SALGA at third adaptation planning workshop on how to use 'Let's Respond' toolkit to mainstream adaptation interventions into municipal IDPs With support from the District, half of the B-municipalities have included climate change in their IDPs (Knysna, Mossel Bay and Hessaqua)

Chapter 5. Understanding municipal adaptation planning in practice

In comparing the adaptation planning processes that were undertaken by the Bergrivier, Drakenstein and Eden Municipalities, a number of emergent patterns can be highlighted regarding the factors that both support and inhibit such processes. This section aims to collate the results of the three individual case studies by analysing the different adaptation planning 'stories' in relation to four themes, identified through a thematic analysis. These themes include the following:

1. Perceptions of climate change and the environment / development divide
2. Leadership and the importance of climate change champions
3. Collaboration and knowledge co-production for climate adaptation planning
4. 'Learning by doing' for adaptation to climate change

The four themes listed above are discussed under their respective sub-headings and Table 3 situates these themes in relation whether they were overall barriers or enablers in each municipality. Tables 4 and 5 then provide a more detailed synopsis of the various barriers to and enablers of climate change adaptation that have emerged from the case studies.

5.1. Perceptions of climate change and the environment / development divide

Despite two decades of democracy since the country's emergence from apartheid rule, discourses around development and the environment in the South African context continue to be underwritten by binary perceptions of 'nature versus society', a lens that pictures economic growth and social upliftment priorities as being fundamentally divergent from those of environmental stewardship (Patel, 2009; Leck *et al*., 2011). This cognitive divide demonstrates historically-influenced path dependency (Barnett *et al.,* 2015), which is problematic for the implementation of adaptation measures as climate change is persistently 'pigeonholed' in the environmental sector (Taylor *et al*., 2014). This is despite the complexity of the issue and its tie to multiple, interdependent problems across sectors and scales (Koch *et al.,* 2007; Dombkins, 2014). Whilst some forward-thinking South African cities such as Durban (e.g.: Roberts *et al.,* 2008, 2010 and 2012) and Cape Town (e.g.: Ziervogel *et al.,* 2010; Cartwright *et al.,* 2012; Colenbrander *et al.,* 2013) have exemplified various ways in which developmental challenges can be tackled in a more climate-compatible manner, the important role played by local municipal authorities in institutionalising climate change is increasingly being realized. It is therefore largely among local governments that engrained worldviews need to be reshaped (Kiragu, 2010; Pasquini *et al.,* 2013).

An initial indicator of a failure among government bodies to shift away from this paradigm is the institutional location in which the climate change function sits, and hence the position from which the adaptation agenda is championed. As with departmental structures in the national and provincial government spheres, the mandate to address climate change at the

municipal level is seen as synonymous with local environmental affairs. Hence, it *"generally sits under the environmental scope of a municipality – if there is such a thing*" (Respondent A, WCG). In all three municipalities considered in this study, climate change was automatically understood as being a subsidiary function of environmental management. Even in the Drakenstein and Bergrivier Municipalities, in which there is no overarching environmental department, the climate change agenda was assigned to the individual responsible for environmental concerns. This arrangement did prove to have positive implications in terms of the collective enthusiasm for environmental sustainability among the three municipal champions, which in turn translated into a desire to drive the adaptation planning process. However, the propensity in these municipalities to view climate change as contiguous with the environment illustrates the persistence of historically-defined 'mental models' (Wolf and Moser, 2011; Barnett *et al.,* 2015), which can be associated with dilemmas such as conflict around where people's responsibilities lie: "[there is] *the challenge of people seeing it as an environmental issue, not as a transversal issue – that's another problem because people say 'why are you coming to speak to me?' … 'it's not my problem,* [when] *it's obviously your problem'"* (Respondent A, WCG).

The framing of climate change as an environmental issue is further problematic in light of the broader developmental context in which the municipalities are positioned, wherein demands for service delivery, economic growth and social upliftment tend to outweigh any concerns related to the environment (Patel, 2009; Saito, 2012; Pasquini *et al.,* 2013). This is particularly true in relation to climate change adaptation, which is "still widely perceived within municipalities as a call to respond to a vague and distant threat that complicates (and thereby delays, protracts and makes more costly) immediate tasks of extending public infrastructure and rolling out basic services as quickly, extensively and cheaply as possible to improve living conditions and economic activity in the near term" (Taylor *et al.,* 2014: 93). Climate change was acknowledged in all three municipalities as being important, and in some cases fundamental to the way in which development programmes are carried out. However, whilst the majority of interview respondents envisioned a more resilient and climate-considerate future society in theory, it was evident that more immediately pressing issues posed a challenge in terms of prioritizing and mainstreaming the climate adaptation agenda into development planning in a practical sense: "*remember, with climate change, your daily operations still stay the same."* … *"the moment you can't reach your infrastructure and service delivery needs within* [the annual municipal] *budget, then you have a budget deficit – then come and talk about climate change!"* (Respondent A, WCG).

Attempting to 'sell' climate adaptation projects to decision makers who are riddled with an array of problems becomes even more difficult when there is scepticism or uncertainty around the issue (Whitmarsh, 2011). Even though different people may be exposed to the same impacts and information on a regular basis, beliefs are found to be strongly influenced by dynamics such as individual characteristics, personal values and existing worldviews, perceptions of risk, as well as broader socio-political conditions (Adger *et al.,* 2009; Etkin

and Ho, 2007; Dow *et al.,* 2013). Climate change scepticism was generally not seen to be a problem in BRM, due to factors such as the Municipality's prior engagement with climate change issues through the ICLEI-LAB programme in 2010, the incorporation of climate scientists into the adaptation planning process, which improved the credibility and acceptance of the issue (Ziervogel *et al.,* 2016), as well as the fact that those leading the process identified the environment as being highly valuable. A lack of scepticism in the BRM may further be attributed to the fact that the region's economy is largely based on agricultural productivity and hence much of the population's income is directly dependent on the welfare of natural ecosystems and the services that they provide (BRM, 2015). This means that any shifts in the climate are highly noticeable as they impact people's livelihoods: *"We can see the changes in our agriculture – huge changes!,"* which has knock-on effects for the region as a whole: "*Almost 40% of our economy in Bergrivier is agriculture, and if the farmers are hit by the drought like now, it affects immediately the unemployment, immediately the whole economy in our area"* (Respondent E, BRM).

Conversely, in the Drakenstein Municipality, there seems to be a considerable degree of public disbelief about the extent to which environmental changes can be attributed to human-induced climate change. Whilst this cognitive trend does seem to be shifting with the increasing proximity and severity of climate-related impacts, acceptance of the science does not necessarily translate into institutional or behavioural change. This disconnect between perception and performance correlates with the observation that, over the last decade, "awareness of climate change has grown without translating into widespread individual action" (World Bank, 2010: 322). This problem was illustrated by one of the respondents from the DM, who acknowledged that *"I think that a lot of the officials … have sort of come to accept that climate change is here to stay. But I think that generally out there, there is still a lot of climate scepticism. I think that perhaps with this year and next year's threatened El Ninos* [and] *elevated temperatures, we can use this as a lever to convince people. But as soon as things go back to normal, people sort of say 'ah but what are you talking about?' So it's a difficult one to say whether our climate change plan is actually going to convince anybody of anything really. I think the realities – when they manifest themselves – people* [will] *say 'ok, fine we now believe you'*" (Respondent F, DM).

A behavioural pattern of waiting for costs to be incurred before action is taken is an unsurprising finding (e.g.: Anguelovski and Carmin, 2011; Ziervogel and Parnell, 2012; Pasquini *et al.,* 2015), particularly in light of the tendency among humans to prefer smaller, more immediate rewards than those which may hold greater value in the longer term, a trade-off that causes decision-making around climate change to be particularly difficult (Pasquini *et al.,* 2015): *"there is that perverse incentive where we have to wait on a disaster to actually draw on disaster funds … you've got to make the case for payback periods and that kind of thing"* (Respondent A, WCG).

Climate change scepticism varied somewhat in the Eden District and was only reported to be a problem with members of the older generation, as well as those with traditional /

indigenous (rather than western) belief systems. In general, however, the validity of the issue is not contested among government leaders due to the first-hand regularity with which they encounter climate-related impacts and the costs thereof, which have increased considerably in recent years: "almost 80% of the 'special perils' losses (relating to storm, wind, water, hail/snow) incurred by Santam in this area since 1996, occurred within the last five years" (Santam Group *et al.,* 2011: 6). This implies that climate change is 'epistemologically proximate' to decision makers in EDM, rather than being a distant or indistinct threat (Deppisch *et al.,* 2013).

Negative perceptions of climate change among municipal officials, combined with the challenge of balancing environmental objectives with development needs, means that local government decisions continue to be made in relation to trade-offs between environmental and socio-economic demands, resulting in a maintenance of the 'status quo' (Barnett *et al.,* 2015). Exacerbating this problem is the fact that the necessity for municipalities to respond to climate change exists within a non-mandatory policy context, where frameworks for adaptation exist but are not legislated (Spires, 2015). One official found this to be a key issue, stating that a lack of legislation is *"essentially the problem – there's no legislation that forces you* [to respond] *… At a national level there is a white paper, but it's all a 'nice to have', so until such time that there is …* [some form of legislation], *adaptation will not be prioritized*" (Respondent A, WCG). In this institutional context, it becomes vital to have someone championing the climate change agenda from within the municipality, so as to prevent political marginalization of the issue and to drive more effective responses that lead to tangible outcomes, beyond the development of an adaptation plan (Termeer *et al.,* 2012; Pasquini *et al.,* 2015; Turner, 2016).

5.2. Leadership and the importance of climate change champions

A number of studies (e.g.: Roberts, 2008; Burch, 2010; Ziervogel *et al.,* 2010; Maiello *et al.,* 2013) have illustrated that in cases where strong leaders or champions are driving a climate change response process, more positive outcomes have been achieved. For example, whilst a delay in adaptation action is often attributed to a lack of funding, capacity or insufficient information about possible climate-related impacts (e.g.: Biesbroek *et al.,* 2013; Eisenack *et al.,* 2014; Klein *et al.,* 2014), Measham *et al.* (2011) find that such barriers are overcome more easily when local leaders consider climate change to be an urgent issue and prioritize adaptation measures in their overall planning schemes. Moreover, Bass *et al.* (2011: 25) illustrate that, in Malawi, "champions for mainstreaming … are as essential as the institutional and financial resources that are already firmly understood as necessary for [the country's] sustainable development".

The presence of climate change champions in the three municipalities considered in this study was clearly shown to be a key factor in driving the adaptation agenda, particularly in terms of ensuring the effectiveness of the adaptation planning process, and in mainstreaming climate adaptation into master planning documents. Some of the participants in the CCMSP realized this, with one municipal official noting that *"if you don't*

have a champion in any genre of what you are trying to do, you are not going to succeed. You need a dedicated person to really drive the whole thing." (Respondent J, EDM). However, significant variances across the three case studies further indicated that the degree to which such positive outcomes are achieved is strongly dependent on a set of more nuanced factors, such as the institutional location from which the climate change agenda is championed, the degree of political support provided to the champion, as well as the nature of the individual climate change champion in question. These sub-themes are discussed below.

5.2.1. The institutional location from which climate change is championed

Taylor *et al.* (2014) maintain that leaders can be found in various places, which may be both internal and external to the municipality. For example, Ziervogel *et al.* (2010) found that in the City of Cape Town, there were various champions working to form links between climate change adaptation and urban water supply, including those from different government departments, NGOs and private consultancies. Whilst one of the requirements of the CCMSP was for municipalities to nominate a *local* champion, the strong leadership provided by the provincial initiator transpired to be equally as important. Her capacity to guide the process allowed for the opening of communication channels between different government levels and across sectoral divides, which confirms that champions can exist at an extra-local level.

However, whilst provincial representatives can play a potentially important role in local adaptation planning (particularly in terms of facilitating such processes), it remains essential for local champions to take ownership of the climate change problem beyond the planning stages. Where this does not happen, municipalities run the risk of incurring an 'implementation deficit' (Dupuis and Knoepfel, 2013), which in turn can lead to an overall 'adaptation deficit' (Frankhauser and McDermott, 2014). This problem is suggested in the statement that *"the workshopping process was a good way of* [planning] *and a good way of engaging various stakeholders – but only up until* [the provincial initiator] *left … Everyone got on with what they needed to do after* [she] *left, but there was a gap – a missing energy"* (Respondent J, EDM).

The local champions from all three case studies accepted their roles in driving the adaptation agenda, although the outcomes that emerged from each process varied considerably. In comparing the BRM and DM case studies, one can determine that a more beneficial outcome can be achieved if the climate adaptation agenda is steered from a 'higher' institutional standpoint within the municipality. The BRM process, in which an adaptation plan was rapidly finalized and mainstreamed, was championed by the Manager: Strategic Services, who was concurrently responsible for the IDP and worked from within the office of the administrative CEO. Her senior position provided her with a more influential role within the organisation and she was therefore able to influence the policy process and drive the rapid acceptance of the adaptation plan. The champion's position further allowed her to garner additional support for the adaptation agenda from senior

management, and the Municipal Managers in particular, as she expressed that *"I think I was very lucky in the sense that a lot of people kind of go 'ah, climate change and environmental stuff …* [is not important]', *and I had two Municipal Managers through the time that were both really supportive of it, which is very nice and actually very important"* (Respondent E, BRM). Turner *et al.* (2016) confirm that having this backing is essential, as the 'starting point' of embedding adaptation in an organisation "is to ensure that senior management understand, support and co-own the goals of adaptation and the chosen approach" (p.18).

The situation differed somewhat in DM, where the adaptation planning process was championed from within the Civil Engineering Department by the Municipality's Senior Engineer, who was afforded at the time the co-responsibility of environmental management. The champion attempted to highlight the importance of considering climate change in the Municipality's policies and practices. However, inadequate buy-in from elected officials, combined with the failure of senior management to prioritize climate adaptation, meant that the agenda became somewhat lost when the Municipality underwent a restructuring process. This caused confusion around the siting of the adaptation mandate and communication breakdowns across departmental divides, resulting in the adaptation plan being neither completed nor mainstreamed.

In the Eden Municipality, the climate change champion was located in the Environmental Department. However, a realization of the close tie between environmental and disaster management led to the process being unofficially co-championed by the District's Disaster Manager. The cross-sectoral championing of the climate adaptation agenda proved to be a constructive development, as the champions were able to share their knowledge, pool their resources and divide the responsibility for driving the process. Moreover, this arrangement contributed to relationship building and increased institutional learning around the transversality of the climate change issue, as one official realized that "*you can't divorce the different aspects of* [a] *problem and say it's just agriculture's problem for example – we are all in this together"* (Respondent K, EDM). This suggests the growth of a 'learning culture' in the Municipality, which is essential for effective adaptation responses in the longer-term (Lonsdale, 2012). As they began working together more closely during the adaptation planning process, the Environmental and Disaster Management Departments were also able to gain a clearer realization of their mandate (in terms of the 2002 DMA and its proposed amendments) to address climate change issues and impacts at the local level. This is important due to the lack of mandatory environmental or climate change legislation in South Africa, as well as in light of the tendency of local governments to maintain historically-influenced perceptions around 'green' issues (Taylor *et al.,* 2014).

The various advantages that arose from the cross-sectoral championing of EDM's adaptation planning process illustrates Pasquini *et al.'s* (2015: 68) observation that "municipalities can benefit by locating administrative champions for climate change in departments other than environmental departments, or at least in addition to." Moreover, although the EDM adaptation plan is still in draft form, a number of the B-municipalities in the District have

demonstrated the ability to champion the adaptation agenda from a grassroots level, incorporating some of the measures from the District plan into their local level IDPs. This shows that adaptation has started to be mainstreamed in EDM despite the delay in adopting the plan at the district municipality level. This positive development further indicates that climate change champions can play a key role in driving the adaptation agenda across both horizontal and vertical scales. This type of support is valuable as "o*ne of the difficult things in adaptation policy and implementation is that implementation happens very much at the local level and policy generally happens at higher levels. For various reasons, there is a lack of cohesiveness between them"* (Respondent B, WCG).

5.2.2. The importance of having political buy-in to the adaptation agenda

Key in enabling more effective ties between policy and implementation is the presence of strong political support (Pasquini and Shearing, 2014; Pasquini *et al.,* 2015). Whilst it is possible to champion climate adaptation from within the administrative section of a municipality (such as in the BRM), it is essentially in the hands of politicians that decisions around resource allocations lie and thus "engaging senior leadership and getting [political] 'buy-in from the top' is key for unlocking resources for, and coordinating approaches to, organisational adaptation" (Turner *et al.,* 2016: 19). Without sufficient practical support from political leaders, climate adaptation is too easily side-lined, as was the case in the Drakenstein Municipality. The value of having senior political figures (as opposed to administrative leaders or junior political or administrative officials) championing climate adaptation is illustrated in a study by Pasquini *et al.* (2015), who found that in Hessaqua Municipality (which is a B-municipality of the Eden District), strong buy-in from senior councillors resulted in rapid mind-set changes across departmental divides, leading directly to the spread of initiatives promoting sustainable development. Such positive outcomes may be also be attributed to the notion that societal responses to climate change are largely shaped by the discourses of those in leadership positions (Shove, 2010): *"if the top management says this* [the climate adaptation plan] *is not important, then everybody else will brush it away. So it really starts at the top"* (Respondent E, BRM). This observation is consistent with Measham *et al*'s. (2011: 900) study of municipal adaptation planning processes in Sydney, in which "it was clear that the opinions and value system of the mayor in particular, as well as the CEO or general manager, made a strong difference as to the opinions held by other participants."

5.2.3. Nature of the climate change champion

Carmin *et al.* (2012a) argue that whilst exogenous forces such as political mandates, financial incentives or system shocks can initiate institutional change, such changes are equally a force of endogenous factors, including the character and values of the individual driving the climate change agenda. The champions from all three municipalities had an existing interest in environmental and climate change issues, and demonstrated the desire to take ownership of the adaptation planning process. However, the significantly different outcomes of each process revealed that, over and above a passion for the topic, effective

mainstreaming of climate adaptation at the municipal level requires determination, innovation, lasting motivation and a willingness to learn. According to one municipal official, *"this comes down to the biggest thing: the difference in people … Societal values are so important when it comes to actually doing things on the ground, it is absolutely character-based"* (Respondent J, EDM). This belief aligns with Adger's (2009: 338) argument that the limits to adaptation "are endogenous and emerge from 'inside' society … It all depends on goals, values, risk and social choice."

Cavazotte *et al.* (2012) confirm that leadership effectiveness, as measured by the achievement of proposed outcomes, is influenced not only by a leader's behaviour or skills but by individual differences in personality traits. Those such as openness, conscientiousness and emotional intelligence are shown to have a strong positive correlation with the occurrence of transformative changes in social and organisational cultures. The importance of certain individual qualities was exemplified most clearly in BRM, whose champion illustrated how a local leader, even in the absence of in-depth knowledge about climate change, can enable an effective adaptation response. Motivated by her enthusiasm for the topic, she was not constrained by factors such as her limited knowledge of climate science or a lack of resources, but used her existing skill set to facilitate a collaborative process. Whilst some of these skills were learnt (for example, her ability to speak both English and Afrikaans and therefore being able to mediate between stakeholders across a language barrier), her effectiveness as a leader was equally due to her personal qualities – "[her] *personality when you* [meet] *her – she's just an angel!"* (Respondent E, BRM). One such quality was her willingness to co-operate and fully engage with the multidisciplinary team, rather than take control of the process. This is a highly advantageous trait, as "learning for adaptation requires suspension of the need to be an expert" (Lonsdale, 2012: 16).

The EDM climate change champion was similarly effective as a leader, demonstrating not only a strong passion for the topic but a desire to motivate B-municipalities to recognize and respond to climate change problems in a proactive way: "*I predict that the B-municipalities will say that they don't have the resources, they don't have the capacity and they cannot even cope with their present workload … but I am not willing to state these limitations as barriers for Eden because there is some way that adaptive management can always be achieved"* (Respondent J, EDM). Moreover, his positive attitude prevailed even in the face of trying circumstances: "[it can be] *very disheartening and frustrating, but if everything was plain sailing then it would be boring – so you need to always have these challenges to keep you motivated"* (*ibid.*). Whilst the DM champion was a strong and highly capable leader, his effectiveness in driving the adaptation planning process was subdued due in part to the institutional circumstances under which the process was carried out. Specifically, whilst he had achieved many successes during his time as an official within the Municipality, he was accustomed to having to struggle almost single-handedly to reach environmentally-related goals due to factors such as a lack of capacity and insufficient top-down support for such

matters. This problem was detected by a local official from another municipality, who observed that *"Drakenstein … were way ahead ten years ago on the technical environmental stuff. And they are lagging behind now and I think it's the focus – they choose to focus on different things. And it's their right – it's a council or top management team that wants to focus on other stuff"* (Respondent E, BRM).

These circumstances meant that the champion felt impelled to take individual ownership of the Municipality's climate change response, which led to difficulties in terms of engaging a multi-stakeholder group and resulted in a lack of dynamism during the adaptation planning process: *"he's always been one of these environmental champions and so he had this whole legacy of 'fighting for the rights of the greens'. So we had to say that 'no, we don't just want the greenies there, we want the engineers and the disaster managers and the health and the transport' … so it got a little bit better, but eventually we had to make one-on-one arrangements with some of the people"* (Respondent B, WCG). The DM champion was also strongly influenced by the rich institutional knowledge that he gained during his time in the Municipality, and the lessons that he had learnt from past endeavours. For example, whilst both the BRM and EDM champions agreed that it is important for governments to be mandated officially with the implementation of climate change response measures, the DM champion saw this to be less of an imperative: *"What I've found over the years is that when you've been legislated to have a piece of paper in place, it's been a rush job to comply and it's been put on the shelf afterwards. It hasn't actually been implemented. It comes out when it needs to come out* – [when] *the auditors come around … that's why I haven't actually been too concerned about having a specific plan in place*" (Respondent F, DM).

These 3 cases highlight the importance of climate change leadership and illustrate the nuanced dynamics thereof. However, Burch (2010: 22) notes that for effective and lasting adaptation responses, "climate change action must eventually become more independent of the vagaries of personality and political will that may render it fragile in the long run". Instead, municipalities should strive to work together collaboratively, so as to foster a culture of learning and achieve an integrated response to climate change wherein adaptation goals infiltrate into institutional practices across vertical and horizontal spheres (Lonsdale, 2012; Rauken *et al.,* 2015; Turner *et al.,* 2016).

5.3. Collaboration and knowledge co-production for climate adaptation planning

The championship of climate change from the local level has shown to be a contributor to more effective policy planning and the increased realization of adaptation goals. However, municipal champions work under certain constraints, including those such as resource limitations, knowledge deficits and an absence of concrete political backing (Leck and Roberts, 2015), all of which make adaptation challenging: *"It wasn't an easy or fluid process – it was difficult … and it's quite upsetting to see that many of the areas that we identified as priorities* [for adaptation] *were not really addressed"* (Respondent J, EDM)). In this context,

drawing on partnerships and networks for support can be a crucial enabling factor of improved adaptation planning at the sub-national level (Taylor *et al.,* 2014), and in fact "climate change networks have proven critical to the development of climate governance in municipalities" (Pasquini *et al.,* 2015: 68). For example, in Ethekwini Municipality, the establishment of collaborative partnerships with various national and international agencies has allowed for capacity building among municipal officials, which in turn has been a key factor in stimulating climate change response initiatives such as the Municipal Climate Protection Programme (Roberts and O'Donoghue, 2013). Combined with strong leadership from engaged officials, support from the Municipality's partners and actor-networks has led to opportunities such as overcoming financial barriers through the procurement of adaptation funding, as well as opportunities to learn from global leaders in the climate change field (Spires, 2015).

The complexity of climate change means that building such networks is key to enabling more effective adaptation responses (Dombkins, 2014). Policy planners are thus increasingly embracing a paradigm of collaborative governance (Emerson, 2011) that encompasses multiple forms of knowledge and is inclusive of a range of different actors across sectors and scales (Burgess, 2014; Swilling, 2014). This approach is particularly relevant to place-based adaptation planning scenarios, in which different stakeholder groups within a single geographical region may be vulnerable to similar climatic impacts. By working collaboratively, they can pool information and resources to improve the identification of issues and possible adaptation options (Andersson *et al.,* 2013; Steynor *et al.,* 2016). Such collaboration and co-production of knowledge is key to the design of the CCMSP, in which municipal adaptation planning processes are envisioned to be participatory and to garner broad-based input through multi-stakeholder workshops. However, the degree to which this objective was achieved in the three municipalities varied according to factors such as the emergence of opportunities for collaboration, the presence of existing relationships and networks, as well as the receptiveness of municipal stakeholders to collaborative engagements. In terms of the latter, a failure in DM to involve a broader group of non-state actors in the process was linked to a strong custody of the climate change mandate by officials in the environmental sector. Whilst ownership of the issue is necessary and should lead to positive outcomes (e.g.: Roberts, 2008; Moser and Ekstrom, 2011), in this context it acted as a barrier to realizing greater multidisciplinarity. Thus, the Municipality failed to find an appropriate balance between 'top-down' and 'bottom-up' approaches, as is advocated by Koontz and Newig (2014).

These conditions meant that the type of knowledge informing the DM's adaptation plan was limited to the administrative knowledge provided by government actors, and the explicit climate science supplied by the provincial initiator, through her ties at CSAG. This can be seen in the DM champion's response when asked about the sourcing of information for the adaptation plan, as he said that *"I think we relied on the work that province did … we just decided that we're not going to reinvent the wheel … just use what's out there and tap into*

that. [The provincial initiator] *had a whole shopping list of information that she needed … she panel-beated it into the plan and she gave it over to us"* (Respondent F, DM). This inhibited the level of convergence between the information provided by the provincial initiator and the locally-specific knowledge around climate vulnerabilities, which tend to have different implications for the multiple stakeholder groups affected. Such a unidirectional flow of information suggests that the DM's planning process was more closely aligned with a 'highway' of knowledge *transfer* rather than a more favourable arrangement in which there is a 'communal spider web' of knowledge *exchange* (Vogel *et al.,* 2007, Kasperson and Berberian, 2011, Swilling, 2014). According to Dombkins (2014: 24) such "traditional management methodologies, where planning is completed by experts and then sequentially implemented and delivered, are inappropriate for complex policies," which instead should recognize the role of multiple agents.

The adaptation planning process undertaken in BRM can be viewed almost as the antithesis to that of Drakenstein. The BRM's prior engagement in collaborative workshops through ICLEI's LAB programme meant that they had already been exposed to different ways of thinking and responding, and *"this is the reason that they are more open, amenable and receptive"* (Respondent B, WCG). Moreover, at the time of undertaking the adaptation planning process, the Municipality was afforded a number of capacity-building opportunities that were made possible through the incorporation of climate scientists, academic researchers and the ACDI interdisciplinary research group into the process. These partnerships allowed for a marriage between scientifically-rigourous and policy-relevant information, and enabled the establishment of strong network ties amongst the various actors. Such ties were also made possible by the presence of existing relationships between members of the core research team, some of whom had worked together in the past.

However, whilst the BRM's adaptation plan was developed in a collaborative manner, and the establishment of networks created an enabling environment for knowledge co-production, there was no opportunity for broader comment from the general public once the strategy had been drafted. This suggests that the Municipality failed to recognize the appropriate level of stakeholder engagement (i.e.: inform, consult, involve or collaborate) (Bradley, 2015) at different phases of the adaptation planning process. Whereas key stakeholders were 'involved' and 'collaborated' with during the planning process, the broader public was not 'informed' or 'consulted' at the end of this process. One of the core team members felt that this was disappointing, as although it is acceptable to keep the plan internal to the Municipality after completing the planning process, this approach is *"also interesting in the sort of 'age' of co-production and stakeholder engagement, where you want to provide those opportunities and make it possible so that you can say you've done that"* (Respondent D, researcher). This failure to engage the public in decision-making processes is not unique to the BRM, but is reflective of the broader South African policy environment (Njenga, 2009). Whilst governments are required by various pieces of legislation, including the Constitution (RSA, 1996) and the Municipal Systems Act (Act No. 32

of 2000), to carry out public participation processes, it has become the norm to adopt a 'tick the box' approach to realizing this mandate. Policy therefore continues to be made by governments in a top-down manner rather than gaining meaningful bottom-up input, despite the inclusion of various stakeholder groups in the early stages of decision making processes (Scott, 2009; Hoosen, 2010).

The incorporation of state and non-state actors from various sectors and disciplines is an important aspect of knowledge co-production and partnership-building (Swilling, 2014), as illustrated in the BRM. Additionally, however, sustainable responses to complex issues such as climate change require that both vertical and horizontal networks are formed across multiple government tiers and cross-sectoral spheres (Amundsen *et al.,* 2010; Rauken *et al.,* 2015; Vogel and Henstra, 2015). It is through such networks that institutional rules and norms are disseminated, which in turn can lead to behavioural changes (Carmin *et al.,* 2012a). The mainstreaming of the BRM's climate adaptation plan into the Municipality's IDP, and the alignment of this plan with provincial and national climate change policies, indicates an awareness of the role played by multi-level governance arrangements in developing an integrated climate change response, which is at the core of the NCCRWP (DEA, 2011). This was further demonstrated in EDM, where the provincial Climate Change Directorate engaged with stakeholders at the district scale, which subsequently allowed for adaptation responses to be filtered down to the B-municipalities who had also been involved in the District's adaptation planning process. For example, an official from Knysna Municipality explained that *"the work being done at the local level definitely falls within the district climate change adaptation plan … Each municipality faces its own sorts of challenges, so the District plan stems down to the local level"* (Respondent L, EDM).

The unpredictable manner in which extreme climate-related events occur in the Eden District (Nel *et al.,* 2014) means that it is essential for adaptation responses to be undertaken in a proactive manner. Amundsen *et al.* (2010) maintain that multi-level governance structures, in which information and responsibilities are shared among government bodies across different spheres, are crucial to affecting a shift away from a paradigm of reactivity. By maintaining links between different departments at the district and local scale, as well as the maintenance of connections with provincial and national networks, multi-level governance is enabled. This was illustrated by the District's Disaster Manager, who explained that "*if there is anything that cannot be solved at the district level, that is above the means that we have to solve it, then we would refer that to the provincial Disaster Management Advisory Forum … and if it's a national matter, the provincial will feed back to the national. So in that way you have a direct link from district level right up to the national. And now the revised legislation … will also require advisory forums at the local level. And in this way we will also get the local authorities' input"* (Respondent K, EDM).

Networks and partnerships across sectors and spheres can therefore enable collaboration and the co-production of knowledge, giving power to more effective climate adaptation responses (Bauer and Steurer, 2014). However, the effectiveness of these collaborative,

multi-stakeholder arrangements requires flexibility, a willingness to learn continually and the understanding that "actors do not necessarily adopt a predetermined role. Indeed, partnerships provide spaces for actors to behave in an unorthodox manner" (Broto *et al.,* 2015: 4).

5.4. 'Learning by doing' for climate change adaptation

Formal adaptation planning is a relatively new field, having emerged out of the increasing realization of the importance of creating an enabling institutional environment for adaptation (Berman *et al.,* 2012), coupled with the fact that regardless of mitigation commitments, climate change impacts will have significant consequences for vulnerable communities (Matthews and Caldeira, 2008; Mheel, 2009). However, contrary to mitigation, adaptation action is not yet widely legislated and therefore relatively few rules, frameworks or 'best-practice' examples for adaptation planning exist (Carmin *et al.,* 2012b). Moreover, given the context-specific nature of climate change impacts and adaptation needs, the formal institutions that do exist are not always directly transferrable across locations or scales (Anguelovski and Carmin, 2011). With an absence of formal mandates for climate change adaptation and in the context of limited resources, capacity and institutional support, local adaptation planning has been considerably experimental in nature; with policy planners drawing on various tools and networks to develop locally-appropriate responses to climate change (*ibid.*). This local level action is crucial in the South African context, as past endeavours have illustrated that "municipal innovation is often a key factor in catalyzing meaningful activity by both provincial and national governments" (Roberts, 2008: 537).

The WCG's CCMSP is telling of such an innovative and experimental approach to tackling climate change adaptation, as whilst the province has been a forerunner in developing strategies for responsive action (e.g.: WCG, 2008), this type of hands-on support for adaptation planning has not been provided to local municipalities in South Africa in the past. Moreover, the necessity for climate change adaptation has only recently started to gain ground in municipal planning, with delayed responses being linked to the tendency among South African local governments to prioritize the reduction of existing socio-economic development deficits over environmentally-related issues (Patel, 2009; Taylor *et al.,* 2014), as seen in the Bergrivier, Drakenstein and Eden Municipalities. In this context, the provincial team members resolved to design the CCMSP based on their existing knowledge of policy development, their past exposure to collaborative planning processes, as well as the experiences seen in alternative case studies such as Durban's Municipal Climate Protection Programme (Roberts, 2008). Thus, whilst the imperatives and expected outputs of the CCMSP were uniform for all three municipalities, the provincial initiator explains that "*the workshops are where things started becoming different – we didn't want to have a set template as we hadn't done this before. We wanted to be flexible and find out what works and what doesn't work"* (Respondent B, WCG).

An assessment of the workshops undertaken in the three municipalities confirms that this is where the 'experiments' began to emerge, as whilst each adaptation planning process included an initial inception meeting, their similarities ended at this point. Instead, unique approaches were adopted to acquire stakeholder input and develop the different plans. The BRM went on to engage participants in three multi-stakeholder workshops, whereas the DM's process was comprised of one workshop and a series of focus group interviews. EDM, on the other hand, held three inclusive workshops followed by individual workshops with a number of the B-municipalities. The different workshopping structures that emerged in each case are evidence of the flexibility with which the provincial team approached the CCMSP. In addition to a divergence in overall workshop structure, significant variances were evident in relation to factors such as the different conditions driving each adaptation response, the diversity of stakeholder groups participating, the degree of dynamism enabled in each process (e.g. the ability of facilitators to make adjustments to the workshop activities if they were seen to be less effective than anticipated), as well as the resultant policy outputs of each adaptation planning process. This individuality is illustrative of Dombkin's (2014: 30) observation that "it is difficult to standardize complex policy outcome, due to the high level of emergence; the policyowners' lack of directive control over implementation; and multiple delivery agents." According to the provincial initiator, the differences that emerged in each case were largely "*based on the nature of the municipality and the climate change champion in question. This reflected personality, political and power dynamics – we didn't impose on this but allowed it to come out and went with it, and we also responded to other opportunities that presented themselves"* (Respondent B, WCG).

The leveraging of opportunities came out most strongly in the BRM, where the Municipality was afforded the opportunity to collaborate with researchers and academics from various organizations (Ziervogel *et al.,* 2016). This proved to be an enabling factor of the highly effective adaptation planning process that emerged in this case, although this success can also be attributed to the local champion's openness to new experiences and willingness to learn from others (Lonsdale, 2012). In the DM, the champion identified the CCMSP as an excellent opportunity to build adaptive capacity, recognizing that *"if you get offered something like that … then you must be first in the queue, you must react immediately. And you can reap the benefits of it. And you build on these opportunities as you get them. A lot of the climate change stuff is opportunistic, and we take what we can when we can get it"* (Respondent F, DM). However, the DM's adaptation planning process was far less dynamic than that of BRM. Although the champion was enthusiastic about developing an adaptation plan, the substantial knowledge that he had gained from his time working in the Municipality resulted in a degree of 'entrained thinking,' which occurs when leaders become (at least partially) blinded to new ways of thinking by prior experiences or successes (Snowden and Boone, 2007). This inhibited the level of flexibility and innovation which played into the DM adaptation planning process. However, the provincial initiator reflected an understanding of this by explaining that, whilst it was expected of the champions to drive

the process, it was highly experimental and *"in this environment it would have been impossible for them to really own the process"* (Respondent B, WCG).

Similarly, in EDM, the champions embraced the opportunity to develop an adaptation plan and were highly engaged in the planning process, but felt that once the provincial initiator had left that there was a decline in the level of co-operation and commitment to the adaptation agenda, particularly among the B-municipalities. This was attributed to the absence of an adaptation mandate as well as factors such as limited resources to implement adaptation options. Nevertheless, the Municipality's ongoing need to build adaptive capacity obligates them to continue finding creative and proactive ways of prompting climate change responses at the local level. One way in which this is achieved is to change the framing of climate change, as "*if you're talking to councillors about 'climate change' they are not going to understand what you are saying, so we change the wording, we play with the words, to get funding"* (Respondent I, EDM). In this regard, a problem may be framed from the sense of managing the impacts of natural disasters, for example: *"recently in Wilderness, we had two houses almost falling into the sea – which can be termed a disaster in terms of safety, property risk etc. So we got together and looked at the problem from a holistic point of view*" (as opposed to looking at it solely through a climate change lens) (Respondent J, EDM). This is especially relevant when the current or potential impacts of climate change have economic consequences, and the District therefore encourages B-municipalities "*to look at climate change from a more local economic development perspective – in terms of unlocking the green economy, for instance"* (*ibid.*).

EDM is also committed to responding to climate change relatively early and is thus able to draw on past experiences in climate change adaptation to steer the development of future projects. As one District Official explained: *"In Afrikaans we have this saying, 'nood leer bid'* [necessity is the mother of invention] … *and the more we do, the more we are able to do, because we will have best practice examples to go by"* (Respondent K, EDM). This paradigm of 'learning by doing' aligns with Roberts and O'Donoghue's (2013) observation that, with the lack of appropriate models to guide action, an iterative or 'phased' approach is best suited to adaptation planning. Such an approach ensures that the understanding and experience gained through experimental processes can be applied to subsequent interventions so as to better shape the way in which thinking, planning and action takes place.

The value of such collaborative and experimental engagements therefore lies not only in their tangible outcomes (such as the formal adaptation plans that are developed), but also in the informal institutions that arise in the form of social learning and capacity building (Collins and Ison, 2009; Emerson *et al.,* 2011), which Armitage *et al.* (2011) argue are themselves a key form of adaptation. Whilst BRM was the only Municipality to finalize and adopt a climate change adaptation plan and successfully mainstream it into its IDP, it was agreed by officials from all three municipalities that being involved in the process was in itself a highly beneficial and educational experience. For instance, in Eden Municipality, a

district official explained that whilst some of the stakeholders had previously failed to understand how climate change related to the challenges that they face in their daily activities, *"through discussions in the workshops they came to realize how climate change feeds into these vulnerabilities. One municipality would identify something that another hadn't thought of, and vice versa"* (Respondent J, EDM). Similarly, in the Bergrivier, *"it turned out that most of their vulnerabilities … had some kind of climate element to them. They hadn't realized this before – it was a revelation to them"* (Respondent C, researcher).

In DM, the adaptation planning process gave rise to social learning not only for the municipal stakeholders, but for the provincial CCMSP team as a whole. Specifically, they realized the strong ties between adaptation and mitigation at the local level, and through engagements with local officials from the Municipality, decided that these response programmes should not be separated in the future: *"we soon realized that hey, this is silly, we are going to have to combine the whole lot. So it's been a learning curve for everybody"* (Respondent F, DM). This finding is analogous with Newig *et al.'s* (2016: 354) observation that "policy learning may result from examining one's past experiences or those of others through time." Such 'learning-by-doing' is essential in responding to climate change, the complexity of which calls for adaptive management techniques in which actors are flexible and can respond to changing situations in a dynamic way (Cartwright *et al.,* 2012; De Visser, 2012; Dombkins, 2014).

The BRM process contributed not only to social learning and the establishment of networks and relationships among stakeholder groups, but to capacity-building for individual participants. Reflecting on the process, one of the municipal officials spoke about the public that had been involved: *"I remember specifically* [a community member] *from Aurora – she is an activist and was very vocal during the anti-apartheid era. Now she is a 'socio-developer', and I am sure that this programme also contributed to her leadership skills because she was involved right from the start. And thinking back … she is a nice example of someone who was developed by this process"* (Respondent E, BRM). Meyer and le Roux (2006) argue that developing such capacity in South African municipalities is essential, as a lack thereof is a significant impediment to realizing more effective and sustainable solutions to environmental and social governance problems. They stress that "capacity-building clearly goes beyond the training of individuals to the strengthening of the institutions and frameworks within which they work" (*ibid.* 449). In this light, it is essential to capitalize on opportunities for institutional capacity-building, as it is these institutions that urge and enable behavioural change (Levin *et al.,* 2012), and through which transformative adaptation potential is leveraged (Ziervogel *et al.,* 2016).

5.5. Barriers to and enablers of climate change adaptation

This section provides a detailed discussion of the barriers to and enablers (or opportunities) of climate adaptation planning in the three municipal case studies. Whilst this discussion is not thematic in nature, a useful entry point is to conceptualize the four key themes discussed in sections 5.1 – 5.4 in relation to their overall position as either a barrier or

enabler in each municipality. Table 3 provides a visual aid in this regard. In addition to classifying themes as a barrier or enabler in each municipality, the table adopts a 'neutral' ranking to specify themes that did not play a significant role as a barrier or enabler, or where a theme may have had both positive and negative aspects in a municipality.

In line with the methodology of this study, the evaluation presented in Table 3 is relational across the three case studies, rather than corresponding to a universal model. For example, whilst officials in the BRM did undergo social learning through the adaptation planning process, the Municipality is given a neutral ranking for this theme as it is viewed in comparison to the degree of learning that was demonstrated in the DM and EDM processes. Similarly, DM is ranked as neutral with regards to the nature of the climate change champion. This is due to fact that the champion had a strong interest in and knowledge of environmental affairs and was willing and eager to engage in the adaptation planning process, which is an enabling factor. However, a simultaneous barrier in this regard was the strong ownership that he took of the process, which inhibited the diversity of stakeholder engagement and the degree to which knowledge and policy were co-produced.

Table 3: Summary of whether key themes acted as an overall barrier or enabler in each municipality's adaptation planning process, where B = barrier, E= enabler and N = neutral.

Key themes:		**Municipality:**		
		BRM:	**DM:**	**EDM:**
1. Perceptions of climate change and the environment / development divide		**E**	**B**	**N**
2. Leadership and the importance of climate change champions	Institutional location of champion/s	**E**	**B**	**E**
	Political buy-in to the adaptation agenda	**E**	**N**	**N**
	Nature of the champion	**E**	**N**	**E**
3. Collaboration and knowledge co-production		**E**	**B**	**E**
4. 'Learning by doing'		**N**	**E**	**E**

Biesbroek *et al*. (2014) note that a common idea of existing scholarly frameworks for adaptation (e.g.: Moser and Ekstrom, 2010; Lehmann et al., 2015) is that the first step to overcoming adaptive barriers is to identify them, as this lays the foundation for problem solving processes. An analysis of the adaptation planning processes undertaken in the Bergrivier, Drakenstein and Eden Municipalities indicates that there are a number of factors that inhibit climate adaptation at the local level (Table 4). Those most commonly cited by interviewees include resource and capacity constraints, as well as various formal and informal institutional barriers. Other barriers that emerged from the case studies were linked to a lack of stakeholder continuity, relational challenges and power dynamics, as well

as information constraints, all of which tend to align with the barriers that are identified in the broader literature on adaptation (Measham *et al.,* 2011; Klein *et al.,* 2014).

Whilst an initial identification of barriers is critical, Biesbroek *et al.* (2014: 109) further argue that "decision making on complex issues does not revolve around finding the best solutions, but rather around the articulation of problems and solutions between actors with different frames, values and beliefs". In this way, the potential for barriers to be transformed into enablers of adaptation is increased (Burch, 2010), as these participatory interactions can lead to changes in the underlying social practices (the cultures, values, behaviours and governance systems) that give rise to the policies and technologies impeding effective adaptation (Barnett *et al.,* 2015). The multi-stakeholder workshopping processes undertaken in the three municipalities allowed for the occurrence of such collaborative engagements by bringing together a range of actors with different backgrounds and interests, and creating a platform for discussion, debate and problem solving. The outcomes of these interactive processes highlighted not only the barriers to adaptive action but also a range of opportunities that have the potential to enable better climate adaptation planning at the local level (Table 5).

The opportunities which emerged most strongly include: ensuring the presence of sound leadership, locating champions in departments other than (or in addition to) environmental departments, garnering support from politicians and / or senior management, drawing on and/or building relationships and networks, embracing innovation and adaptive management techniques, changing the way in which climate change is framed, as well as mainstreaming the climate adaptation agenda. A further, interesting opportunity that was highlighted by one official in EDM was the potential for policy planners to improve and align their efforts by drawing on informal means of communication and establishing personal relationships. This correlates with Lonsdale's (2012: 18) observation that "the real value of networks is often from the informal rather than the formal interactions that occur and the development of trust between individuals."

Table 4: Summary of the main barriers / constraints inhibiting climate change adaptation planning in the Bergrivier, Drakenstein and Eden Municipalities.

Barriers / Constraints	Bergrivier Municipality	Drakenstein Municipality	Eden Municipality
Resources and capacity	Existing financial constraints aggravated by legal conflict with farmers ('worst case scenario' budget) No capacity for dedicated environmental / climate change department	Lack of financial resources a major cause of significant capacity constraints: Organogram indicates understaffing of 40 – 50% Lack of capacity and time means that existing climate change-related successes not documented Collapse of local environmental NGOs due to lack of leadership capacity	Lack of capacity to write policy at local level (i.e.: number of staff and knowledge constraints) Lack of capacity and resources to prioritize and implement adaptation projects
Institutional (formal)	Lack of legislation	Lack of legislation *not* seen as a problem (i.e.: this perception may be a barrier as it suggests a lack of drive to prioritize the adaptation agenda) Restructuring of municipal departments caused confusion around mandates and communication breakdowns Draft plan not completed – adaptation agenda not mainstreamed	Lack of legislation seen as a major barrier, particularly for B-municipalities Draft plan completed but not finalized/adopted
Institutional (informal)	Climate change perceived as an environmental issue and as an unfunded mandate	Lack of political buy-in Environmental management seen as a 'soft' function therefore lack of operational component Climate change perceived as an environmental issue and as an unfunded mandate Climate change scepticism among officials Prioritization of mitigation over adaptation	Climate change perceived as an environmental issue and as an unfunded mandate in B-municipalities Lack of buy-in / commitment in some B-municipalities Climate change scepticism among older community members and those with different cultural beliefs

Stakeholder representation / continuity	Irregular stakeholder representation at workshops Climate change champion left the Municipality therefore adaptation plan no longer prioritized	Lack of stakeholder diversity and continuity throughout Municipal restructuring caused shift in stakeholder responsibilities	Number of participants waned toward end of adaptation planning process and only four of the six B-municipalities took part in individual workshops Decline in priority of adaptation agenda after provincial initiator left
Relationships and power dynamics	Strained relationship with farmers Water sector had strong representation at workshops - resulted in dominant focus being on water-related issues, lack of voice from some other important sectors	Strong ownership of climate change by Municipal champion and lack of existing relationship between stakeholders and WCG created gap in communication channel Divergent ideas/perceptions among different stakeholder groups led to more focused group interviews – resulted in lack of knowledge co-production and poor dynamism	District and B-municipalities each prefer not to be directed by the other – power struggle Initial lack of strong relationship between environmental and disaster management departments Lack of integration between different sectors in Municipality meant that much of the planning had been happening in 'pockets'
Information	Climate change signal very ambiguous therefore high uncertainty about appropriate adaptation pathway No opportunity for broader general public to comment on adaptation plan after completion of planning process	Provincial initiator acted as 'middleman' between CSAG and Municipality – linear transfer of information from science to policy Insufficient perspective gained on locally- / sectorally-specific vulnerabilities due to lack of broader representation / stakeholder input at workshops	Provincial initiator / CSAG main source of information on climate change scenarios Insufficient availability of information on locally-specific climate change impacts Some officials lack an understanding of the real underlying causes of climate change scenarios, therefore adaptation / mitigation responses seen as an add-on not an add-in

Table 5: Summary of the main enablers of / opportunities for climate change adaptation planning in the Bergrivier, Drakenstein and Eden Municipalities.

Enablers / Opportunities	Bergrivier Municipality	Drakenstein Municipality	Eden Municipality
Leadership	Good buy-in from political and administrative leaders – enabled partly by institutional location of champion Champion was a highly effective facilitative and integrative leader – enabled an effective process as did not clash with workshop leaders Workshops provided opportunity for community members to exercise / build leadership skills	Champion initiated an environmental focus in the Municipality and drove the implementation of many existing projects related to environmental management / climate change	Support from political and administrative leaders Enthusiastic and committed champion Strong leadership emerged from disaster management: co-championing across sector departments enabled improved alignment of goals, shared resources etc.
Relationships and networks	Past relationship with ICLEI increased the Municipality's receptiveness to climate change issues Existing relationships among members of the core team presented opportunities to build partnerships. Involvement of key partners allowed for multidisciplinarity and co-production of knowledge Integration of scientists in core team increased credibility around climate change scenarios Multi-level governance framework – adaptation plan aligns with provincial and national strategic objectives	Champion had existing awareness of climate change issues due to past work with broader networks in Western Cape – enabled strong relationship to be established with province Ongoing support being provided to Municipality by provincial Climate Change Directorate for development of merged adaptation / sustainable energy plan	Champion and provincial initiator had worked together on past projects / forums Champion had good relationship with B-municipalities and strong network ties with organisations in environmental / conservation sector through GRI Multi-stakeholder workshops provided opportunity to realize network ties - development of project 'matrix' Informal communication channels enable networking and personal relationships enable easier exchange of information Strengthened relationship between environmental and disaster management departments - improved resources and capacity, stronger mandate for adaptation response (more direct link to DMA) Multi-level governance framework - climate adaptation responses filtered down from district to local level

Innovation, adaptive management and social learning	Planned workshop activities adapted to improve relevance and effectiveness based on emergent needs and information Champion open to new experiences and willing to learn from others Workshops enabled officials to realize how climate change feeds into range of vulnerabilities Individual learning led to capacity building for community members Opportunity to creatively overcome resource, capacity and knowledge deficits by providing research projects for postgraduate students – enabled by partnership with UCT	Workshop structure adapted to accommodate the need for more focused group meetings Realization of strong ties between adaptation and mitigation at local level resulted in shift in approach towards more holistic climate change response Acknowledgement that final plan will need to be continually reviewed and adapted according to changing circumstances	Additional round of workshops held with individual B-municipalities to allow for more refined adaptation planning support Workshops enabled officials to understand how climate change feeds into range of vulnerabilities – realization that they are pursuing a common goal Unofficial co-championing of climate change by Disaster Manager allowed for more integrated and proactive adaptation response Co -champions acknowledge the importance of learning from past projects and adapting responses accordingly to 'build back better' Champion acknowledges that innovative approach are needed to overcome resource and capacity constraints – values adaptive management, believes that there is always a way that this can be achieved
Framing of climate change		Framing climate change as a disaster risk response or local economic development imperative enables greater political acceptance and support	B-Municipality officials recognize that best way to get funding is to change the framing of climate change
Mainstreaming	Adaptation plan rapidly finalized and mainstreamed due to: (1) Mandate for climate change adaptation sits with Manager: Strategic Services who was also champion and responsible for IDP – enabled mainstreaming, (2) Finalization of adaptation plan appropriately timed to coincide with annual IDP review	Climate change already seen as fundamental to planning even though it does not appear in master planning documents Opportunity to mainstream climate change into 2017 IDP review	SALGA provided input at workshop on how to mainstream adaptation into IDP using 'Let's Respond' toolkit Adaptation mainstreamed into some local level IDPs through support from District

A comparative analysis of the barriers and constraints to adaptation in the three municipalities (Table 4) indicates that, whilst some of these are experienced commonly in all cases (e.g.: the tendency for climate change to be perceived as an environmental issue and as an unfunded mandate), most are in fact specific to the context in which each adaptation process is undertaken. For instance, the organisational restructuring that took place in the Drakenstein Municipality at time of the adaptation planning process was seen by provincial and municipal officials as a major factor inhibiting the effectiveness of this process. Whilst this is not something that occurred in either the Eden or Bergrivier Municipalities, each of these latter cases faced unique challenges that served to undermine the capacity to adapt in each locality. Examples of such constraints in this regard include the strained relationship between the farming community and local government in the BRM due to prior conflict, and an initial lack of integrated, cross-sectoral planning in EDM despite the region's vulnerability to natural disasters and the transversal consequences thereof. This observation is consistent with the notion that complex systems (and thus complex policy problems alike) (Dombkins, 2014) are non-linear and have multiple possible states of stability that give rise to variable emergent properties which change over time and across spatial scales (Holling, 1973; Poli, 2013).

Similarly, in comparing the enablers of and opportunities for adaptation (Table 5), one can determine that the potential for enhancing adaptive capacity depends on the circumstances underlying each municipality's adaptation planning process. These differed according to the specific drivers of climate vulnerability in each case, and were dependent on factors such as the presence of existing relationships and networks, the level of support provided by local political leaders, as well as the manner in which the climate adaptation agenda was championed from within the municipality. Moreover, the presence of dissimilar constraints and opportunities across the three case studies demonstrates that these factors are context-specific (Barnett *et al.,* 2015) and influenced by the 'local reality' in which adaptation takes place (Roberts, 2008; Eisenack *et al.,* 2014). Dilling *et al.* (2015) explain that an improved understanding of the local context will allow for more relevant and salient information to be produced, and in fact they identify "clarifying the decision context" as being "the first step to designing structured decision-making support systems" (p.6).

Whilst the adaptation decision pathways taken by the three municipalities were influenced by the underlying context, these contextual circumstances have, in turn, been steered by the institutional and cultural histories that have constrained or enabled the contemporary adaptation responses adopted in each case (Burch, 2010; Wise et al., 2014). Barnett *et al*. (2015: 6) consider path dependency to be a major trigger of barriers to adaptation, noting that "history shapes current decisions, and the changes identified for adaptation are impeded because they work against existing governance institutions. Path dependency manifests as resistance to changing the way things have always been done, even if business as usual seems to be increasingly maladaptive."

This concept of path dependency speaks strongly to one of the overriding adaptive barriers identified in this study: the fact that "climate change is not taking place in a space void of vested interests" (Garrelts and Lange, 2011: 200). The tendency for local decision-makers to prioritize competing policy objectives over and above climate adaptation responses was a common finding in all three of the municipalities, and is largely guided by the persistent framing of climate change as a 'green' environmental issue by both state and non-state actors. Whilst it is true in the South African context that the achievement of socio-economic development goals warrants significant attention and resource allocation (Patel, 2009; Saito, 2012); it is imperative that government leaders broaden their understanding of climate change to realize that, rather than being solely an environmental issue, it is one that is inherently socio-ecological in nature (Swilling, 2012).

The observation that the emergence of barriers to and opportunities for adaptation in each municipality were dependent on the specific underlying conditions present in each case relates closely to Lehmann *et al.'s* (2015) notion that 'first tier' adaptive barriers and opportunities tend to emerge from a set of 'second tier' variables. Fig.2 provides a visual conceptualisation of this finding by mapping the tiered variables in relation to two potential decision-making outcomes, namely: (a) transition to a 'well-adapting' society and (b) maintenance of the 'status quo'. The horizontal rows (i.e.: actor-specific characteristics, institutional environment and natural and socio-economic environment) represent the second tier variables that underlie or drive the occurrence of first-tier (primary) variables, which are represented by the vertical columns (i.e.: information, resources and incentives). The interactions and feedbacks between the first and second tiers give rise to the decision context. For example, a municipality may cite a resource-related variable such as insufficient financial means as a barrier to adaptation and, as a consequence, fail to take adaptive action. However, this first-tier variable is driven by second-tier factors such as institutional and organisational values and preferences which, in part, determine the allocation of resources. Moreover, variables interact not only between first and second tiers, but may do so within tiers. For instance, the presence of competing policy objectives may be contingent on the level of socio-economic development, both of which are considered second tier variables.

The decision pathway that is eventually taken is subject to whether these variables are barriers or opportunities in the specific municipality – and they could be either, depending on the local context. For example, the institutional variable around the location of the climate change function was an enabling factor in the BRM, where the adaptation mandate was driven by the champion from within the office of the CEO. Conversely, this same variable was a barrier in DM, where a municipal restructuring process caused departmental fragmentation and thus confusion around the siting of the adaptation mandate. These factors contributed to the different adaptation planning outcomes that emerged in each municipality.

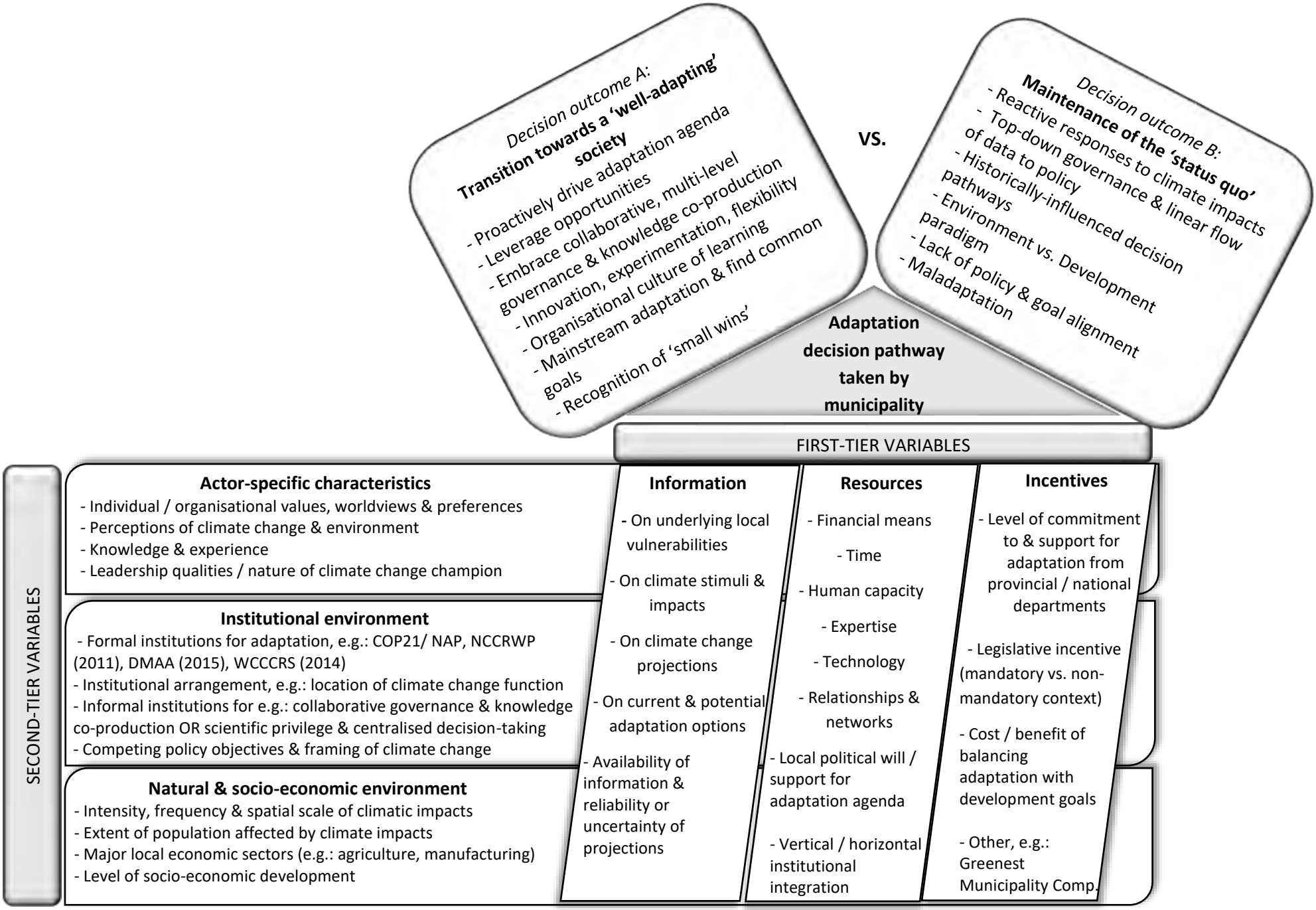

Figure 2: First and second tier variables interact to influence adaptation decision-making pathways in municipalities. Depending on whether each variable is a barrier or enabler in the specific context, it will contribute either to decision outcome A or B (Source: adapted from Lehmann et al., 2015)

In line with Lehmann *et al.* (2015), the framework depicted in Fig.2 is visualised as being descriptive rather than normative in nature, and therefore does not assume that an absence of barriers will result in the adoption of a positive decision-making pathway or a successful adaptation planning outcome. Rather, it is aimed at provoking deeper insight into the barriers and enablers of adaptation by highlighting the importance of feedbacks and interdependencies between and among variables. In this way, it provides a first step toward addressing the knowledge gap identified by scholars such as Biesbroek *et al.* (2015) and Leck and Roberts (2015), who call for research and practice to transcend the simple identification and classification of barriers and opportunities and reach a greater understanding of 'how' and 'why' these factors arise.

Drawing on Lehmann's *et al*.'s (2015) concept, one can argue that in order to change historically-defined, path-dependent development trajectories and truly overcome adaptive barriers, there needs to be a shift in the underlying factors driving these unsustainable pathways (Garrelts and Lange, 2011). Jones (2011: 68) notes that such change may be uncomfortable, as "actors will find themselves held accountable for aspects of their work that used to slip beneath the radar, such as the political and relational challenges of implementation." However, if appropriate solutions to complex policy problems are to be realized, then decision makers need to take responsibility for this complexity and experiment with different ways of working alongside the constraints that they face (*ibid.*). One way in which this could be approached is to test the use of a bridging concept to establish a common conceptual language around climate adaptation (for example, one could draw on Deppisch and Hasibovic's (2013) framework of SER thinking). This tool would potentially build a mutual understanding of problems and enable common goals to be found, thus assisting in overcoming challenges such as path-dependent worldviews, multiple different stakeholder perceptions or divergent values and priorities. Finding these complementarities may then increase the likelihood of realizing well-informed and socially-relevant decisions, and provide robust solutions to complex policy problems (Swilling, 2014).

In discovering new pathways for adaptation, decision makers should remain aware that the changes that are made do not necessarily have to be transformational (Pelling, 2011). Nor do these changes always necessitate additional effort, capacity or finances, or call for the disregard of local development needs. Rather, building local-level resilience to climate change in a multi-stressor context requires that adaptation responses become integrated into existing governance functions and discourses by mainstreaming climate change objectives into the overall approach to policy and planning in municipalities (Lebel *et al.,* 2012; Pasquini *et al.,* 2015). Mainstreaming is associated with a variety of benefits, including not least its role in overcoming issues around 'boundary definition' (Henstra, 2015), which arise in cases such as the Drakenstein Municipality where many of the climate change-related actions already being taken are prioritized for reasons other than explicit climate adaptation or mitigation (for example, to address disaster risk or economic efficiency) (Tompkins *et al*., 2010).

Mainstreaming adaptation was in fact the ultimate goal of the CCMSP, as noted by the provincial initiator in her statement that *"the municipalities don't have the money or capacity to take on something new. So* [we have to ask] *how can we take what they do already and just slightly change the way that they do stuff?"* (Respondent B, WCG). Giving the example of storm water, the provincial initiator explains that municipalities already have to maintain storm water drains by clearing leaves to prevent blockages from occurring. However, budget and capacity constraints mean that some municipalities only do this once a year, which is insufficient and results in huge problems with flooding. The costs amounting from floods often far exceeds the budget requirements for simply taking a proactive approach and cleaning storm water drains bi-annually. Similarly, with shifts in seasonality, leaves might begin to fall at different times of the year. Adaptation in this context may therefore require municipalities to shift their drain maintenance procedures by a few weeks to accommodate the dynamics of seasonal changes or respond to seasonal climate forecast information to prepare better. *"So it's not that you need to employ a new person or have a massive amount of new budget or do anything new or different – it's just to do the stuff that you do slightly differently ….* [And] *focusing more on the stuff that you already do and tweaking that makes it an easier entry level for adaptation"* (*ibid.*).

Chapter 6. Conclusion

The central aim of this dissertation has been to assess the factors and actors that affect the development of climate adaptation plans at the municipal level. This research responds to the renewed emphasis on planned adaptation that has arisen in climate change policy discourses (UNFCCC, 2015; Vogel and Henstra, 2015), wherein decision makers have progressively recognized the importance of establishing institutions that facilitate longer-term adaptive capacity building (Adger, 2008; Berman *et al.,* 2012). Notwithstanding the importance of a coherent global climate change response, the crucial role played by local governments in driving proactive adaptation planning has been increasingly demonstrated by innovative, pioneering cities and municipalities around the world (e.g.: Carmin *et al.,* 2012b; Broto and Bulkeley, 2013; Anguelovski *et al.,* 2014). This highlights the growth in understanding that, whilst climate change is a large-scale phenomenon, its impacts converge in localities, which necessitates that adaptation responses are reflective of local environmental, institutional and socio-political realities (Roberts, 2008; Kiragu, 2010; Dilling *et al.,* 2015).

Given the recent focus, it is not surprising that scholars have detected that there is insufficient research that is relevant to the practice of local-level adaptation planning (Moser, 2010; Baker *et al.,* 2012). Specifically, there is a gap in looking beyond a superficial identification of adaptive barriers and opportunities to discover their sources, and consider the more context-specific, endogenous factors that play out in these complex institutional processes (Biesbroek *et al.,* 2015; Leck and Roberts, 2015). In addressing this gap, a place-based approach has been adopted to consider the factors and actors that influenced the outcomes of the adaptation planning processes that were carried out between 2012 – 2013 in the Bergrivier, Drakenstein and Eden Municipalities, under the auspices of the WCG's CCMSP. In light of the nature of this programme, which takes a participatory, multi-stakeholder approach to adaptation planning, the study was framed from the perspective of knowledge co-production and collaborative governance (Emerson *et al.,* 2012; Hegger *et al.,* 2012).

Such collaborative approaches to decision-making have increasingly become the 'norm' in policy and planning processes, which have largely undergone a paradigm shift away from a mechanistic worldview towards one that recognizes the complexity of compound policy problems such as climate change (Cilliers, 2000; Jones, 2011; Dombkins, 2014). In practice this has meant that, rather than being informed by top-down management and disjointed science-policy interfaces (Roux *et al.,* 2006; Vogel, 2007; Kasperson and Berberian, 2011); formal institutional development is occurring in environments that promote transdisciplinary research, knowledge democracies, stakeholder heterogeneity, participatory engagements and collaboration across hierarchical governance levels (Pohl *et al.,* 2010; Luyet *et al.,* 2012; Leck and Simon, 2013; Bauer and Steurer, 2014; Swilling, 2014). This framing required an understanding of *who* was involved in the policy processes in the three municipalities and *how* these actors were engaged (Pelling, 2011), and it thus

contributed to meeting objective 2 – '*to explore the role of key stakeholders in the co-production of climate adaptation plans'.* The degree to which this objective was achieved was inhibited by certain factors such as time and resource limitations. Whilst the most crucial stakeholders from each municipality were interviewed, these constraints prevented consultations with a broader actor network. Tensions surrounding a municipal restructuring process in DM, coupled with strong ownership of the adaptation planning process by the climate change champion, also meant that gaining access to stakeholders was difficult in this case.

Such challenges occur not only in research engagements but in the practice of collaborative adaptation planning, which has shown to be a highly challenging process associated with multiple, interacting barriers that do not accommodate straightforward solutions (Eriksen *et al.,* 2011; Andres, 2013; Biesbroek *et al.,* 2014). By looking comparatively at the development of climate adaptation plans in the three municipalities, this study has highlighted a number of barriers that have emerged in local policy and planning procedures, as well as the various opportunities that exist for these processes to be improved in the future, thus achieving objective 4: '*to identify the barriers to and opportunities for climate adaptation planning at the municipal scale.'* An inductive analysis of the qualitative data collected from an inception meeting, 14 semi-structured stakeholder interviews and an ongoing document analysis process resulted in four major themes being identified. These related to: (1) stakeholder perceptions of climate change, (2) the importance of effective local leadership, (3) knowledge co-production and (4) 'learning by doing'.

The results of this thematic analysis highlighted that the degree to which the goal of the CCMSP was realized was strongly dependent on the local conditions under which the programme was carried out, which served either to support or undermine a fruitful engagement process. The dissimilar outcomes of each municipality's adaptation planning process suggests a correlation with the theoretical understanding that 'adaptation is local' and that 'context matters' (Agrawal, 2010; Dilling *et al.,* 2015), and is further indicative of the nonlinearity that is characteristic of complex policy problems (Cilliers, 2000; Dombkins, 2014). In this regard, success was shown to be linked closely to the presence of an enabling municipal environment in which there was sufficient political will and a passionate climate change champion dedicated to driving the process. This finding contributes to the growing number of studies that demonstrate the influential and catalytic role that can be played by effective leaders who proactively drive local adaptation agendas (e.g.: Roberts, 2008; Anguelovski and Carmin, 2011; Carmin *et al.,* 2012a; Pasquini *et al.,* 2015; Turner *et al.,* 2016).

The local municipal environment in Bergrivier proved to be the most favourable to adaptation planning out of the three case studies, as suggested by the relative speed with which its Climate Adaptation Plan (BRM, 2014) was developed and mainstreamed. However, this outcome was also due to the existence of various timely prospects for collaboration and knowledge co-production, which allowed the BRM to engage constructively in transdisciplinary inquiry and to build partnerships and networks with external stakeholders

and research institutions. These are opportunities that were not directly afforded to either DM or EDM at the time, which meant that there was comparatively less scope for these latter two municipalities to collectively overcome complex problems and realize a common adaptation objective.

In addition to such limitations, the results of the study indicate that local adaptation planning was constrained by various barriers that stemmed from sources both external and internal to the municipal environments, as has been demonstrated in some of the broader adaptation literature (e.g.: Carmin *et al.,* 2011; Jordan and Huitema, 2014; Massey *et al.,* 2014). Thus, whilst certain barriers (e.g.: financial constraints) were found to be common across all three municipalities, others were highly context-specific; particularly those which arose as a result of more endogenous factors such as individual stakeholder values and objectives. The barriers which emerged most clearly in the analysis of the three case studies encompassed both 'first-tier' and 'second-tier' variables (Lehmann *et al.,* 2015). Recognizing the interactions between these variables and understanding the role that they play in decision making processes contributed to meeting objective 3: *"to unpack the challenges that arise during municipal climate adaptation planning processes."* The most prominent barriers that arose included the following: insufficient financial and human resource capacity to affect a dedicated climate change response, an absence of formal institutions (particularly mandatory legislation) to motivate and guide local adaptation planning, a lack of political will to institutionalise adaptation, insufficient cross-sectoral integration, poor stakeholder representation and continuity throughout the adaptation planning process; as well as a lack of employee continuity in some organisation's organogram profiles more generally, climate information and time constraints, relational challenges and variable power dynamics.

Strongly affecting the level of acceptance of, and thus drive behind, the adaptation agenda was the role played by individual stakeholder perceptions around climate change. Whilst the respondents from all three municipalities found this to be a topical issue, its importance was generally seen as being secondary in relation to the primary mandates of local government bodies, which are largely dictated by a focus on economic development and service delivery. This problem is linked to the tendency for climate change to be viewed as contiguous with environmental or 'green' concerns, the prioritisation of which holds the (historically-derived) legacy of choosing the 'environment over people' (Taylor *et al.,* 2014). This finding is indicative of the salient role played by social capital, path dependency and informal institutional dynamics in shaping adaptation responses (Adger, 2009; Garrelts and Lange, 2011; Biesbroek *et al.,* 2015; Leck and Roberts, 2015).

Scholars (e.g.: Lebel *et al.,* 2012; Pasquini *et al.,* 2013 and 2015; Turner *et al.,* 2016) have increasingly highlighted the potential to overcome such problems by embedding climate change into overall municipal planning, so as to form a strong tie between adaptation and development objectives. Such 'mainstreaming' of adaptation is in fact a core imperative of the CCMSP, and was shown in this study to be one of various opportunities for enabling a

more effective planning process. Energizing this approach is crucial, given both the socio-economic conditions and non-mandatory policy environment in which South African municipalities currently undertake climate adaptation planning (Patel, 2009; Saito, 2012; Pasquini and Shearing, 2014; Spires *et al.,* 2015). Notable other opportunities that reflect those cited in the literature included: the presence of strong leadership and support 'from the top' (e.g.: Carmin *et al.,* 2013; Anguelovski *et al.,* 2014), locating climate change champions in departments other than, or in addition to, environmental departments (Pasquini *et al.,* 2015), drawing on and/or building relationships and networks to co-explore and co-produce knowledge and policy (e.g.: Bidwell *et al.,* 2013; Steynor *et al.,* 2016; Ziervogel *et al.,* 2016), embracing innovation and adaptive management techniques (e.g.: Rodima-Taylor *et al.,* 2012; Jordan and Huitema, 2014), using informal communication channels (e.g.: Pahl-Wostl, 2009; Lonsdale, 2012) and changing the way in which climate change is framed (e.g.: McEvoy *et al.,* 2013; Duncan, 2016).

Moreover, there was a strong agreement amongst stakeholders that in spite of the challenges and failures that were encountered, the *process* of adaptation planning was, in itself, highly beneficial. Importantly, it served as a new platform for multiple actors to engage in discussion, debate and problem solving, which resulted in substantial social learning and awareness-raising around the issue of climate change. Such learning outcomes were shown not to be restricted to local stakeholders, but instead were shared by the WCG's CCMSP team. Importantly, the provincial representatives realised that future policy planning processes would benefit from shifting toward a more integrated approach to climate change response planning in which both adaptation and mitigation objectives are recognized, and which is undertaken from the district rather than local municipal scale. These benefits highlight the theoretical understanding that adaptation actions do not necessarily have to be transformational, as any effort made to build adaptive capacity and transition toward a more climate resilient, 'well-adapting' society is a sign of progress (Tompkins *et al.,* 2010; Armitage *et al.,* 2011; Pelling, 2011; Taylor *et al.,* 2014).

The recognition of the various opportunities in the three case studies signifies the realization of objective 1: *'to document the institutional, political and social conditions that aid climate adaptation planning in municipalities.'* These findings suggest that the success of future adaptation planning processes under the CCMSP will be contingent on the presence of effective local leadership and strong political will, as shown in other case studies (e.g.: Roberts, 2010; Carmin *et al.,* 2013; Pasquini *et al.,* 2013). Interestingly, neither of these specific underlying factors were explicitly addressed by the Province. So although the CCMSP requires municipalities to identify a champion and provides ways to assist adaptation planning, these efforts may be in vain unless the programme places greater emphasis on tackling the underlying issue of inadequate political will, and attempts to have more of an impact on the *type* of leadership that municipalities provide (Meijerink and Stiller, 2013; Leck and Roberts, 2015). Future adaptation planning engagements may therefore need to explore different strategies to address these causal barriers.

In opening up this 'black box' of decision making (Biesbroek *et al.,* 2015), there should be equal consideration afforded to the more 'invisible' and nuanced dynamics that affect policy development, including the social construction of knowledge, differential problem framing, conflict and adversity, as well as innovation and cycles of adaptive learning (Pahl-Wostl, 2009; Jones, 2011; Leck and Roberts, 2015). This complex policy environment necessitates the maintenance of a flexible approach to planning that remains cognizant of the specific context in which each process is taking place (Tschakert and Dietrich, 2010; Jordan and Huitema, 2014; Dilling *et al.,* 2015). This will mean both reflecting on the experiences gained from these initial three adaptation planning 'experiments' (Bulkeley *et al.,* 2013), and 'learning by doing' as new collaborative planning processes are undertaken elsewhere in the province (Tschakert and Dietrich, 2010).

The results of this study have highlighted various factors that may serve to inform future adaptation planning processes in municipalities. These 'policy lessons' and the implications thereof have been summarised in Table 6. Recommendations have also been suggested in this regard, and are based on both the experiences of the various stakeholders who were involved in the CCMSP in Eden, Bergrivier and Drakenstein Municipalities, and on the broader literature related to adaptation planning.

Table 6: *Key policy lessons, the implications thereof and recommendations for future adaptation planning processes in municipalities*

No.	Policy Lesson	Implications	Recommendations
1.	The success of municipal adaptation planning processes are largely contingent on two preliminary conditions: 1. A strong sense of political will and buy-in to the adaptation agenda from politicians; and 2. Appropriate leadership from dedicated climate change champions.	Without adequate political will / buy-in to the process, any efforts from municipal officials / departments to affect an adaptation response may be in vain. Provinces play only a facilitative role in municipal adaptation planning processes. Municipalities therefore need to take ownership of the plan and its implementation once the engagement process is complete. This requires climate change champions to drive the adaptation process going forward. However, it is not only the presence of leaders / champions that are important, but the *type* of leadership qualities that they have.	Future adaptation planning processes should place more of an emphasis on tackling the underlying issue of inadequate political will, which needs to be addressed first and foremost. A greater emphasis should be placed on the need to identify champions who not only have in interest or stake in the climate change agenda, but who have demonstrated facilitative and integrative leadership skills, who are humble, who are willing to learn continuously, who embrace diverse perspectives and who accept change. The implications of this policy lesson suggest the need to address not only the 'visible' barriers to adaptation, but also the underlying factors that cause adaptive barriers to arise (i.e.: both 'first tier' and second tier' variables should be considered).
2.	It is of key importance to link climate change adaptation with other municipal functions, development priorities and / or existing initiatives.	While there is an increasing emphasis being placed on the role of local governments in responding to climate change, it is important to note that, in SA,	Climate change adaptation needs to be mainstreamed into master planning documents, particularly the

		they operate under significant resource and capacity constraints. Hence, if climate change adaptation fails to be embedded in the existing functions of municipal departments, then it is unlikely to be seen as a priority. Rather, it has the tendency to be perceived as an unfunded mandate or an additional function (i.e.: it is seen as less important / urgent than other development priorities). Moreover, if climate change is situated only within environmental departments, then it is largely perceived as a 'green' issue (i.e.: a luxury or handbrake on development).	IDP, as it is from this document that budget allocations are determined. Climate change portfolios / champions should be situated in departments other than, or in addition to, environmental departments. For example, in the office of the municipal manager so that it is understood to be a cross-cutting (rather than just environmental) issue. Existing projects or initiatives that are undertaken for economic or other reasons, but are climate change-related, should be identified and the link made more explicit. This will allow officials to understand how climate change may affect their roles, and how adaptation can support the achievement of their goals and priorities.
3.	A more holistic, integrated approach to municipal-scale climate change planning is needed.	At the local level, adaptation initiatives generally have mitigation co-benefits and vice-versa.	Rather than separating adaptation and mitigation (energy) responses into separate plans, overall climate change response plans should be developed.
4.	Collaboration and knowledge co-production are essential for enabling more successful municipal climate change responses.	Climate change is a complex policy field, and so too is the context in which climate change response planning takes place (i.e.: climate change imperatives have to compete with various other municipal priorities; different stakeholder groups have diverse needs, priorities, values etc.; the social, political and environmental context is always changing; etc.). Hence, if a collaborative approach is not taken, then climate change responses are less likely to be well-informed, cognizant of the current context and meaningful to / accepted by stakeholders with diverse interests and concerns. Through collaboration and the building of relationships and networks, new (i.e.: more climate-conscious) institutional rules and norms can be more broadly and effectively disseminated, which in turn can lead to attitudinal / behavioural changes over time. Although there are various benefits of collaborative approaches, municipalities should also remain aware of the challenges in this regard.	A broad array of stakeholders should be engaged in planning processes. They should be representative of both state and non-state organisations across both vertical and horizontal scales. Opportunities to involve external stakeholders such as scientists and researchers should be leveraged. The different backgrounds, values and priorities of stakeholders should be considered. Multiple types and sources of knowledge should be drawn on and incorporated into the planning process. Knowledge should be shared among multiple stakeholders rather than transferred in a unidirectional manner (e.g.: from 'science' to 'policy'). Climate change planning processes should be undertaken from the district rather than local scale. This would enable municipalities to develop a broader network for support, and would enable a deeper influence to be achieved as districts feed down climate change imperatives and / or lessons to B-municipalities.

			Partnerships should be formed with other actors and / or departments (e.g.: environmental and disaster management). Stakeholders should build on past relationships, develop new relationships and extend networks of communication and support for planning / responding to climate change. Municipalities should find a balance between 'top-down' and 'bottom-up' approaches and determine the appropriate level of engagement for different stakeholder groups at different stages of the planning process. This will allow the limitations of participation to be avoided and enable a more effective engagement process that is more relevant and meaningful to stakeholders.
5.	Municipalities need to remain flexible, embrace a culture of 'learning by doing' and create an enabling environment for experimentation, so as to build resilience to uncertainty and unexpected change.	Municipal adaptation planning is a relatively new policy field and therefore no 'templates' exist to guide planning processes. Moreover, whilst lessons can be learnt from the experiences of others, each context is unique and therefore the 'local realities' need to be taken into account.	Municipalities should embrace any opportunities for support, collaboration and / or external input, be willing and open to learning from others and allow for planning processes to be dynamic (e.g.: adapt workshop activities if they are not working well). Stakeholders should recognize that climate change projections and impacts are uncertain. They should therefore remain flexible in their approach and review plans / activities regularly in order to adapt to changing contexts. 'Small wins' should be recognized and celebrated. Unconventional approaches such as using informal communication channels (e.g.: text-message conversations over 'Whatsapp') can allow information and lessons to be shared more quickly and easily among local officials, and can contribute to relationship-building. An innovative approach is often required if municipalities are to effectively respond to climate change under resource, capacity and other constraints. For example, being proactive in applying for funding for projects from outside organisations, and changing the framing of climate

			change to appeal to the priority areas of politicians / decision makers (e.g.: emphasizing the local economic development or disaster mitigation co-benefits that adaptation / mitigation responses may have).

To inform more successful processes of experimental adaptation planning in practice, future research agendas should build on the growing knowledge base around the barriers to and opportunities for planned adaptation, and focus more on learning about the *design* of these policy processes (Newig *et al.,* 2016). Such research could explore the design of existing adaptation planning procedures in order to inform and improve future processes of this nature. However, given the context-specific and localised nature of adaptation (Dilling *et al.,* 2015), the focus should remain on the *principles* of adaptation planning and policy design that promote collaborative governance and knowledge co-production, and which call attention to the underlying, 'invisible' properties of municipal climate governance (Leck and Roberts, 2015). This will contribute to addressing the lack of existing adaptation planning frameworks that is a consequence of the novelty of the discipline (Carmin *et al.,* 2012a). In exploring this novel field of adaptation design, researchers should investigate the potential to integrate 'bridging concepts' into the adaptation planning process, so as to find a common adaptation 'language' that can be used to inform the way in which stakeholders from multiple backgrounds and with variable values and worldviews perceive, process and deal with complex issues (e.g.: Deppisch and Hasibovic, 2013).

Given the above comments and the limitations of this study with regards to stakeholder engagement (as described in section 3.5), future research endeavours would benefit from additional engagement with a wider stakeholder base. This would allow researchers to develop a more holistic and inclusive understanding of collaboration in the context of municipal adaptation planning, and would also ensure that a greater diversity of perspectives are included, thereby strengthening the results of the process. Whilst it was beyond the scope of this study, further research would also benefit from a more in-depth consideration of vertical and horizontal governance interactions, particularly in terms of how these interactions (or lack thereof) support or undermine the effectiveness of adaptation planning processes in municipalities. Finally, given the growing body of empirical research related to local adaptation planning (e.g.: Carmin *et al.,* 2009; Roberts, 2010; Carmin *et al.,* 2012; Anguelovski *et al.,* 2014; Lehmann *et al.,* 2014; Chu *et al.,* 2016), there exists an opportunity to synthesise and build on this related work in order to identify gaps in the research, as well as further policy and / or other recommendations.

In conclusion, it is important that researchers and decision-makers alike appreciate climate change adaptation as an ongoing, incremental process rather than a concrete goal or end-point (Pelling, 2011; Taylor *et al.,* 2014). Such processes should focus on the 'small wins' that lead to learning, trust building and commitment, and which feed back positively into collaborative governance processes (Ansell and Gash, 2008). The provincial initiator

appreciates such small steps as being demonstrative of adaptive progress, as expressed in her statement that: "*I was very happy that we achieved that, in all three* [municipalities] *actually – just the fact that we had the conversation, we did the workshops … It was definitely an excellent first step … If you think of planting, we probably got around to digging the soil up. In some place we put in the compost, in other places we didn't even get that far … and maybe we planted one or two seeds … so it's a long process, and that would be a take-home point for me"* (Respondent B, WCG). But the ground was prepared for flowers to bloom in the climate they might find themselves in in the future.

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Appendix A

Interview guidance questions [November - December 2015]

**Questions relate to the objectives of the study, as indicated. i.e.:*

1. To document the institutional, political and social conditions that aid climate adaptation planning in municipalities.
2. To explore the role of key stakeholders in the co-production of climate adaptation plans.
3. To unpack the challenges that arise during municipal climate adaptation planning processes.
4. To identify the barriers to and opportunities for climate adaptation planning at the municipal scale.

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1. ***Could you tell me about your involvement in the development of the climate adaptation plan?*** *(Objective 2).*

- What types of activities have you been involved in?
- At what stages of the adaptation planning process?

2. Did you get support from your organization? *(Objective 1).*

- How was it organized?
- Was it something that came from their side or did you drive the process?
- How well were you supported in your role? (What is this role?)

3. Which stakeholders were involved in the adaptation planning process? *(Objective 2).*

- Who decided on this? How?
- How were these various actors / stakeholder groups / organizations situated in relation to yours?
- How was the scope of their involvement determined?
- Do you think that the process of including different stakeholder groupings has been sufficient? Why / why not?

4. What voices did the different actors bring? *(Objective 2).*

- Were they active and involved in the workshops?

5. What role have relationships played in the process? *(Objective 2).*

- Between Environmental and Disaster Management? (*EDM)

6. Have you managed to build any relationships across sectors / at the local level that you did not have previously? *(Objective 2).*

7. How does climate adaptation feed into your mandate? Is it drawn from provincial/national policy? *(Objectives 1 and 3).*

8. Has adaptation been included in any policies / plans at the local level? *(Objectives 1 and 4).*
- Have any steps been taken to mainstream climate adaptation planning into different sectors / across local and district scale? What / how?

9. How have power dynamics played into the development of the plan? *(Objectives 3 and 4).*
- Was there strong leadership emerging?
- Was there conflict / co-operation?

10. What benefits have been realized from the process? *(Objectives 3 and 4).*

11. What challenges were faced / currently being faced in mainstreaming adaptation planning and implementation? *(Objectives 3 and 4).*

12. What resources were important and what was missing? *(Objectives 3 and 4).*
- What other opportunities have been important in developing the plan?

13. What opportunities do you see to further adaptation work in the district? *(Objectives 3 and 4).*
- What do you need to do this?
- Would you do it again?

Appendix B

Letter of support from the Western Cape Government

Sarah Birch
Directorate: Climate Change
E-mail: Sarah.Birch@westerncape.gov.za
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Dear Municipal Climate Change Champion,

ACDI Climate Change Research in support of the Western Cape Government Municipal Support Programme on Climate Change

The Western Cape Government Department of Environmental Affairs and Development Planning (DEADP) is the department responsible for facilitating and coordinating a transversal climate change response in the province. This includes the implementation of activities that support local and district municipalities in their climate change response endeavours. Within the past five years your municipality has been part of the Climate Change Municipal Support Programme to develop climate change adaptation and response plans/strategies.

The African Climate & Development Initiative based at the University of Cape Town continues to work in collaboration with DEADP on enhancing our climate response in the province. As such they have identified Ms Julia Davies, as a Master student to undertake a research study in the next four months on the Municipal Support Programme. The aim is to assess the various approaches in developing climate change adaptation plans at the municipal level in order to enhance our response across the province and beyond.

We have motivated that you were a key climate change champion that was invoved in, and pioneering these processes and that you will have unique insights and perspectives on the development process. We very much encourage your open and transparent engagement with Ms Julia Davies. Our vision is that this research will help us to collectively rcise the bar in future climate change response plan development with municipalities and in enhancing and strengthening your own processes and revisions into the future.

Yours Sincerely,

Sarah Birch
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Date: 10 November 2015

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