

Exploring transformation in local
government in a time of environmental
change and thresholds:
A case study of eThekweni Municipality

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ABSTRACT

Despite significant efforts over more than forty years, the challenge of achieving global sustainable development remains. This is becoming more urgent in light of new science that highlights the extent to which human development has now compromised critical earth systems, and the persistent levels of poverty and socio-economic inequality that continue to undermine human wellbeing. Within this context, calls for “transformation” in environmental governance to facilitate development pathways that are more sustainable have become more prominent. These calls have been accompanied by the emergence of a contemporary body of literature on transformation, but there are still varied opinions regarding what constitutes transformation and how this can be translated into implementation.

This thesis begins to address this gap by exploring the concept of transformation in environmental governance, through the lens of a climate change adaptation case study in the local government of eThekweni Municipality (Durban, South Africa). Climate change is a critical part of addressing sustainable development and therefore exploring “transformative adaptation” is seen to be an important “pathfinder” in understanding transformation in the broader context of environmental governance. The case study analyses the changes that have taken place in the climate adaptation work of eThekweni Municipality and the factors that have catalysed, facilitated and acted as barriers to transformative adaptation. Interviews with municipal officials and non-municipal stakeholders provide the qualitative data for the thesis, and the outcomes are assessed against the characteristics of transformation and transformative adaptation that appear in the contemporary literature. Through this process, an assessment is made as to whether eThekweni Municipality’s climate adaptation work constitutes transformative adaptation, the extent to which the case study experience reflects similarities to, or differences from, the literature, and what this means in terms of transformation and transformative adaptation in different contexts. An important idea that emerges is that transformative adaptation is neither linear nor predictable. Rather, in order to initiate and sustain transformative adaptation, it is necessary to build a “landscape of change”, with multiple actors, projects and policy initiatives interacting at different times and across scales to facilitate transformation and transformative adaptation. The results of the study are then elevated to the context of environmental governance more broadly, to propose a conceptual framework for transformation in environmental governance. This framework: summarises the critical characteristics of transformation in environmental governance; describes the elements of the “landscape of change” (context, actors, shifting discourses, practices, catalysts, facilitating factors and barriers) that need to be considered in order to advance transformation; and highlights the importance of monitoring the evolving “landscape of change”, given its inherent complexity and unpredictability.

In this way, the thesis highlights the complexity involved in initiating and sustaining transformation in environmental governance but also provides practical direction on how such processes might be framed. It also considers the implications of these outcomes for local governments in African cities. The thesis therefore contributes to the evolving transformation literature by translating the theoretical concept of transformation into the practical space of a local government. It also develops a conceptual framework for transformation in environmental governance that may be universally applicable beyond the case study context. In doing this, the thesis provides initial direction and a point of reflection for other cities that are also beginning to grapple with what transformation will mean in their context, and what might be required to more proactively facilitate this process.

PREFACE

The research described in this dissertation was carried out in the School of Built Environment and Development Studies, University of KwaZulu-Natal, Durban from July 2012 until August 2017 under the supervision of Dr Catherine Sutherland.

This dissertation represents original work by the author and has not otherwise been submitted in any form for any degree or diploma to any tertiary institution. Where use has been made of the work of others it is duly acknowledged in the text.

Joanne Douwes

Catherine Sutherland

**SCHOOL OF BUILT ENVIRONMENT AND DEVELOPMENT STUDIES
DECLARATION - PLAGIARISM**

I, declare that:

1. The research reported in this thesis, except where otherwise indicated, is my original research.
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3. This thesis does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.
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Signed:

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LIST OF ABBREVIATIONS AND ACRONYMS

CEO	Chief Executive Officer
COP 17	17 th Conference of the Parties to the United Nations Framework Convention on Climate Change
CPD	Corporate Policy Department
CSCM	Coastal Stormwater and Catchment Management
DAC	Durban Adaptation Charter
DCCI	Durban Chamber of Commerce and Industry
DMU	Disaster Management and Emergency Control Unit
D’RAP	Durban Research Action Partnership
EDU	Economic Development and Investment Promotion Unit
EMD	Environmental Management Department
EPCPD	Environmental Planning and Climate Protection Department
ETA	EThekweni Transport Authority
EU	Engineering Unit
EWS	EThekweni Water and Sanitation Unit
FW	Futureworks Consulting Company
HSU	Human Settlements Unit
ICLEI	Local Governments for Sustainability
IDP	Integrated Development Plan
IPCC	Intergovernmental Panel on Climate Change
IRC	Inter-religious Council
MAP	Municipal Adaptation Plan
MCPP	Municipal Climate Protection Programme
NDCs	Nationally Determined Contributions
OCM	Office of the City Manager
SDG	Sustainable Development Goal
SRCI	Sustainable and Resilient City Initiatives Unit
SSPB	Strategic Spatial Planning Branch
UEIP	uMngeni Ecological Infrastructure Partnership
UKZN	University of KwaZulu-Natal
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WCT	Wildlands Conservation Trust

CHAPTER ONE: INTRODUCTION AND RATIONALE FOR THE THESIS

1.1 Overview

Sustainable development is the dominant normative framework that has shaped how the relationship between environment and development is understood and analysed since the early 1980s (detailed further in Chapter 2). Despite significant efforts over the past forty years, the challenge of achieving sustainable development¹ remains, and is becoming more urgent in light of new science that highlights the extent to which human development has now compromised critical earth systems (Rockström et al., 2009; Steffen et al., 2015). The 2030 Agenda for Sustainable Development (United Nations, 2015b) therefore calls for a “transformative vision” in order to achieve its Sustainable Development Goals (SDGs) and argues that transformation is required in order to shift existing development pathways to be more sustainable and just (Costanza et al., 2012). A body of contemporary literature is therefore emerging, that focuses on the need for “transformation” in environmental governance. Scholars have identified resilience, adaptation, transition and transformation as critical moments along a continuum of responses towards social and environmental change (Walker et al., 2004; Folke et al., 2010; Pelling, 2011; O’Brien, 2011). Transformation is seen as the end point along this continuum of responses to the environment and development crisis facing the planet, and requires fundamental and systemic change in order to ensure sustainability. The concept of “environmental governance” encompasses environmental politics and policy and has the goal of improving the state of the environment and moving towards sustainable development. It includes all the “organisations, policy instruments, financing mechanisms, rules, procedures and norms that regulate the processes of global environmental protection” as well as the multiple actors engaged in this arena (Najam et al., 2006, p. 1). In the context of this thesis, references to the need for “transformation in environmental governance” therefore imply that fundamental changes are needed in the human systems and processes that perpetuate unsustainable development paths and exacerbate environmental and social risk.

A specific challenge within the broader arena of sustainable development is that of climate change, given that its impacts will be felt at scale over significant time horizons (Jones et al., 2014) and that these impacts will have the potential to significantly undermine sustainable development, for example through changing patterns of agricultural productivity, affecting species distribution, altering access to clean water and increasing coastal vulnerability. These impacts, when added to other stresses such as poverty, inequality and disease, will make it difficult to achieve sustainable development objectives such as food and livelihood security, poverty reduction, improved health and functional ecosystems (Denton et al., 2014). Taking urgent action to mitigate and adapt to the likely impacts of climate change is therefore an important focus of the SDGs (Goal 13). In this context, “transformative adaptation” is seen as an important climate change response, and implies that adaptation needs to fundamentally challenge the underlying systems and processes that perpetuate risk and vulnerability

¹ According to the Brundtland Report of the World Commission on Environment and Development (WCED, 1987, p. 41) which initially coined the phrase, “sustainable development” is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: firstly, the concept of “needs”, in particular the essential needs of the world’s poor, to which overriding priority should be given; and secondly, the idea of limitations imposed by the state of technology and social organization on the natural environment’s ability to meet present and future needs.

to climate change (Field et al., 2014), such as prevailing socio-economic, environmental, regulatory or governance systems. Given the significance of climate change within the context of achieving sustainable development, and given the focus of transformative adaptation on fundamental systems change to reduce risk and vulnerability in human and natural systems, understanding what transformative adaptation looks like and what it takes to facilitate transformative adaptation, can also provide insights into effecting transformation in the broader context of environmental governance. In this way understanding transformative adaptation can be an important “pathfinder” in understanding transformation more broadly.

Importantly, many of the challenges relating to sustainable development and climate change are found in cities, given that these are spaces where populations are at their most dense and, in the case of many cities (particularly those in the developing world), at their most vulnerable (UNHabitat, 2011). They therefore provide an important locus for understanding transformation and transformative adaptation. Cities are also spaces of opportunity, innovation and change (Satterthwaite and Bartlett, 2016) and are therefore more likely to be the spaces where transformation and transformative adaptation can be achieved.

These challenges are clearly evident in the city of Durban (South Africa), which is managed by the local government of eThekweni Municipality². Although investments have been made in socio-economic development and basic service provision, the city still faces significant challenges relating to high levels of inequality, poverty and unemployment, as well as unequal (and in some cases, inadequate) access to housing, water, sanitation and electricity (EThekweni Municipality, 2017a). Much of the natural environment has also been transformed through development, invasive alien plant impacts, and unsustainable resource use. These social, economic and environmental challenges are exacerbated by the likely impacts of climate change, which will include changes in rainfall distribution, temperature increases and sea level rise.

A critical question for eThekweni Municipality therefore lies in how to facilitate transformation in environmental governance in ways that not only enhance the protection and management of the city’s natural environment, but simultaneously facilitate opportunities to address the socio-economic inequities that compromise human wellbeing for much of the population in Durban. The challenge of climate change adaptation provides a useful starting point for this conversation, given the work that has been unfolding in the city to integrate this agenda into municipal planning and implementation, and the way this has attempted to address the prevailing socio-economic and environmental conditions that need to be fundamentally shifted in order to reduce vulnerability and enhance sustainable development. EThekweni Municipality’s climate adaptation work is therefore used as a focus through which to explore the concept of *transformative adaptation* and, through this, to gain insights into the broader concept of *transformation* in environmental governance. This is important in order to understand how theoretical ideas around transformation might translate into practice in the context of an African local government.

² In this thesis, ‘Durban’ refers to the spatial location of this city in South Africa, and includes both the urban core and the rural hinterlands of the eThekweni Municipal Area. The eThekweni Municipality is the local government institution that is responsible for managing Durban.

These ideas are introduced briefly in the next sections of Chapter 1 for the purposes of providing background for the thesis rationale, and are developed in further detail in Chapters 2 and 3.

1.2 Background

The discourse of sustainable development has emerged over a long period of time, beginning in the 1960s through the ideas generated by the modern environmental movement (Sutherland, 2016), strengthening around the time of the first global environmental conference, the United Nations Conference on the Human Environment, held in Stockholm in 1972 (United Nations, 1972) and being defined in the Brundtland Report in 1987. This laid the foundations for reconsidering the connectedness of people and the natural environment, and for working more proactively to consider ways to balance the needs of development with the planet's available natural resource base. Most recently, the "2030 Agenda for Sustainable Development" (United Nations, 2015b), which includes the SDGs, highlights the ongoing challenge of achieving a more sustainable development path, and provides a global framework for renewed action in this regard. The work of Rockström et al (2009) and Steffen et al (2015) has added a level of urgency to this action, by defining "planetary boundaries" for a number of critical biophysical earth systems. These planetary boundaries represent thresholds or tipping points beyond which changes in earth systems could result in irreversible and abrupt environmental change. This work highlights that currently four earth systems have already exceeded these boundaries, and that urgent action is needed to ensure that human development does not further compromise these life-sustaining earth systems. One of these earth systems is climate change, which represents a very specific challenge within the broader arena of sustainable development. Subsequent work (Leach et al., 2013; Raworth, 2017) has also highlighted the need to include social thresholds alongside earth system thresholds when determining alternative development pathways that are more sustainable and just.

Although sustainable development is a broad issue and requires managing many threats and risks (Denton et al., 2014) such as biodiversity, landuse change and freshwater use, the issue of *climate change* is currently receiving significant global and local attention. This is because of its long time horizons and sometimes irreversible impacts (Jones et al., 2014), and its potential to fundamentally undermine the achievement of sustainable development objectives if development pathways are pursued that are not resilient to the effects of climate change (Denton et al., 2014). The importance of addressing climate change as part of achieving sustainable development is acknowledged in the SDGs through a specific climate change focused goal (Goal 13). The Paris Agreement (United Nations, 2015a), an agreement adopted in 2015 within the UNFCCC focusing on greenhouse gas emissions mitigation, adaptation and climate finance, also acknowledges the importance of addressing climate change as a critical component in achieving sustainable development.

Within the arenas of both sustainable development and climate change, there is also an increasing acknowledgement of the role of cities as both contributors to the challenges of sustainable development and climate change, but also as potential spaces in which to develop innovative responses to these challenges. This is reiterated through the inclusion of an urban focused SDG (Goal 11), and in the "New Urban Agenda" (United Nations, 2016), the outcome document that was agreed upon at the Habitat III cities conference in Quito, Ecuador, in October 2016 and which is intended to guide efforts around urbanization for a wide range of actors over the next 20 years. The New Urban

Agenda recognises the role that cities and urbanisation need to play in contributing to sustainable development, and acknowledges climate change as a particular challenge within this context. This focus on cities in the context of sustainable development is not new and has been extensively explored, in order to understand: the challenges associated with cities in terms of environmental issues; what is required to achieve sustainable development in cities (e.g. in relation to health, urban agriculture, resource conservation and pollution minimisation); and the potential for cities to become “solution spaces” in the context of rapid urbanisation (see e.g. Haughton and Hunter, 1994; Rees, 1999). However, the last 10 years have seen renewed emphasis on the role of cities within the context of sustainable development and climate change, and on the need to coordinate and support urban action in these spaces. Addressing the challenge of climate change through focused action in cities is therefore an important and necessary contribution towards achieving sustainable development more broadly. The critical question however, is what kind of action is required, particularly given that the sustainable development agenda is not a new one, and that past and current actions have not fundamentally altered the patterns of development that perpetuate these challenges.

Within this context, a growing body of literature is emerging that is focused specifically on transformation in the context of environmental governance, examining the concept of transformation more closely to understand its driving forces and characteristics, in order for this to inform how fundamental changes might be undertaken to put the world onto an alternative and more sustainable development pathway. The transformation agenda is not a new one. Since the emergence of the modern environmental movement in the 1960s, the world has grappled with the social, economic and environmental transformations that will be needed to meet human development needs in the context of a finite natural resource base. This has required significant consideration of the transformational shifts that might be needed in economic systems, modes of production, consumption and distribution, and in the way humanity interacts with the natural environment, in order to achieve the desired sustainable development objectives (e.g. Rees, 1999; Swilling and Annecke, 2012). As early as 1972, the United Nations Declaration on Human Development (United Nations, 1972, p.1) itself recognised that “man’s capability to transform his surroundings, if used wisely, can bring to all peoples the benefits of development and the opportunity to enhance the quality of life”, highlighting the importance of transformation that leads to futures that are sustainable and that contribute to human wellbeing. However, the transformation agenda is now receiving renewed attention. The current and evolving literature suggests, for example, that transformation: involves a complete altering of an existing system in a way that challenges established paradigms and the root drivers of risk (Pelling, 2011; Solecki et al., 2015); should aim for outcomes that are positive, just and sustainable (Leach et al., 2013); and can be catalysed, facilitated and/or undermined by a range of factors (Geels and Kemp, 2006; Folke et al., 2010; O’Brien, 2011). The need for transformation in environmental governance is echoed in the SDGs, through their focus on a “supremely ambitious and transformational vision” (United Nations, 2015b, p.5).

The need for transformation in the context of climate change is also recognised. In the context of climate adaptation for example, transformation is seen to be necessary if maintaining existing systems offers little scope for adaptation. In such instances, fundamental changes to social, economic, regulatory, governance or environmental systems may be a more appropriate mechanism for reducing risk to climate change (Pelling and Manuel-Navarrete, 2011) and promoting sustainable development within a climate change context (Denton et al., 2014). In the context of climate change, a relatively

new body of literature is therefore emerging that is focused specifically on “transformative adaptation”, to understand the climate adaptation responses that are required in order to achieve these fundamental system shifts. In addition to the characteristics of transformation highlighted above in relation to environmental governance more broadly, the early transformative adaptation literature also highlights the need to: Integrate the climate adaptation, climate mitigation, disaster risk reduction and development agendas (e.g. Roberts et al., 2016; Satterthwaite et al., 2016); engage multiple stakeholders in decision-making (e.g. Baird et al., 2014; Fraser et al., 2016); transform institutions and governance structures (e.g. Carmin et al., 2012; Pelling et al., 2015); and work across governance, geographic and time scales (e.g. Revi et al., 2014a). Given the focus of transformative adaptation on the need for fundamental systems changes across the social, economic, environmental and governance arenas in order to reduce the systemic risk and vulnerability to climate change that is created by these systems, understanding what transformative adaptation looks like and how this can be facilitated can also provide insights into how broader transformation in the environmental governance field might take place. Cities, as centres of production and consumption, and as the spaces where populations, economies, social activities and environmental and climate change impacts are increasingly concentrated, are central to the transformation and transformative adaptation debate (e.g. Revi et al., 2014a; United Nations, 2016a). These ideas are developed further in Chapter 2.

The major challenge is that transformation, and what constitutes transformation, is understood in different ways and there is little guidance emerging regarding what transformation means and what is needed to translate ideas on transformation into implementation (Bahadur and Tanner, 2014). The same is true for transformative adaptation, with clear operational definitions of what constitutes transformative adaptation remaining elusive (Cramer et al., 2014). If transformation is a critical response in a world where current development practices have undermined the sustainability of critical earth systems and exacerbated inequality and vulnerability, then it is essential to understand more about what it will take to give effect to a transformative agenda, particularly at the level of cities, in order to facilitate more rapid transformation and the implementation of alternative development pathways that are sustainable and just. Although there is unlikely to be a single definitive understanding of what constitutes transformation, the opening up of this debate, and the use of practical examples and case studies to illustrate responses that are transformative, or that demonstrate transformational intention, are important in helping to translate theoretical ideas into practical spaces for action.

1.3 Rationale for the thesis

The conceptual rationale for this thesis is summarised below and in Figure 1.1. If sustainable development is to be achieved, transformation in environmental governance is needed in order to fundamentally alter the systems that perpetuate development that is not sustainable, and exacerbate environmental and social risk. Climate change, as a specific sustainable development challenge, provides an important lens through which to explore what such transformation might mean and how this translates into practical action. Climate change adaptation is an important focus within this, given the growing emphasis on the need for transformative adaptation that can alter the systems that perpetuate risk and vulnerability to climate change. Cities, as spaces where sustainable development and climate change challenges are most profoundly manifest, provide an important location for such explorations. The sustainable development-climate change adaptation-cities nexus therefore provides

an important focus through which to better understand transformation in environmental governance. The intention of this thesis is to contribute to the transformation debate by exploring a case study that is located at this nexus. The concepts of transformation and transformative adaptation are used as a conceptual frame within broader social-ecological systems theory, to reflect on the changes that have taken place in an urban climate change adaptation case study. Although the case study is focused on a specific sustainable development challenge, the intention is to use the climate adaptation case study to gain insights not only into transformative adaptation and what might constitute and facilitate this, but also into the form that transformation might take in the broader environmental governance arena, in a local government context.

The case study focuses on eThekweni Municipality, the local government responsible for managing the city of Durban in South Africa, with a specific focus on the climate change adaptation work that has evolved over the last thirteen years within the municipal institution. Over this period, significant efforts have been made to integrate climate adaptation into eThekweni Municipality's planning and decision-making processes and to translate these policy frameworks into practical climate adaptation projects and initiatives. This climate adaptation work has been undertaken with the intention of reducing the risk and vulnerability of the city, especially for vulnerable human communities and for natural systems that are susceptible to further degradation. Through its focus at a local level on addressing the global sustainable development challenges that have been previously highlighted, eThekweni Municipality's climate adaptation work provides a useful case study through which to explore transformative adaptation to climate change and, from this, to understand transformation in environmental governance more broadly. The case study is also used to understand the processes and factors that catalyse, facilitate and act as barriers to transformation and transformative adaptation in this context, and whether the eThekweni Municipality case study can provide additional insights into how to translate conceptual ideas around transformation into practice in a local government context.

This thesis therefore makes a theoretical contribution to the literature on transformation and transformative adaptation. It also makes a contribution to the practice that is unfolding in Durban's climate adaptation journey, through its focus on a local government that is continuing to develop its climate adaptation work.

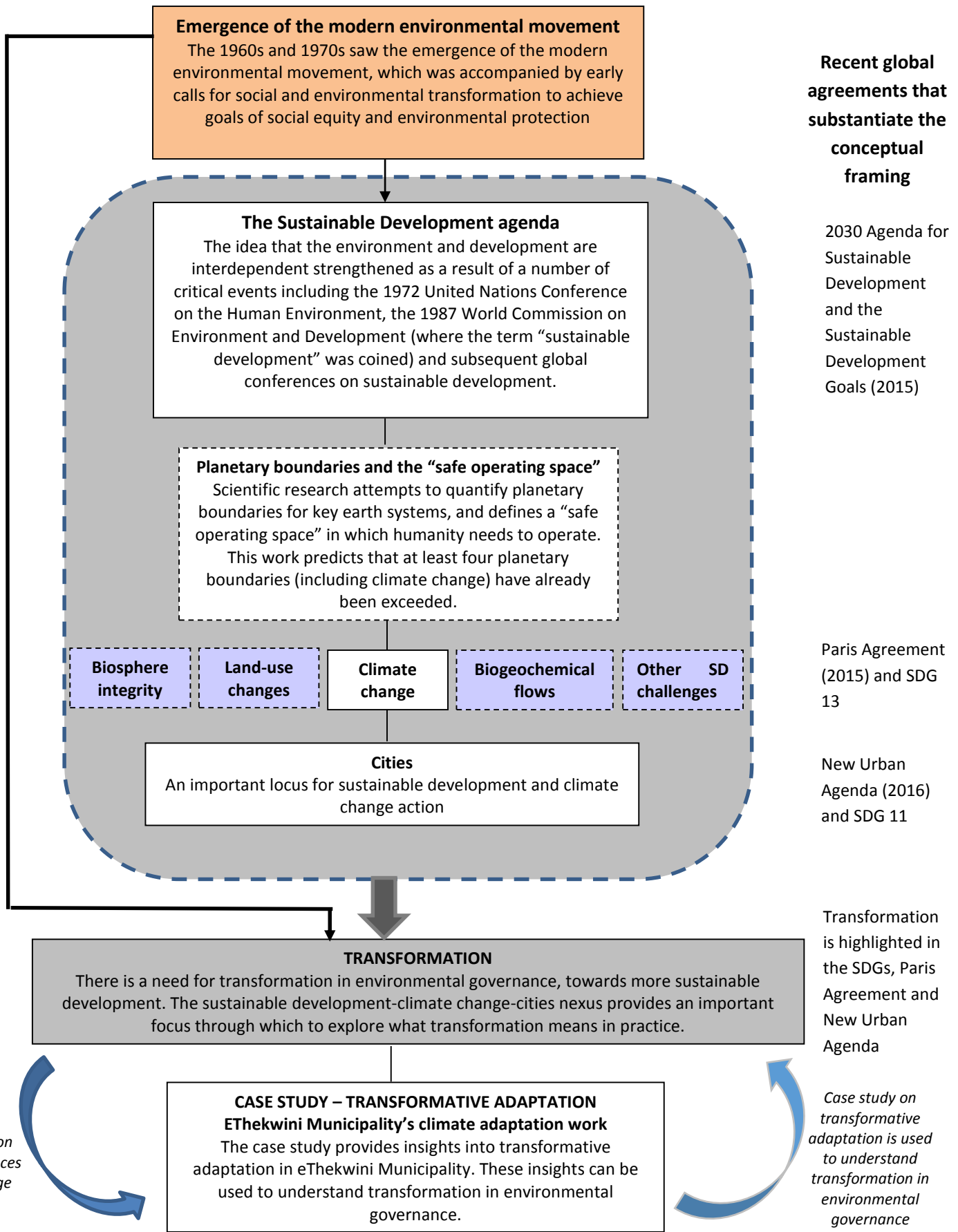


Figure 1.1: An overview of the conceptual rationale for the thesis

1.4 Aims and objectives

The aim of the thesis is to analyse the process of transformation and its implications for environmental governance in local government, with a specific focus on the climate change adaptation sector in eThekweni Municipality (Durban, South Africa).

The objectives for the research, and the more specific questions that underlie these, are as follows:

Objective 1:

To identify emerging characteristics in the contemporary literature that can be used to assess the presence and effectiveness of transformation within environmental governance in eThekweni Municipality, with a specific focus on transformative adaptation in the climate change adaptation sector.

- How are the concepts of transformation and transformative adaptation currently understood in the emerging environmental governance and climate change literatures?
- According to the contemporary literature, what are the emerging characteristics of: transformation in the environmental governance context; and transformative adaptation in the climate change context?
- How can these emerging characteristics be used to help recognise and assess transformative adaptation within the local government case study?

Objective 2:

To understand the changes³ that are taking place towards transformative adaptation in the local government climate adaptation case study within eThekweni Municipality by analysing the context, actors, practices and projects involved, the role of social learning and the nature of the change that results.

- What are some of the contextual factors and catalysts that influence how transformative adaptation is initiated and unfolds in the case study?
- Who are the main actors involved and what role do they play?
- What practices and projects emerge as being the most effective in catalysing transformative adaptation within the case study context?
- What are some of the factors that catalyse, facilitate or act as barriers to transformative adaptation?
- What role does social learning play in facilitating transformative adaptation?
- Who or what stands to benefit the most from the climate change adaptation work that is unfolding in eThekweni Municipality?

³ One of the objectives of this thesis is to assess the extent to which the emerging climate adaptation work in eThekweni Municipality can be considered to be transformative adaptation. Until the point where this assessment has been undertaken at the end of Chapter 6, the word “change” is used to describe the shifts that are being observed in the local adaptation work, as the Municipality works towards integrating climate adaptation into planning and implementation. Change does not necessarily equate to transformation, but depending on the nature of the change, it may ultimately have a transformative impact.

Objective 3:

To reflect critically on the extent to which the processes, practices, projects and the change that emerges within the context of the climate adaptation case study, reflect the emerging characteristics of transformation and transformative adaptation identified in the contemporary environmental governance and climate change literatures respectively.

- How do the characteristics of the changes that are seen in the climate adaptation case study relate to the emerging characteristics of transformation and transformative adaptation found in the literature?
- Are there any observations from the case study that can add value to the emerging contemporary literature on transformation and transformative adaptation in the context of environmental governance and climate adaptation respectively?

Objective 4:

To reflect on the extent to which the observations and learning on transformative adaptation in the climate change adaptation case study, can provide insights into transformation in the broader environmental governance arena.

1.5 Chapter outline

Figure 1.2 provides a graphic overview of the structure of the thesis, and this is further described below.

Chapter 1 has presented the introduction and rationale for the thesis by highlighting the urgent calls for transformation in environmental governance and the contemporary body of literature that accompanies this. The transformation literature is focused on the need to fundamentally alter the human systems and processes that perpetuate development paths that are not sustainable and that exacerbate social and environmental risk. The chapter has also indicated that climate change is a significant component in achieving sustainable development and therefore that understanding transformative adaptation could be an important “pathfinder” in understanding transformation in the broader context of environmental governance. Cities are also highlighted as the spaces where the most significant transformation is needed, and which therefore provide an important locus for understanding transformation and transformative adaptation. The chapter therefore frames the importance of the sustainable development-climate change-cities nexus as an important focus through which to better understand the concept of transformation in environmental governance. The climate adaptation case study in eThekweni Municipality was briefly introduced as the lens through which the thesis intends to better understand transformative adaptation and transformation at this nexus.

Chapter 2 provides additional context to the global sustainable development debate and summarises the main ideas emerging in the scientific arena regarding environmental and social thresholds. Further information on climate change is also provided in order to contextualise the climate change and climate adaptation challenges, particularly in the context of African cities. The importance of transformative adaptation in this context is also highlighted. In doing this, the chapter provides the

theoretical framing for the eThekweni Municipality climate change adaptation case study, both in terms of introducing and defining relevant terminology and concepts, and in presenting the main theoretical constructs of the broader climate change debate. These global debates, and the recognition that the global development path is unsustainable, support the argument that the concept of transformation in environmental governance, and transformative adaptation in the climate change arena, are urgent agendas.

Chapter 3 explores the transformation and transformative adaptation literatures, which are summarised in a heuristic framework that articulates: what constitutes transformation and transformative adaptation in the context of environmental governance and climate change respectively; the key catalysts, facilitating factors and barriers that either facilitate or hamper transformation and transformative adaptation; and the anticipated outcomes of transformative change. This heuristic framework is used in Chapter 6 to assess the changes that have taken place in the eThekweni Municipality case study.

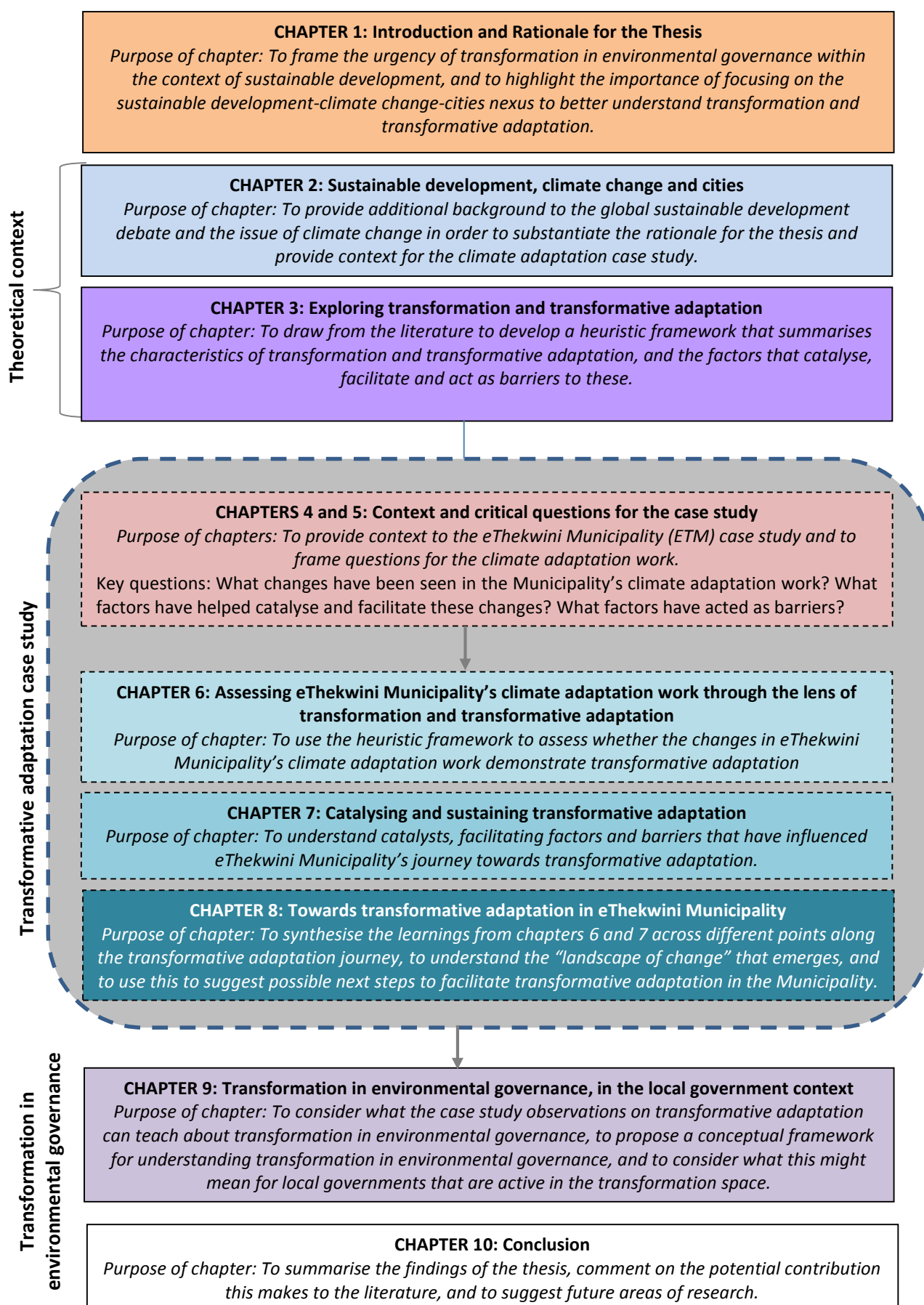


Figure 1.2: An overview of the structure of the thesis

Chapter 4 provides the context to the case study by outlining the socio-economic, environmental and institutional context of eThekweni Municipality and the climate change predictions and potential impacts of these on the city and its residents. The chapter also explores the national climate change policy context in South Africa and its interactions with the local work in eThekweni Municipality. The chapter concludes by providing a brief overview (based on existing literature) of eThekweni Municipality's climate change adaptation work and the specific policy decisions and projects that have been part of this. It therefore provides the context within which to analyse and interpret the data collected for this dissertation.

Chapter 5 describes the methodology used to carry out this research. The research draws on qualitative methodologies for data collection and the majority of the research data was generated through interviews undertaken with municipal officials and individuals external to the Municipality. The chapter details the interviews that were conducted and provides a rationale for the interview questions. It then describes how the interview results were consolidated into themes that aligned with the characteristics of transformation and transformative adaptation identified in the literature. It also details how Hajer's (1995) discourse analysis approach was used to identify storylines within each theme. The chapter goes on to explain the descriptive quantitative analysis that was undertaken to determine the frequency of responses within storylines and storyline components and the distribution of these responses across respondent categories. It then outlines the use of both qualitative and quantitative methods applied to the storylines and storyline components to assess the case study against the characteristics of transformation and transformative adaptation that were summarised in the heuristic framework.

The case study research findings are presented and synthesised across two chapters. Chapter 6 uses the heuristic framework to assess whether the climate adaptation work in eThekweni Municipality can be considered to be transformative adaptation. The chapter begins by describing the storylines and storyline components emerging from the interviews in relation to the nature of the change that has taken place in eThekweni Municipality's climate adaptation journey. After describing each of the storylines and storyline components, the chapter uses these results to reflect against the transformation and transformative adaptation literatures in order to analyse whether the changes that are seen in the eThekweni Municipality case study can be considered to demonstrate transformative adaptation.

Chapter 7 explores the factors that catalyse, facilitate and act as barriers to transformative adaptation, and compares these with the transformation and transformative adaptation literatures to identify areas of similarity and difference. The chapter describes the storylines and storyline components emerging from the interviews in relation to the factors that are seen to be catalysts, facilitating factors or barriers to transformative adaptation in the case study. The chapter also uses quantitative analysis to understand the frequency of responses in relation to each storyline and storyline component, and across the respondent categories. The results are then compared with the ideas found in the transformation and transformative adaptation literatures to assess areas of similarity and difference. The chapter concludes by summarising these findings and suggesting insights that can be gained from them in terms of broader processes of transformation in environmental governance in a local government context.

Chapter 8 consolidates the climate adaptation case study story by summarising how various factors (including global and local context, actors, catalysts and barriers) interact in the “landscape of change” for eThekweni Municipality’s climate adaptation journey in ways that either contribute to, or undermine, the potential for transformative adaptation. The chapter then uses this summary and the outcomes from Chapter 7 to highlight critical considerations and opportunities that could be used to advance transformative adaptation in eThekweni Municipality’s climate adaptation work.

Chapter 9 then broadens the discussion to reflect on the critical messages emerging from the climate adaptation case study, for transformation processes more broadly in the field of environmental governance and to propose a conceptual framework for transformation in environmental governance. The chapter considers the implications of these messages for local governments that seek to be active agents of transformation, and whether the “requirements” for transformation make it a realistic objective for local governments that are severely constrained by their bureaucratic municipal context.

Chapter 10 concludes by reflecting on the original research aim and objectives and summarising the main findings of the thesis in relation to these, before reflecting on the implications of these findings for transformation in environmental governance, in the context of a local government. The chapter then suggests additional research questions that could advance work in the transformation field, before providing final concluding comments.

CHAPTER 2: SUSTAINABLE DEVELOPMENT, CLIMATE CHANGE AND CITIES

Sustainable development provides the overarching framework within which to understand and analyse transformation and transformative adaptation in cities. This chapter therefore first presents the main conceptual framework of sustainable development, drawing on ideas and concepts from the social-ecological systems literature. It then outlines the main literature on climate change and how this applies to cities, particularly those in Africa.

2.1 The global sustainable development agenda

The discourse of sustainable development has emerged over a long period of time⁴, beginning in the 1960s and 1970s with the emergence of the modern environmental movement. This was supported by scientific research and reports that were produced by a range of scientists to highlight the growing environmental crisis (Sutherland, 2016). In the 1960s the scholars and activists of the modern environmental movement first identified the major environmental challenges facing the planet and then produced a series of reports which challenged the notion of infinite growth. The discourse of “limits to growth” emerged at this time as a clear warning by scientists that many of the earth’s resources were finite and that economic growth and development could not continue unabated (Meadows et al., 1972). A new discourse that recognised the interdependency between environment and development emerged at the first global environmental conference, the United Nations Conference on the Human Environment, held in Stockholm in 1972 (United Nations, 1972). This meeting concluded that the environment and development are interdependent, laying the foundation for a new way of thinking about how to understand and navigate these connections in a way that balances the needs of ongoing development with the planet’s available natural resource base. It was also at this conference where the issues of equity and the divide between the developed and developing world were recognised as being critical to the environment and development debate.

A number of major global events and critical pieces of work have shaped the sustainable development debate since 1972. In 1987, the World Commission on Environment and Development (WCED, 1987), also known as the “Brundtland Commission” published “Our Common Future” (WCED, 1987). This report coined and defined the term “sustainable development” as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987, p. 41). The report attempted to reconcile two ideas: firstly the idea that there are ecological “limits to growth”, requiring that controls are put in place for population growth and development in order for the earth and people to survive; and secondly the idea that growth is needed in order to eliminate poverty, particularly in developing countries in the south. In this way, the report captured some of the tensions between the opposing interests of the north and south within the sustainable development debate (Swilling and Annecke, 2012). This report was extremely influential and provided the strategic foundation for the first United Nations Conference on Sustainable Development in 1992 (also known as the “Earth Summit”), which was held in Rio de Janeiro, and the World Summit on Sustainable Development which took place in Johannesburg in 2002 (Swilling and Annecke, 2012).

⁴ Some (e.g. Wheeler and Beetley, 2004) argue that debates around the environment, equity and economic concerns relating to sustainable development, have been ‘gestating’ for more than a century.

The concept of sustainable development was therefore intended to balance social, economic and environmental needs. Representations of sustainable development have evolved over time, from those that see these three components as overlapping circles, with sustainable development being achieved at their intersection point (Figure 2.1) to other representations that see sustainable development as an embedding of these components within each other and within a governance framework (Figure 2.2).

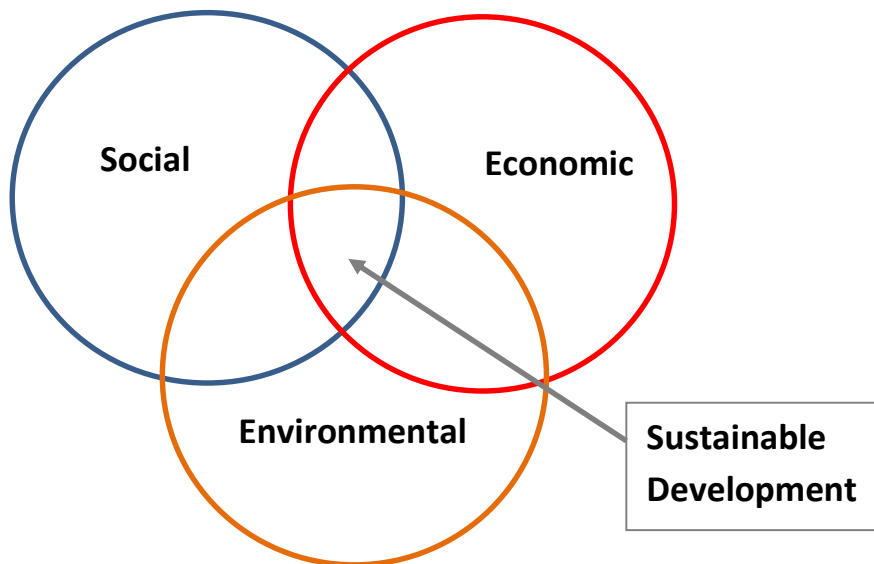


Figure 2.1: Sustainable development model representing the social, economic and environmental components as overlapping circles with sustainable development occurring at the point of overlap (adapted from Flint, 2013)

The latter representation (Figure 2.2) is found in South Africa’s National Strategy on Sustainable Development (Department of Environmental Affairs, 2011). In this representation, the economic, socio-political and environmental systems are embedded within each other, and then integrated through the governance system. Sustainable development requires that these systems remain mutually compatible as critical development challenges are met through specific actions and interventions. This normative idea of sustainable development has been adopted over time in both the public and private sphere, where it is used to shape policy and practice (in the public sphere), and to guide business (in the private sphere) towards a “triple bottom line” where profit or loss is measured against social, environmental and financial performance. Within the sustainable development discourse however, sustainability can exist on a continuum from weak to strong. Weak sustainability balances social, ecological, economic and governance requirements but without radically changing the way in which development happens (Sutherland, 2016) or the dynamics of power and social and environmental justice within this. Strong sustainability on the other hand argues that sustainable development can only be achieved if sufficient attention is given to issues of social and environmental justice and to governance approaches that include a variety of actors, including local communities, in policy making (Lubke, 2004).

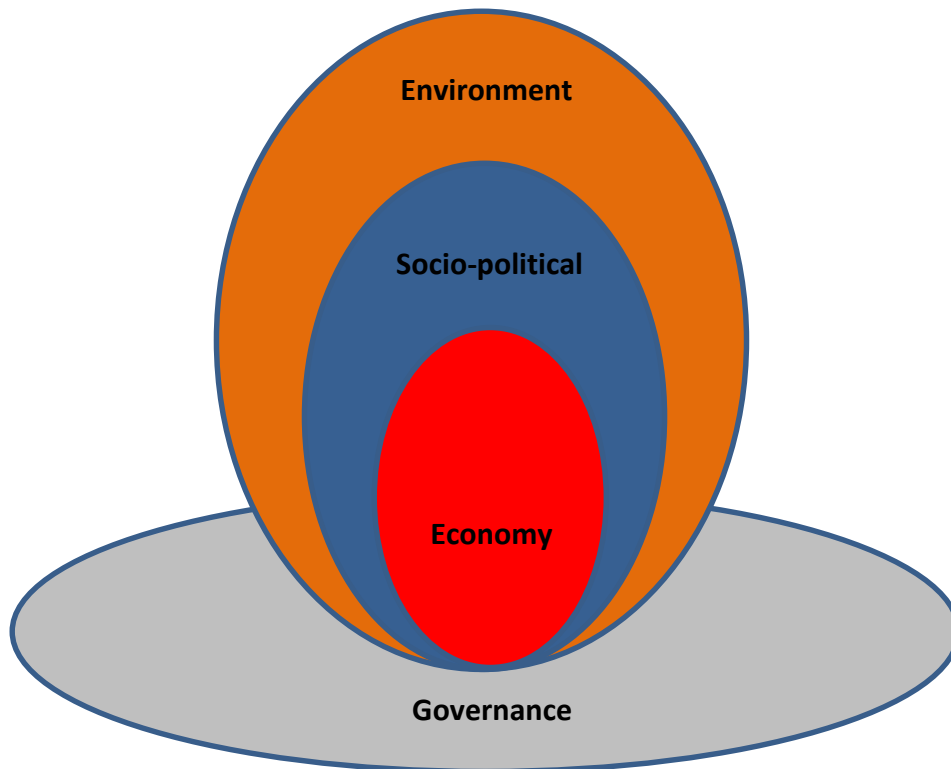


Figure 2.2: Embedded sustainable development model, indicating that all components need to remain mutually compatible within a governance framework (Source: Department of Environmental Affairs, 2011)

In June 2012, 20 years after the Rio Earth Summit, the United Nations once again brought together governments, international institutions and major groups at Rio+20⁵ to agree on a range of smart measures aimed at reducing poverty while promoting decent jobs, clean energy and a more sustainable and fair use of resources. This sustainable development conference was seen to be a chance to move away from “business-as-usual” and to act to end poverty, address environmental destruction and build a bridge to a more positive future. The outcome document from the conference, entitled “The Future We Want” (United Nations, 2012), emphasised that there has been insufficient progress in the integration of the three dimensions of sustainable development (social, economic and environment) since the 1992 conference. The report also highlighted the urgency in finding ways to address these ongoing and overwhelming challenges.

The aspirational SDGs that were adopted in 2015 as part of the 2030 Agenda for Sustainable Development (United Nations, 2015) reflect this, with the 17 goals and 169 targets covering a broad range of sustainable development issues that span social, economic and environmental challenges. These include the need to end poverty and hunger and improve health and education, whilst at the same time combating climate change and protecting oceans and forests. The SDGs currently provide the global architecture for further work in the sustainable development arena. The goals and targets contained in the SDGs set out an “ambitious and transformational vision” (Item 7) that includes a focus on addressing climate change and its impacts (Goal 13), and a specific focus on urban areas and “making cities and human settlements inclusive, safe, resilient and sustainable” (Goal 11). This

⁵ Rio+20 is the commonly used name for the 2012 United Nations Conference on Sustainable Development

supports the transformation focus of this thesis at the sustainable development-climate change-cities nexus. However, despite these important global frameworks for action, the world continues to grapple with the challenge of balancing the needs of ongoing development with the planet's available natural resource base.

2.2 Environmental and social thresholds

The urgent need for progress in balancing the needs of human development with those of the planet's natural resource base, is highlighted by clear scientific evidence that the main driver of planetary-scale change is the growing human population's demand for energy, food, goods, services and information, and its disposal of waste products. In this regard, the last 60 years have seen the most profound transformation of humanity's relationship with the natural world in the history of humankind (Steffen et al., 2015). The impact of humans on earth systems has led scientists to suggest that the world has entered the "Anthropocene"⁶, a proposed epoch dating from when human activities began to have a significant global impact on earth's geology and ecosystems (Anthropocene, 2016). Importantly however, these growing demands on the earth's systems are not evenly distributed across the globe. As far back as 1987, when the term "sustainable development" was first defined (WCED, 1987), it was recognised that disparities in consumption patterns and inequity in the distribution of, and access to, resources, plays a critical role in determining where human impacts on the environment are greatest. Solutions to these challenges are therefore likely to be complex.

Global science also suggests that the world is fast approaching threshold points for critical earth systems (e.g. Rockström et al., 2009; Steffen et al., 2015) which, if crossed, could undermine the sustainability of global earth systems. The "planetary boundaries" concept originally developed by Rockström et al (2009) aims to help guide human societies away from unsustainable development trajectories by defining a "safe operating space" in which humanity can continue to survive and thrive. This "safe operating space" lies within the planetary boundaries (or "thresholds") that have been estimated for critical earth systems. In re-examining the "planetary boundaries" concept, Steffen et al (2015) recognize biosphere integrity and climate change as core planetary boundaries based on their fundamental importance for the earth system, and identify four earth system processes that are estimated to have already exceeded their planetary boundaries (Figure 2.3). These are biosphere integrity, climate change, biogeochemical flows and land-use. In essence, this work warns that the ecological foundation upon which the global economy and society depend has already been severely undermined by human activities, and that the current scale of anthropogenic pressures on the earth system are now such that the possibility of abrupt global environmental change can no longer be excluded. This is echoed in the United Nations Global Environment Outlook assessments, which highlight the impacts of issues such as population growth, rapid urbanization, rising levels of consumption, desertification, land degradation and climate change on foundational issues such as water and food security across all six regions covered by the assessments (<http://www.unep.org/geo/assessments/global>, accessed 24/06/2017). This work therefore

⁶ The term 'Anthropocene' was widely popularized in 2000 by atmospheric chemist Paul J. Crutzen and, in January 2016, a paper in *Science* suggested that the Anthropocene should be recognized as a distinct geological era from the Holocene. In April 2016, the International Anthropocene Working Group met to consolidate evidence for the Anthropocene as a geological epoch and, in August 2016, recommended that the Anthropocene be designated as an epoch in the planet's history, with the 1950s as the starting point. However, this designation is not yet official, and the debate continues.

highlights the rapid and unprecedented environmental changes that are now facing the planet (O'Brien and Selboe, 2015a) and the need for urgent and dramatic action to alter the current global development path.

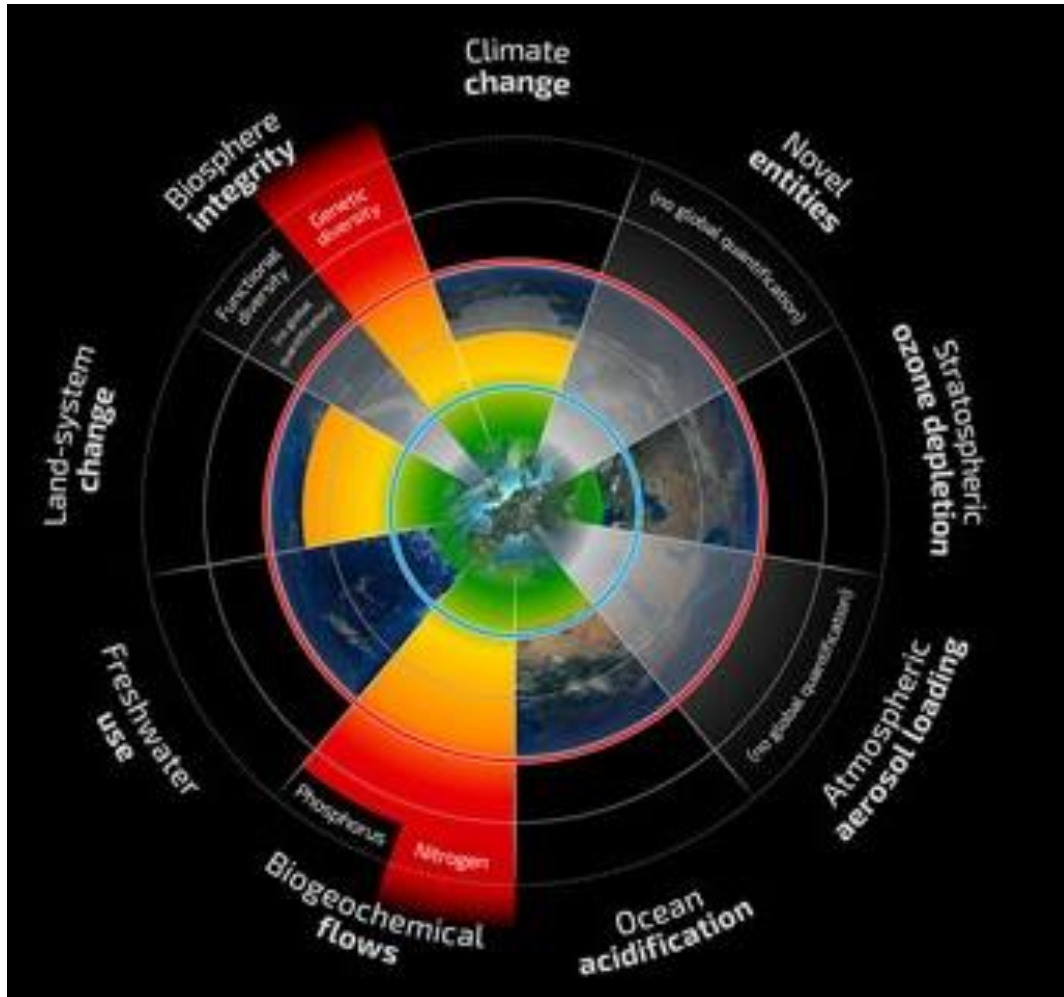


Figure 2.3: The planetary boundaries described by Steffen et al (2015), which demonstrate the four earth systems that are already estimated to have exceeded their planetary boundary.

Within this arena of earth system thresholds and planetary boundaries, an equally important focus is social boundaries. Many of the environmental challenges that face humanity are not purely environmental; they also have a strong human development component (O'Brien, 2009). In this regard, it is critical to consider the social dimension of ecological problems and acknowledge the importance of understanding governance issues, institutions, politics, social networks, actors and groups as part of this context (Folke et al., 2010). Leach et al (2013) and Raworth (2012) highlight that just as exceeding natural boundaries could tip the planet over critical environmental thresholds, so too can dropping below levels at which people are able to live. They emphasise that there are social boundaries below which deprivation from critical resources will endanger human well-being, and argue that the "safe and just space for humanity" exists somewhere between planetary boundaries and social boundaries (Figure 2.4a). In her latest paper, Raworth (2017) proposes a combined

representation of ecological overshoots and human wellbeing shortfalls that can aid in global scale assessments (Figure 2.4b).

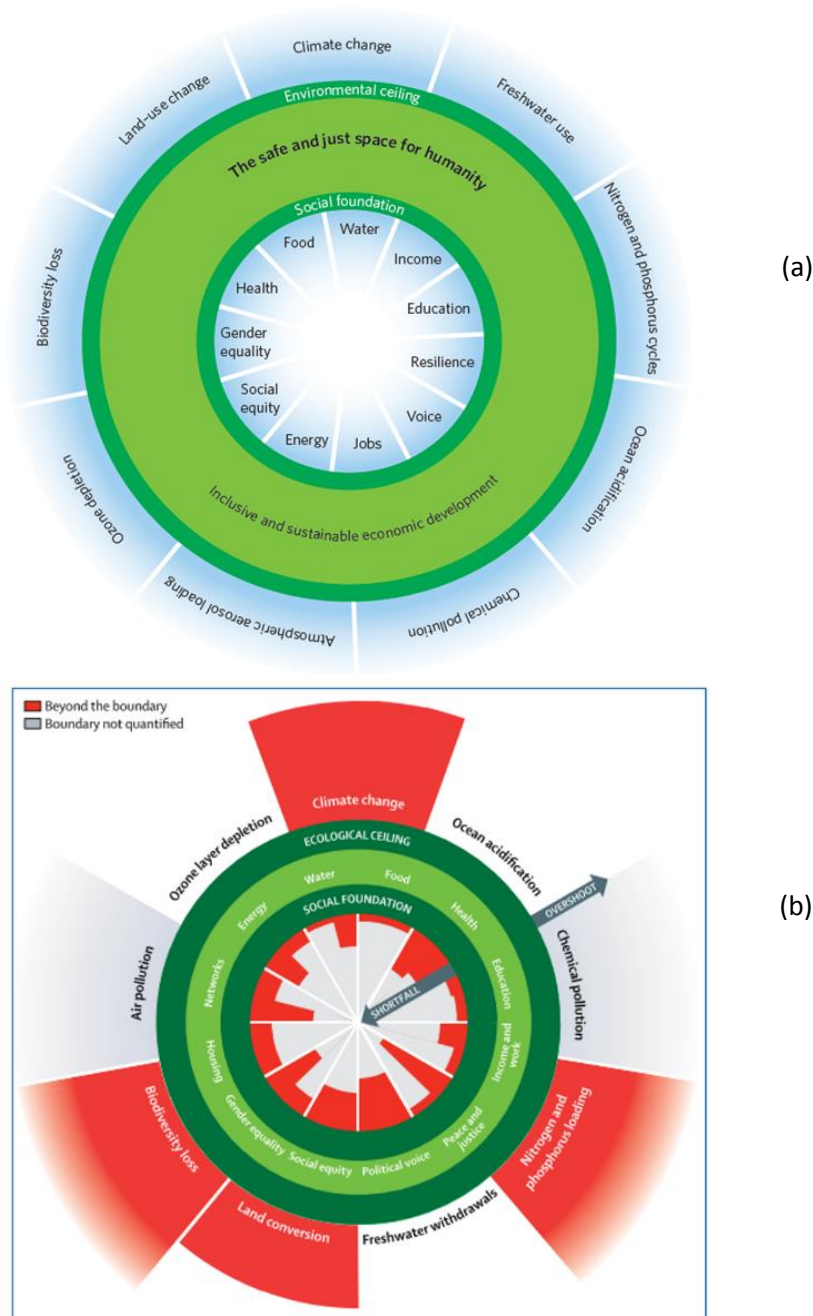


Figure 2.4 (a) The “safe and just space for humanity” lies between the inner limits of the social foundation and the outer environmental boundaries (Leach et al., 2013); Figure 2.4 (b) Ecological overshoots and human wellbeing shortfalls (Raworth, 2017).

These ideas are critical in framing the essence of the current global sustainable development challenge. This involves recognising the dependence of human wellbeing on planetary health, addressing the entrenched inequalities that are reflected in the simultaneous ecological overshoots and human wellbeing shortfalls (Raworth, 2017) and undertaking this in a way that rebuilds the ecosystems and natural resources that are needed for the world’s collective survival (Swilling and Anneck, 2012).

The range of sustainable development issues that are highlighted in the SDGs and in the planetary boundaries work, emphasises that the world is facing a number of challenges in terms of achieving sustainable development. Within this suite of biophysical, social and economic challenges, the issue of climate change is currently receiving significant attention. The following section presents the theory and literature on climate change, given that it is a core planetary boundary and because it forms the main focus of this thesis.

2.3 Climate change as a significant sustainable development challenge

2.3.1 Introduction to climate change

Climate change refers to a change in the state of the climate that persists for an extended period, typically decades or longer. These changes may be due to natural internal processes or to external processes, including changes in the composition of the atmosphere or in land use due to persistent human activities (IPCC, 2014). Human activities and land use changes can result in the release of heat-absorbing greenhouse gases (such as carbon dioxide and methane) into the atmosphere, which increase the capacity of the atmosphere to absorb and store heat. This can contribute towards rising average temperatures, which in turn affects issues such as rainfall distribution and intensity, and sea level rise. These changes can have significant impacts on economies, ecosystems, human health and wellbeing (IPCC, 2014), although the likelihood of these impacts and their potential interactions varies depending on the context. Climate change is now recognized by global scientists (e.g. Rockström et al., 2009; Steffen et al., 2015) as a core planetary boundary because of its fundamental importance for the sustained functioning of the earth system. However, the climatic changes that have been evident to date suggest that this earth system process has already exceeded its planetary boundary, suggesting that the sustainability of this global earth system has already been undermined.

2.3.2 Climate change and sustainable development

Climate change is of particular significance in the context of sustainable development given that its scope is global and long-term, and that it affects a broader range of human and earth systems than many other sources of risk (Jones et al., 2014). It also has the potential to undermine the achievement of sustainable development objectives (Denton et al., 2014). The importance of addressing climate change as a critical component of sustainable development is supported by the SDGs (with SDG 13 focusing on climate change) and by the Paris Agreement (United Nations, 2015a), which was adopted at the 21st Conference of the Parties to the UNFCCC in 2015 and which became binding on 4th November 2016. The Paris Agreement reiterates the importance of climate change in achieving sustainable development by emphasising “the intrinsic relationship that climate change actions, responses and impacts have with equitable access to sustainable development and (the) eradication of poverty” (United Nations, 2015a, p. 3), and by stating the intention of the Paris Agreement to “strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty” (United Nations, 2015a, p. 5). This close relationship between climate change and sustainable development is also emphasised in the Intergovernmental Panel on Climate Change’s (IPCC) Fifth Assessment Report, which suggests that emergent risks from climate change that relate to sustainable development include losses of ecosystem services,

challenges to land challenges to land and water management, effects on human health, and risks of harm and loss in vulnerable areas (Denton et al., 2014). Supporting these ideas, the World Meteorological Organisation's 2016 report on the global climate between 2011 and 2015 (World Meteorological Organisation, 2016), cites the estimated social, economic and environmental costs associated with high-impact climate events during this period. These include, for example, an estimated 258,000 excess deaths linked to the East African drought in 2010-2012, economic losses of approximately US\$40 billion associated with flooding in South-East Asia in 2011, and the loss of 4,100 lives as a result of heat waves in India and Pakistan in 2015. Such events are predicted to become more frequent under altered climate conditions and highlight the significant potential for climate change to fundamentally undermine the ability to achieve the goals of sustainable development.

2.3.3 Addressing the climate change challenge

Critical challenges in trying to address climate change lie in the unpredictability of climate change and its exact impacts, the difficulties associated with downscaling global climate data, and the incomplete understanding of the way in which climate change will interact with and in some cases exacerbate existing challenges such as poverty, inequality and water issues (Revi et al., 2014a). Two predominant categories of response exist to address the challenges of climate change. Climate change *mitigation* refers to human interventions that aim to reduce the sources or enhance the sinks of the greenhouse gases that alter the composition of the atmosphere and exacerbate climate change (Field et al., 2014). Mitigation initiatives could, for example, involve increasing the use of renewable energy over fossil-fuel based energy sources (which would reduce the production of greenhouse gases) or restoring forests that act as carbon sinks.

Climate change *adaptation* on the other hand (which is the focus of the eThekweni Municipality case study in this thesis) acknowledges that the earth is already committed to a level of climate change. Therefore, there is a need to adjust to actual or expected climate and its impacts and to seek to moderate or avoid harm or exploit beneficial opportunities in human systems (Field et al., 2014). Over time, the framing of adaptation has expanded to focus not only on biophysical vulnerability, but also on the wider social and economic drivers of vulnerability and how people are able to respond to these (Noble et al., 2014). Examples of climate change adaptation (Noble et al., 2014) might include engineering solutions (e.g. levees or floodwalls to reduce the impacts of sea level rise and flooding), technological options (e.g. more efficient irrigation and fertilisation methods to enhance agricultural production in conditions of climate stress), ecosystem-based adaptation using biodiversity and ecosystem services to reduce risk (e.g. the use of mangroves as a buffer to reduce damage to coastal communities), social options (e.g. social protection schemes and awareness raising activities), and institutional adaptation options (e.g. appropriate insurance facilities, and the implementation of regulations to control inappropriately located development). Although engineered and technological adaptation options are still the most common, there is growing experience of the value of other interventions in the ecosystem-based, institutional and social realms (Noble et al., 2014). It is also increasingly being recognised that climate mitigation is a critical part of climate adaptation through its potential to reduce future climate risk, and that integrating these two agendas in responding to climate change challenges, is critical (e.g. Rosenzweig et al., 2015; Roberts et al., 2016).

However, planning for climate adaptation comes with a number of challenges. These include the difficulty of predicting the exact impacts of climate change, especially since levels of risk vary across different contexts and because adaptive capacity plays a part in either reducing or exacerbating climate change impacts. The difficulties associated with making exact predictions regarding climate change and its likely impacts, also create challenges when trying to weigh up the exact costs and benefits associated with adaptation action or inaction (Dowd et al., 2013). For these reasons, determining what kind of adaptation response is most relevant in a given context is extremely challenging. There are also few reference points to guide decision-making, given that the number of local governments that have pursued programmatic responses to climate change are few and most have experienced difficulties (Bulkeley and Broto, 2013). Within this context, it can be extremely challenging for cities to introduce the concept of climate adaptation into municipal planning and decision-making and to develop their own initiatives to take this agenda forward. This is exacerbated in the developing world context, where a range of developmental challenges need to be addressed urgently and therefore these compete for the attention of decision-makers and politicians. Promoting climate change as an equally important priority in this context, is extremely difficult. This is explored further in Chapter 7.

Both the climate change mitigation and adaptation agendas received a significant global “boost” when the Paris Agreement became binding on 4th November 2016. This global agreement requires that all nations: commit to Nationally Determined Contributions (NDCs) for carbon emission reductions, in order to try and hold the increase in global average temperatures to well below 2^oC above pre-industrial levels; pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels; and foster the ability to adapt to the adverse impacts of climate change (Extracted from paragraph 1 of Article 2 of the Paris Agreement), through the development of adaptation strategies or plans. In South Africa, the country’s Intended Nationally Determined Contribution was submitted to the UNFCCC on 25th September 2015 (Department of Environmental Affairs, 2015) and summarises the current strategic direction for climate change mitigation over the short, medium and long term in the country. From an adaptation perspective, the first draft of South Africa’s National Climate Change Adaptation Strategy was circulated for comment in January 2017. It is likely that many of these responsibilities will ultimately translate to the local level, with local governments playing an important role in helping national governments to meet the required targets.

2.3.4 The significance of climate change in Africa

The impacts of climate change are likely to be felt disproportionately in countries of the Global South⁷, which are already facing significant developmental challenges for example relating to governance, inequality, and high levels of unemployment. It is now acknowledged that despite Africa’s minimal contribution to global greenhouse gas emissions, the continent is predicted to experience severe consequences from climate change and that this is likely to undermine development efforts in the region and increase poverty (EThekweni Municipality, 2017a). As an example, climate change is expected to exacerbate water stress, climate related health issues and economic insecurity in Africa

⁷ The term ‘Global South’ is used to refer to countries in Africa, Asia and Latin America, sometimes also referred to as ‘developing countries’

(Niang et al., 2014). This is made worse by the fact that poorer people and ethnic and racial minorities tend to live in more hazard-prone, vulnerable and crowded parts of cities, which increases their susceptibility to the impacts of climate change and reduces their capacity to adapt and withstand extreme events (Rosenzweig et al., 2015). In the African context, climate change adaptation is therefore an urgent component of the broader climate change response, given Africa's combination of high levels of sensitivity and vulnerability to climate change and low levels of adaptive capacity (Niang et al., 2014). An additional challenge is that cities in Africa will need to respond to climate change alongside a multitude of other developmental challenges and at a time of global environmental crisis, therefore requiring countries and their cities to increasingly integrate climate change agendas with other environmental issues such as biodiversity loss (Satterthwaite and Bartlett, 2016). However, climate change also presents an opportunity for cities to integrate climate change adaptation and mitigation into their planning and to act in different ways to minimise climate change risks and impacts.

2.3.5 Climate change and transformation

Achieving transformation through climate change responses will require significant commitment from the highest political levels to the scale of the ordinary citizen. Roberts (2016, p. 2) states that “fully operationalising the Paris Agreement and achieving a 1.5°C world will require everyone to sign up for transformative change, personally and collectively”. The required changes will include, for example, the need to delink high quality of life from high greenhouse gas emissions, changing production, consumption and waste disposal systems and promoting low carbon economic systems, as well as changing the relationship between local government and the poor, who will need the greatest support under altered climate conditions (Bartlett et al., 2016). In the context of climate change adaptation, there is still a predominant emphasis on the selection of adaptation options that involve incremental changes to reduce climate impacts (Denton et al., 2014). However, the challenge is that some of these measures “may only be short-term adaptive measures providing temporary alleviation from longer-term climate trends, failing to incorporate recognition of the need for larger scale socio-economic change” (Jarvie et al., 2015, p. 9). There is now increasing evidence that transformative changes are necessary in order to prepare for climate impacts (Noble et al., 2014) and that such change will need to involve “challenging the systems and structures, economic and social relations, and beliefs and behaviours that contribute to climate change and social vulnerability” (Denton et al., 2014, p. 1122). This is particularly relevant in cases where vulnerability is high (Denton et al., 2014), for example in the case of many African cities, where inequity, poverty, unemployment and environmental degradation are prevalent. In such contexts, transformative adaptation is needed that simultaneously addresses adaptation along with other developmental challenges to ensure a more equitable, sustainable and climate safe development path. In this regard, climate change presents critical new governance challenges, but also perhaps new opportunities to consider what form transformative adaptation needs to take, in order to address the impacts of climate change along with other social and economic challenges (Satterthwaite and Bartlett, 2016). These ideas around transformation and transformative adaptation are explored further in Chapter 3.

Climate change, and climate adaptation more specifically, is therefore a critical component of the broader sustainable development challenge, and will require transformative responses in order to fundamentally re-shape development pathways in ways that reduce emissions and facilitate

adaptation. This is particularly relevant in the African context, given existing levels of vulnerability. The selection of an African climate adaptation case study for this thesis is therefore significant.

2.4 Cities, sustainable development and climate change

Importantly, the Rio+20 outcome document, “The Future We Want”, emphasises the need to think globally but to act *locally* in order to achieve sustainable development goals (United Nations, 2012) and highlights the role of cities as both contributors to, and potential solutions for, the current sustainable development challenges. The important role of cities in this context has been recognised for some time, with the emergence in the 1980s of the concept of “sustainable cities” which focused on the environmental and social challenges in cities and what role cities can play in contributing towards sustainable development (see e.g. Haughton and Hunter, 1994; Satterthwaite, 1999). The United Nations’ endorsement in September 2015 of SDG 11, which is to “Make cities and human settlements inclusive, safe, resilient and sustainable”, reflects a growing acknowledgement globally that it is *cities* that lie at the heart of the sustainable development debate, with 54.5% of the global population already living in cities in 2016, and an expectation that this will reach 60% by 2030 (United Nations, 2016b). This is reflected in the New Urban Agenda (United Nations, 2016a), which emphasises the importance of sustainable *urban* development as a critical step towards realizing sustainable development, and points to the implementation of the New Urban Agenda as an important contributor in localising the implementation of the 2030 Agenda for Sustainable Development, through its specific focus on SDG 11. Importantly, global climate impacts are also concentrated in urban areas (Revi et al., 2014b) and therefore the way in which urban areas are planned, financed, developed and governed has a direct impact on sustainable development and climate resilience well beyond the urban boundaries (United Nations, 2016a).

At their best, cities are centres of vitality and diversity where the common good can be met (Satterthwaite and Bartlett, 2016). However, “the dominant processes that drive cities’ economic success... do not of themselves produce healthy or sustainable or inclusive cities. Nor do they produce cities adapted to climate change” (Satterthwaite and Bartlett, 2016, p1). The New Urban Agenda echoes these ideas through its recognition that cities currently face significant threats from “unsustainable consumption and production patterns, loss of biodiversity, pressure on ecosystems, pollution, natural and human-made disasters, and climate change and its related risks” (United Nations, 2016a, point 63). Although cities occupy a relatively small per cent of the earth’s land surface, they account for 60 to 80 per cent of energy consumption and 75 per cent of carbon emissions (Godfrey and Sage, 2012). The current rate of urban expansion also brings with it serious challenges if not managed correctly, and is likely to be accompanied by an infrastructure boom in road construction, water and sanitation, energy, transport and buildings (Seto et al., 2012). This growth puts additional pressure on resources and environmental assets (Godfrey and Sage, 2012) and the cumulative impact of these local urbanisation trends will have significant impacts at a global scale (Seto et al., 2012). This is particularly true in Africa, where the number of cities with 500,000 inhabitants or more is expected to grow by 80% between 2016 and 2030 (United Nations, 2016b). In this way, what happens in cities (and in *African* cities in particular), has significant implications for addressing sustainable development challenges at a global scale.

From a climate change perspective, given that cities are the major centres of energy consumption and carbon production and that they are also home to highly vulnerable urban communities, it is therefore “in the urban arena that much of the struggle to avoid a global climate catastrophe while achieving social development objectives will be played out” (Friend et al., 2016, p. 67). Importantly, 95% of future urban growth is expected to happen in the developing world (Godfrey and Sage, 2012). This rapid urbanisation can result in the expansion of informal settlements, and a growing inability to meet basic service and infrastructure requirements, which can exacerbate levels of vulnerability. This, in turn, is exacerbated by climate change with some predictions suggesting that, unless preventative action is taken, climate change-related natural disasters will put 1.3 billion people and \$158 trillion worth of assets at risk by 2050 (Hurst and Clement-Jones, 2016), double the total annual output of the global economy. For these reasons, cities are increasingly being recognised as having a significant role to play in responding to climate change (Bulkeley and Broto, 2013). Local governments, as the entities responsible for managing development, rights, access and resource use at the level of cities, therefore also have a critical role to play in providing the regulatory framework within which other stakeholders can contribute and collaborate in responding to sustainable development and climate change challenges (Revi et al., 2014a).

Cities are therefore a critical locus for action in achieving sustainable development and in addressing the challenges of climate change. They have a number of advantages in this respect. Importantly, cities are “at the coalface” when it comes to experiencing the social, economic and environmental challenges that result from certain development pathways and can act more quickly and easily to address these. They are also centres of innovation that can provide opportunities for social and political transformation (Friend et al., 2015). As Friend et al (2015, p. 4) highlight in their working paper, “the density and diversity of interacting agents, organizations, cultures, communities, forms of knowledge, and worldviews (in cities) can generate novel social networks, technologies and governance structures that challenge and transform existing relationships”. The high density of cities can also bring efficiency gains and technological innovation while reducing resource and energy consumption. This concentration of power, people and politics in cities, therefore represents “our greatest hope of transforming society and creating a *Homo urbanis* that can live within the safe operating space provided by planetary boundaries and of building societies that value equity and well-being rather than GDP and profit” (Roberts, 2016, p. 3). There is a growing body of evidence that supports the importance of city level action in addressing global sustainable development challenges. A recent C40⁸ report entitled “Deadline 2020: How cities will get the job done” (Hurst and Clement-Jones, 2016) attempts to unpack the changes that C40 cities will need to make in order to contribute towards the global climate goals of the Paris Agreement. The report suggests that, if the actions proposed in the report are implemented by C40 cities, this could represent an estimated 40% contribution to meeting the global greenhouse gas emissions reductions targets outlined in the Paris Agreement. The report also suggests that urban centres are vital sources of adaptation solutions that are essential to successful global adaptation. In both new and existing urban areas, cities therefore have a critical leadership role to play in testing new sustainable development approaches and climate change responses and exploring what alternative and transformative development pathways are possible in a world that is facing increasingly complex social, economic and environmental challenges. This is particularly important in the context of climate change.

⁸ C40 is a network of approximately 90 of the world’s megacities that are committed to combating climate change

The selection of an African urban climate adaptation case study for this thesis, as a means through which to explore and understand transformation and transformative adaptation and how these might translate into meaningful action in a local government context, is therefore important in contributing to the discourse around transformation in environmental governance. The following chapter will explore the concepts of transformation and transformative adaptation in detail.

CHAPTER 3: EXPLORING TRANSFORMATION AND TRANSFORMATIVE ADAPTATION

3.1 Introduction

The previous chapter highlighted the growing sense of urgency that now surrounds the global sustainable development agenda, which is supported by research suggesting that environmental (e.g. Steffen et al., 2015) and social (e.g. Leach et al., 2013) boundaries are already being crossed, and that current development paths are moving economic and social systems beyond the “safe and just space” in which humanity needs to survive. A critical message emerging is that in a world of thresholds and increasing risks and vulnerabilities, there is a need to: navigate new development pathways that remain within environmental and social boundaries; understand the potential environmental, social and political implications of alternative development options; and explore the system transformations that will be needed to facilitate the meaningful implementation of these alternatives. Therefore, although the global sustainable development debate is not a new issue (as outlined in Chapter 2), there is a growing sense of urgency around the need to respond more effectively to these challenges. In response to such calls, a growing body of contemporary literature is emerging that is focused specifically on transformation in the environmental governance arena and which is directed towards examining the concept of transformation more closely and trying to understand its driving forces and characteristics. As mentioned previously, within the broader sustainable development context, a more sector-specific body of literature is also emerging in the climate change field regarding transformative adaptation. This literature draws from, and builds on, the ideas in the environmental governance transformation literature, but also grapples with what this means in the climate adaptation field specifically.

The chapter draws strongly from social-ecological systems theory, which argues that human and natural systems need to be considered as a single, complex system (Redman et al., 2004). This requires understanding the social actors and institutions that operate within any biophysical or geophysical unit, and how these relate to each other. A social-ecological systems approach is critical in generating knowledge around sustainable environmental governance solutions, as it explicitly recognises that there are connections and feedbacks between human and natural systems and that integrated data from a range of natural and social science disciplines is needed to understand these complex social-ecological interactions (Leslie et al., 2015). Social-ecological systems theory states that there are three aspects to the dynamics of complex social-ecological systems and the way in which these evolve. These three aspects are: resilience, adaptability and transformability (e.g. Walker et al., 2004; Folke et al., 2010). In this thesis, a social-ecological systems framing is therefore used to: understand transformation as part of a continuum of responses that are relevant when responding to environmental change; articulate what distinguishes transformation from other responses; and understand the particular contexts in which transformation is appropriate and relevant. Given the climate change adaptation focus of the case study, the chapter also draws from the climate change and transformative adaptation literatures.

The literature review in this chapter therefore focuses on transformation in environmental governance, and on transformative adaptation within the context of climate change specifically. In many instances in these two literatures, the concepts that frame what constitutes transformation and transformative adaptation are the same and therefore these are discussed together. For example, the idea that transformation should involve fundamental system shifts that address underlying causes of vulnerability, is applicable in the context of transformation in environmental governance, and also in the context of transformative adaptation. Such ideas are therefore reflected in both bodies of literature. There are also instances where concepts relating to transformation in environmental governance were not specifically found in the transformative adaptation literature. However, these ideas are also seen to be relevant within the context of transformative adaptation, given that climate change is a component of sustainable development. For example, the literature on the need for “shadow systems” of governance to facilitate innovation and transformation in contexts where new ideas cannot be immediately integrated into systems, does not make specific reference to climate change but is assumed to also be relevant within this context. Finally, there are a number of characteristics that appear specifically in the evolving transformative adaptation literature, for example the need for the climate mitigation, climate adaptation, disaster risk reduction and development agendas to be integrated in order to achieve transformative adaptation. Where relevant, these distinctions across the two bodies of literature are made clear.

However, although there are a number of theories, frameworks and approaches that provide insights on transformation (University of Oslo, 2013) and transformative adaptation, there is still no comprehensive understanding of how deliberate, non-linear transformation towards a common goal comes about. Transformation means different things to different people and there are many understandings of how these changes happen (O’Brien and Sygna, 2013). Rickards and Howden (2012) for example, suggest that the different perspectives on what constitutes transformation are linked to the fact that there are many dimensions and scales across which transformation can take place, and that change can be planned, deliberate, unplanned or forced. Therefore, deciding what constitutes transformation can be both subjective and relative. As Bahadur and Tanner (2014) highlight, the term “transformation” is rapidly becoming part of the policy domain without the accompanying guidance that is needed for implementation. In addition, the urgent calls for transformation have rarely been translated into practice, given the political realities that underpin urbanisation and the institutional structures and processes that accompany these which make transformation challenging (Friend et al., 2015). However, some pointers do exist in the literature to help translate the theoretical concept of transformation into practice. These suggest that understanding the nature and extent of change that occurs, the processes that catalyse and sustain transformation and the outcomes from transformation, can assist not only in identifying instances where transformation has occurred but also in more proactively initiating transformation processes. These ideas are detailed further in this chapter.

The chapter therefore begins by providing an overview of contemporary ideas on transformation. Transformation is first presented as one of a continuum of responses to change (including “resilience” and “adaptation”) that are possible when considering future development pathways. The concept of transformation and its characteristics are then unpacked further. The chapter also suggests that transformation is increasingly shaping the resilience and adaptation discourses. This is then demonstrated through a sector-specific focus on transformative adaptation in the climate change

field, given that this is the focus of the case study for this thesis. Distinctions between incremental and transformative change are also discussed. The chapter goes on to explore the factors that catalyse, facilitate and act as barriers to transformation and transformative adaptation. These ideas are then summarised in a heuristic framework, before the role of cities in transformation is briefly considered. The ideas contained in this chapter are useful to provide a framework against which to assess: the nature of change that has taken place in the eThekweni Municipality case study and whether this can be considered as transformative adaptation; the factors that have either facilitated or hampered transformative adaptation in the case study; and the extent to which the experience of eThekweni Municipality is similar to or different from the ideas captured in the transformation and transformative adaptation literatures. This will assist not only in understanding the changes that are emerging in the climate adaptation case study, but also in providing broader insights into transformation in environmental governance and what form this might take in the context of African local governments.

3.2 Contemporary ideas on transformation in environmental governance

In a context of environmental and social thresholds, a number of responses are possible in order to respond to environmental change. Walker et al (2004) for example, argue that the future path of social-ecological systems will largely be determined by their “resilience”, “adaptability” and “transformability”. In this section, broad definitions are first outlined for each of these concepts, before exploring the way in which these concepts are being continually moulded in a way that makes them less individually distinct and more like “place-holders” along a continuum of change responses. An understanding of these terms is important in order to be able to understand what distinguishes transformation within this continuum, since this is the focus of the thesis.

3.2.1 The change response continuum: resilience, adaptation and transformation

Pelling (2011) describes “resilience” as the tendency towards functional persistence, in other words the ability of a system to absorb a disturbance, adjust and remain relatively unchanged in its function, structure and identity. This is reflected in the definition of urban resilience provided by the “100 Resilient Cities Programme⁹” as being “the capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience” (www.100resilientcities.org, 02/08/2016). “Adaptation¹⁰” is described by Folke et al (2010) as a process of adjustment in response to external drivers, that allows for continued development along the same trajectory and that is facilitated by learning, combining knowledge and experience and adjusting to the changes that emerge as drivers. As O’Brien and Selboe (2015a, p. 3) point out, such responses can be autonomous or planned, reactive or anticipatory, but fundamentally involve a recognition of the reality of change and the need to adapt to “suit different conditions, whether these are political, social, cultural, technological or psychological”. With regards to climate change specifically, the IPCC defines adaptation as the process of adjustment to actual or

⁹ “100 Resilient Cities” is a programme pioneered by the Rockefeller Foundation and is dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century. The programme provides selected cities with the resources to develop a Resilience Strategy.

¹⁰ In the social-ecological systems theory literature, ‘adaptation’ is used in its broader sense of adapting to environmental change. *Climate change adaptation* represents a specific response to the changing climate. This distinction is made in the text where relevant.

expected climate and its effects, and emphasises that in human systems, adaptation seeks to moderate harm or exploit beneficial opportunities arising from these external changes (Field et al., 2014).

However, in the face of accelerating environmental change, there is growing critique that resilience and adaptation responses do not adequately address the type of change that is required to respond to the escalating global environmental crisis. O'Brien (2011) for example, suggests that adaptation to global environmental change is not enough and questions whether adaptation is a form of "environmental determinism" that focuses more on accepting the need to respond, rather than looking to proactively alter or challenge the underlying systems that create the problems currently facing the world. In so doing, O'Brien (2011) suggests that a new science on non-linear and deliberate transformation needs to complement and supplement the current adaptation research, as an alternative response to environmental change. Transformation goes beyond resilience and adaptation and acknowledges that when the status quo is no longer acceptable, or when change is seen to be needed in anticipation of a systems failure, it may be necessary to completely alter the existing system (Folke et al., 2010). What emerges in the literature is therefore a continuum of responses to change: at one end of the continuum lie those responses that seek to retain absolute system stability (of the type reflected in the more traditional definitions of resilience), while responses that seek to fundamentally alter systems, lie at the transformative end of the continuum.

3.2.2 Understanding transformation

Transformation is distinct from resilience and adaptation responses, in that it seeks to challenge the structural causes of risk that lie within and are reproduced by dominant development practices and pathways, and results in a change in the fundamental attributes of a system, often based on altered paradigms, goals, or values (Revi et al., 2014a; Solecki et al., 2015; Pelling et al., 2015). At the level of systems change, transformation requires an understanding of the systems that create environmental challenges and human vulnerability and seeks to change these, regardless of whether these systems are technical, economic, social or political (O'Brien and Sygna, 2013). The term suggests a capacity to construct new development trajectories that can involve radical shifts, directional turns (Pelling et al., 2015), shifts in patterns of interaction among actors including leadership and political and power relations, and associated organisational and institutional arrangements (Folke et al., 2010). Solecki et al (2015) point out that transformation can open new policy options once resilience meets its limits and can extend from personal level to systems level change (Pelling, 2011; O'Brien and Sygna, 2013). Although not all transformations are positive, their focus on fundamental system change can open up opportunities for greater social and economic equality, public participation, rights and sustainable development. Such transformation is seen to be facilitated by factors such as reflection, deliberation, innovation, learning, and leadership (University of Oslo, 2013).

O'Brien and Sygna (2013) suggest that there are three "spheres of transformation" where fundamental changes can occur: the "practical sphere" of transformation includes implementation, technical solutions and institutional changes; the "political sphere" of transformation represents the economic, political, legal, social and cultural systems that have been established over time, and which define the structures and boundaries within which practical transformation takes place; while the "personal sphere" of transformation lies at the level of the individual and is argued to be at the core

of any transformation. In the context of climate change for example, O'Brien (2011) emphasises that the need to understand people, their worldviews and values is a critical component in trying to balance the objective systems approach of climate change and its subjective interior (human) dimensions. This changed "sense of self" can result in individuals shifting from being passive subjects in relation to climate change, to becoming active players in determining the future of their community and world (O'Brien and Hochachka, 2010). Including a focus on individual transformative capacity alongside that of broader social, economic and political systems is essential in helping to deal with the increasing levels of environmental and social complexity that face the world (Ziervogel et al., 2016). Transformation therefore "conveys an occurrence of profound system change, which entails not only structural and behavioural changes but also a realignment of the values and goals espoused by collective and individual actors within a system" (Bartlett et al., 2016, p. 233).

The above descriptions are important in distinguishing a transformative response from one that is focused on resilience or adaptation. In order to make such distinctions clearer, Redman (2016) provides a useful example that distinguishes a transformative response from an adaptive one, related to the case of addressing the urban challenge of traffic congestion, pollution and resource use. He suggests that a "smart cities" approach, aimed at improving the efficiency of existing systems, has a number of benefits, but it is based on the objective of perpetuating existing systems. A transformative approach on the other hand, would consider how to alter the underlying drivers of these urban challenges, for example by promoting changes in residence patterns and urban form so that the movement of people is reduced and changed, or by moving to more distributed energy systems. In another example, Ziervogel et al (2016) argue that in developmental contexts such as those of the global South, where social and environmental injustice are prevalent, transformation would require a contestation of the existing systems that tend to favour elites and undermine environmental, social and economic sustainability. In Durban, South Africa for example, Hordijk et al (2014) explored the post-Apartheid changes in water governance that took place in the city. In this case, the eThekweni Municipality's Water Services Unit translated national policy goals around basic service provision and water as a human right, into differentiated and innovative service provision that saw the most indigent members of the population receiving a free basic amount of water. The practical shifts in water provision, along with the Unit's commitment to experimentation and learning, were assessed by the authors to be early signs of transformation in water governance within this context, even though this was developed in a broader context of inequality. Friend et al (2015, p. 6) add to these ideas by emphasising that "achieving urban transformations is first and foremost a challenge of governance; of reconfiguring state-society relations, and of ensuring wellbeing, social justice and equity for an ecologically viable future". A challenge however is that it is not always clear what needs to be transformed and why, and in whose interests this will be (O'Brien and Sygna, 2013).

3.2.3 Outcomes of transformation processes

In assessing whether transformation or transformative adaptation has occurred, it is also important to consider the *outcomes* of the transformation that has taken place and whether this is positive or negative. Transformation is not a neutral process and there are diverse interests and values at stake (University of Oslo, 2013). Like all societal change, it is politically charged, often contested and can involve conflict (Brown et al., 2013) and it is therefore important to give appropriate consideration to the subject of transformation (i.e. who/what is being transformed?), who the main agents for this

transformation are (e.g. the state, civil society or individuals) and whether the equity and ethical dimensions of transformation have been appropriately explored (Denton et al., 2014). In their commentary on the need to explore alternative development pathways within the context of the “safe and just space” for humanity, (Leach et al., 2012, p. 4) emphasise that different pathways will: involve different actors, interests and values; result in “significantly different winners and losers, opportunities and risks”; and may involve choices and trade-offs. They suggest that part of navigating these alternatives is to assess their implications in terms of *direction* (where will the proposed alternative end up in terms of exceeding the inner social and outer environmental limits of the “safe and just space for humanity”?), *diversity* (is there a diversity of approaches being tested?) and *distribution* (who is likely to benefit and/or lose from the proposed pathway and how is this distributed?). In relation to transformative adaptation, Bahadur and Tanner (2014) reinforce these ideas and indicate that transformative adaptation needs to address issues of power imbalances, for example through making processes more deliberative and equitable, addressing the needs of the vulnerable and promoting social cohesion and inclusion. These questions provide a useful starting point to begin to assess which development pathways are most likely to lead to a future that is more sustainable and just, and provide a metric against which to assess whether the climate adaptation outcomes emerging in the eThekweni Municipality case study for this thesis, demonstrate the principles of equity, justice and ecological sustainability that are required, in order for these to be considered as transformative adaptation that leads to broader transformation.

3.2.4 The integration of transformation into the resilience and adaptation discourses

Although the broad definitions described above provide a starting point for understanding resilience, adaptation and transformation, these terms are by no means distinct and they are increasingly shaping each other and being used in more integrated and overlapping ways. Figure 3.1¹¹ illustrates the connectedness of these concepts along the continuum of responses that is articulated in social-ecological systems theory.

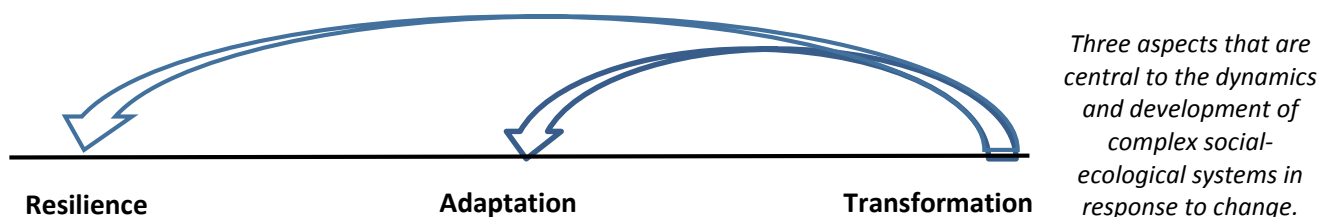


Figure 3.1: Transformation is increasingly shaping the resilience and adaptation discourses along a transformation continuum.

¹¹ It should be noted that Figure 3.1 is intended to show the links between the concepts of resilience, adaptation and transformation and not to represent a linear relationship between them. In reality, the relationships are likely to be more complex and less predictable.

The concept of “resilience” for example, has theoretical appeal, but has come under significant critique. One of the reasons for this has been the perception that there are inherent limitations to resilience-based approaches and that resilience does not create enough space for the more significant changes that are needed to move societies to sustainability (Pelling and Manuel-Navarrete, 2011). Resilience efforts therefore need to be accompanied by whatever transformations are required in the social and political conditions to prevent the creation and perpetuation of vulnerabilities (Leichenko et al., 2015). This implies a “bouncing forward”, rather than a “bouncing back” approach (e.g. Manyena et al., 2011, cited in Leichenko et al., 2015), the latter having significant social justice implications if the conditions that one is bouncing back to, are not favourable for much of society. This consideration of transformation as part of the concept of resilience, is also reflected in the IPCC’s articulation of resilience as “the capacity of a social-ecological system to cope with a hazardous event or disturbance, responding or reorganizing in ways that maintain its essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation” (Fraser et al., 2016, p. 18). Similarly, Bahadur and Tanner (2014) argue that the concept of resilience has conceptual strength, but that a more radical agenda is required that will address underlying system issues, relating for example to issues of people, power and politics. This implies that, for a system to be resilient, fundamental *transformation* may be needed. Durban’s Preliminary Resilience Assessment (EThekwini Municipality, 2015), compiled as a deliverable for the “100 Resilient Cities Programme”, also acknowledges that when the resilience limits of existing systems have been met, transformation provides a useful framing concept for the state changes that may be needed to move towards a more sustainable and equitable development path. This assessment emphasises that resilience is therefore not a stand-alone concept, but rather is part of a “continuum of responses that cities will have to deploy in negotiating the challenges of the 21st Century” (EThekwini Municipality, 2015, p. 7) and that, in different contexts, the most appropriate response may vary.

In the same way that transformation is increasingly becoming part of how resilience is framed, the adaptation discourse has also seen shifts to incorporate transformation. Solecki et al (2015) for example, suggest that there are a range of development pathways available that lead either to improved adaptation of a system or to its collapse. In their conceptual framework, designed to define the theoretical links between resilience and transformation, Solecki et al (2015) represent resilience and transformation as positions along an adaptation pathway continuum, with a range of drivers contributing to whether the system moves from one state to another. Similarly, Pelling (2011) considers three forms of climate change adaptation that draw on elements of resilience, transition and transformation, and which mark points along a change response continuum. From his perspective, *resilience* adaptation implies that existing activities are refined to improve performance without changing the assumptions and routines that guide how a system functions. This can result in practices that are not sustainable (Hordijk et al., 2014). *Transitional* adaptation describes incremental changes that take place within a system to enhance adaptation, but where the overarching norms and systems remain relatively unchanged. *Transformational* adaptation implies that the “root and proximate causes of risk that lie within and are reproduced by dominant development practices and pathways” are considered when developing climate adaptation responses (Revi et al., 2014b, p. 27). In such instances, “transformation is effected through adaptive actions that shift existing systems (and the structures, institutions and actor positions that are components of the system) onto alternative development pathways, even before the limits of adaptation are met” (Pelling et al., 2015, p. 114). Such approaches, that address the underlying failures of development, are seen by Pelling et al (2015)

to have the greatest potential to move beyond the protection of existing systems, so that new climate adaptation possibilities can be opened.

The literature therefore indicates that transformation is increasingly being considered as a critical component of *any* response to global environmental challenges but that, depending on the context, the exact nature and the extent of change required, may vary. The same is true in the particular context of climate change, where there is growing acknowledgement of the need for transformative adaptation in order to address the systems that perpetuate issues of inequity, injustice and unsustainable practices. This suggests that, although there is a set of transformation principles in the broader context of sustainable development and environmental governance, these principles are increasingly being translated into sector specific discourses. The climate change field is one example. Transformative adaptation is explored in greater detail in the next section, given that this is the focus of the case study.

For the purpose of this thesis, understanding this transformation continuum (as shown in Figure 3.1) is critical in order to understand what distinguishes transformation from other responses to change, and to more accurately locate the changes that are seen in the eThekweni Municipality climate adaptation case study in relation to this.

3.3 Making transformation sector-relevant: The example of “transformative adaptation” in the climate change field

As indicated in Chapter 2, climate change adaptation involves an adjustment to the actual or expected climate and its impacts, and seeks to moderate or avoid harm, or exploit beneficial opportunities, in human systems that are affected by climate change (Field et al., 2014). Adaptation has traditionally been seen as a process of incremental adjustments to a changing climate but it is now anticipated that this approach will be insufficient to respond to future climate change and that a deliberate pursuit of transformative adaptation may be required (Denton et al., 2014).

3.3.1 *The characteristics of transformative adaptation*

As indicated previously in this chapter, transformative adaptation is seen to involve a significant alteration of an existing system in a way that challenges the root drivers of climate risk that lie within and are reproduced by dominant development practices and pathways. As Pelling et al (2015) argue, seeing transformation as one of the pathway choices for adaptation helps to open up a broader range of adaptation options, that in turn begin to facilitate informed questions being asked about the structural (rather than proximate) causes of risk, and the dominant values that determine development pathway choices. The transformative adaptation literature is, however, still emerging and is relatively sparse (Jones et al., 2014) and, as O’Brien and Selboe (2015a) indicate, the redefinition of climate change adaptation to include transformation is largely absent in the climate change adaptation literature. They highlight that greater emphasis is still placed on “to do lists” relating to climate impacts, what needs to be done and by whom, more than on addressing the “conflicting values, interests, understandings and approaches to change... and the wider and deeper systems and structures that are contributing to risk” (O’Brien and Selboe, 2015a, p. 2). Despite the complexity and

ambiguity in the definition of transformational adaptation (Cramer et al., 2014), the evolving literature in this field does provide some initial pointers regarding additional characteristics of transformative adaptation in addition to those already described for transformation in environmental governance. These are outlined below:

Transformative adaptation integrates the climate change adaptation, climate change mitigation, disaster risk reduction and development agendas

As Fraser et al (2016, cited in Bartlett and Satterthwaite, 2016, p. 26) suggest, the concept of transformation:

“...potentially unites the climate change mitigation and adaptation agendas with the development agenda, calling for adaptation planning and action that aims to facilitate climate change mitigation efforts and to support socially just and ecologically sustainable development”.

This requires broadening the concept of adaptation to include a just transition to a low carbon future as a key part of reducing vulnerability and risk in a climate stressed future (Roberts et al., 2016). It also requires adaptation responses that support the goals of sustainable development (Denton et al., 2014), for example through addressing issues of housing protection, service delivery, job creation, infrastructure and public services in contexts where these are not uniformly available. Disaster risk reduction also needs to be seen as a central part of the climate adaptation agenda (Rosenzweig et al., 2015). However, the critical challenge lies in integrating these four agendas in ways that maximise overlaps and positive synergies and minimise or avoid negative feedbacks between them (Denton et al, 2014; Satterthwaite et al., 2016).

Transformative adaptation ensures that climate adaptation outcomes are socially just, equitable and environmentally sustainable

As Revi et al (2014b) emphasise, cities that are able to integrate their development and adaptation policies and investments in ways that also tackle issues of poverty, inequality, environmental justice and mitigation, have the potential for transformative adaptation. This is critical given that fostering greater equity, justice and human wellbeing enhances social capital and increases a city’s capacity to respond to climate change (Rosenzweig et al., 2015), especially amongst the most vulnerable. Similarly, placing ecological values at the centre of urban planning is central to transformative adaptation because of the way that this fundamentally addresses the underlying failure of development to be environmentally sustainable (Pelling et al., 2015). In this way, because of its focus on addressing the underlying causes of vulnerability to climate change (whether these relate to social inequity or ecological degradation), transformative adaptation has the potential to contribute towards the goals of sustainable development and may require fundamental shifts in current economic systems, development approaches and social relations, in order to achieve these (Taylor et al., 2014).

Transformative adaptation facilitates decision-making that is collaborative, equitable and informed

For climate adaptation to be considered transformative, engagement (e.g. for risk assessments and climate adaptation planning) needs to include a broad diversity of stakeholders and scientists (Rosenzweig et al., 2015), including communities themselves. This is particularly important in the case of climate change because it is often at the level of communities that climate impacts and appropriate responses to these are best understood. Transformative adaptation therefore has the potential to challenge existing “top-down” governance systems by encouraging improved engagement with a wide diversity of actors and drawing on different knowledge sources that could have the potential to address the challenges more effectively (Baird et al., 2014). Archer et al (2014) echo these ideas by arguing that approaches that give more room to community voices can help re-shape how climate change problems are understood and how they are responded to. This highlights the need for local government to more actively “recognise and support these (community) organisations to influence what is prioritised and how priorities are addressed” (Satterthwaite et al., 2016, p. 254). In particular, addressing the four integrated agendas of climate adaptation, mitigation, disaster risk reduction and development (described above) will require the capacity and skills to ensure that all sectors in local government learn and act together in more integrated ways, and that citizens and civil society are engaged in new ways that create opportunities for local contributions to be proposed and discussed (Satterthwaite et al., 2016).

Transformative adaptation challenges and changes institutional and governance systems where this is necessary

Addressing the complex challenges posed by climate change requires system-wide transformative thinking and this can be both disruptive and threatening to many interests (Leck, 2012). Advancing a climate adaptation agenda may for example require cities to shift the values and goals that guide their priorities (Carmin et al., 2012). The goal of transformation may also “fundamentally challenge the standard operating procedures of the organisation” (Pelling et al., 2015, p. 124), for example in relation to how the institution is structured or the policies and systems that guide how it works. A specific challenge in this regard is that, within local government institutions, the complexity and cross-cutting nature of climate change policies does not fit well into existing bureaucratic institutions where departmental divisions are well entrenched. Effective climate programmes require innovative and adaptive responses that span these departmental divisions and this can challenge “silo-ised municipal offices that are embedded in their own organisational cultures and technical practices” (Aylett, 2013, p. 2). An additional challenge is that, given the systemic nature of the climate change challenge and the multiple scales and time horizons across which climate change and its impacts operate, new skills and partnerships will be required to address the challenges and to enhance the opportunities to leverage non-traditional sources of finance for implementation (Rosenzweig et al., 2015). At present however, “the challenge of coordinating across the governmental and non-governmental sectors, jurisdictions and actors that is necessary for transformative urban climate change policies is often not met” (Rosenzweig et al., 2015, p. 19). Making climate change adaptation part of the core business of local government therefore involves a process of socio-institutional and political change and requires municipal institutions to be open to transformation and to be sufficiently adaptive to respond to these emerging challenges (Taylor et al., 2014).

Transformative adaptation acknowledges the need to work across different spatial, time and governance scales to leverage the greatest impacts

From a *spatial* perspective, transformative adaptation requires an ability to work across municipal boundaries, given that climate change impacts do not adhere to these human constructs. Therefore local governments with the capacity to influence and work with neighbouring local governments and to manage land use changes in ways that protect ecosystem services, will have greater potential for transformative adaptation (Revi et al., 2014b). From a *temporal* perspective, it is equally important to consider that adaptation is an ongoing objective and that no one and no system will ever be fully adapted to climate change. This means that adaptation interventions need to be planned over longer timeframes and mechanisms need to be put in place to ensure that there is coherence and continuity across these (Rosenzweig et al., 2015). This highlights the importance of institutional systems and individual champions that can help ensure sufficient institutional memory for continued effectiveness. From a *governance* perspective, transformative adaptation requires an ability to work across scales – from the local government level to national and international levels (Revi et al., 2014a; Rosenzweig et al., 2015), and to raise the profile of local action so that this informs national and international climate adaptation policies and programmes and positions local governments appropriately to access the necessary funding and support for implementation. This will require local governments to participate in city networks at the national and international level in order to “advance the strength and success of city-level climate planning and implementation” (Rosenzweig et al., 2015, p. 2) and to help accelerate the diffusion of good ideas and best practices to other cities in order to facilitate wide-spread transformative adaptation.

It is important to note that, although the above-mentioned characteristics of transformative adaptation have been discussed separately from earlier descriptions relating to transformation in environmental governance, climate adaptation is a critical part of achieving sustainable development and therefore some of the characteristics of transformative adaptation will also be relevant to transformation in other fields of sustainable development and environmental governance.

Despite the challenges associated with implementing transformative adaptation, there are a number of local governments that have begun to successfully integrate climate adaptation into their planning and decision-making, and whose adaptation projects are seen to represent “pockets of innovation” in an arena where there is generally very little evidence of transformative adaptation taking place (Revi et al., 2014a). This thesis applies these ideas through an assessment of eThekweni Municipality’s climate adaptation work and will reflect on the extent to which the changes seen can be considered to be transformative, in the ways described above.

3.3.2 Integrative frameworks for understanding transformative adaptation processes

Given the complexity of transformation and transformative adaptation, there are multiple frameworks and organising devices emerging that aim to help understand dynamics in the climate adaptation field (e.g. Park et al., 2012; O’Brien and Sygna, 2013; Solecki et al., 2015). The framework provided by Pelling et al (2015) is seen to be particularly useful in the context of this thesis, given its climate change adaptation focus and its attempt to define and understand the interactions between the components within an “adaptation activity space”.

In their “adaptation activity space framework”, decision-making in the context of climate adaptation is described as taking place in seven diverse and co-evolving components within the broader climate adaptation activity space. The seven components of the adaptation activity space, and the changes that follow, are described briefly below:

- Individual: Changes that happen to the ways in which individuals acquire knowledge, and the influence this can have in terms of altering their way of thinking.
- Technology: Changes that happen in material interventions (e.g. engineering solutions, new management tools) and in organisational innovation in terms of structure and function.
- Livelihoods: Refers to the skills sets, production and labour processes that describe the modes of economic reproduction available to those at risk.
- Discourse: The conceptual models that place boundaries on the interventions that are possible.
- Behaviour: Involves changes in routine and day to day behaviours.
- Environment: Involves the recognition of ecological, chemical and physical systems and the fact that these evolve with social and technological systems.
- Institutions: Responsible for regulating and facilitating social behaviour and power relations.

Each component is seen to be able to transform independently through internal change processes, or to interact with other components to either facilitate or limit non-linear change within the context of the broader system. Pelling et al (2015) also pose a number of research questions related to the “adaptation activity space framework”. These questions relate to: the relative significance of individual components in the adaptation activity space in specific cases of transformative adaptation; the manner in which components interact to produce particular outcomes; and the extent to which systemic transformation requires transformative adaptation across all components. They argue that understanding these questions has implications for programmes and policy interventions in the climate adaptation space. Given the climate adaptation focus of the case study in this thesis, the “adaptation activity space framework” is potentially useful in helping to articulate and understand the changes that emerge in the eThekweni Municipality case study, and the activity spaces that contribute to this.

3.4 Incremental and transformative change

Although transformation and transformative adaptation might be the objective in some contexts, these are normative ideas and therefore, given that there is no absolute “endpoint”, it is the process of moving in the direction of these objectives that is important. It is also important to consider whether an immediate shift to a transformed state is possible (and required), or whether incremental change is needed to more gradually transition the system to a transformed state.

Handmer and Dovers (2009, cited in Mustelin and Handmer, 2013) caution that in dealing with complex problems that require new approaches, careful consideration must be given to what needs to be changed and how, as change that is too quick and drastic may create new challenges and confusion. In such instances, rapid transformation may be inappropriate and slower incremental change may ultimately be more effective and sustainable in facilitating the transition of a system towards wider transformation. Solecki et al (2015, p. 3) describe transition as “the process of

movement through a pathway from one state to another”, while Pelling (2011) suggests that transition moves a system towards its full potential by making incremental changes, adjusting developmental goals and reframing problems, without causing irreversible and radical changes. Geels and Kemp (2006) echo this by suggesting that one of the characteristics of transition is the development of new innovation in niches that eventually breaks through into the broader system, but without necessarily resulting in immediate systemic change. Within this context, Frantzeskaki et al (2012) emphasise that although long-term and radical change may be the ultimate aspiration, there is an inherent tension between this and the need to implement practical, specific and small steps in the short term in order to move towards that bigger goal. Pelling (2011) and Solecki et al (2015) suggest that the cumulative impact of incremental transitional changes of this nature at the sub-system level can cause cascading change between various components of the system, ultimately resulting in an evolutionary transformation of the broader system. Small scale transformation can also create opportunities for “cross-learning” and the emergence of new initiatives that can be applied to broader scales (Folke et al., 2010). However, there is also a danger that incremental adjustments can constrain opportunities for transformation if they facilitate the continuation of existing prioritised systems (Matyas and Pelling, 2014).

Despite the potential advantages of incremental changes in driving a system towards transformation, there is considerable debate in the literature around whether incremental change of this nature can be considered transformational. In relation to climate change for example, Kates et al (2012) suggest that there is a distinct difference between incremental adaptation and transformational adaptation and that this difference lies in terms of the scale, novelty and impacts of the change. In this regard, they consider transformative adaptation to involve the pioneering of new interventions at larger scales in a manner that transforms places and shifts location. The decision-making process for transformative adaptation also differs from that of incremental adaptation, with transformative adaptation needing to be “underpinned by long-term vision, commitment and planning, considerable resources and a willingness to experiment, take risks and seize opportunities” (Dowd et al., 2013, p. 14). Despite the fact that in many cases the difference between incremental adjustments and transformation is not well understood (Nelson et al., 2007), there is increasing recognition that incremental and transformative changes are not mutually exclusive and that they should be seen as complementary and mutually informative (Wise et al., 2014; Jakku et al., 2016). In some cases they may even occur simultaneously (Jakku et al., 2016).

In reality, it is therefore extremely difficult to evaluate precisely whether transformation or transformative adaptation, has occurred, given that there is little agreement around the level, scale, speed and extent at which transformation should be pursued (Mustelin and Handmer, 2013). Fraser et al (2016) echo this by highlighting the critical challenge of operationalizing transformation, particularly given the varied interpretations of what transformation means and the temporal and spatial scales across which it should operate. They also indicate that there are few known “complete and deliberate transformations at the city scale beyond historical examples” (Fraser et al., 2016, p. 27). In order to assess whether change is transformational, the extent of change that has taken place can be assessed by understanding how things *were* and how much they have *changed* in relation to a specific issue (Mustelin and Handmer, 2013). However, the type of change that is required and relevant is closely linked to the context in which that change occurs (Dowd et al., 2014), and arriving at a single understanding of what transformation looks like is difficult. Transformation is seldom a

discrete event and can develop “messily over time and space” (Brown et al., 2013, p. 104), making it difficult to say when a series of changes constitutes transformation. Rather than providing specific “criteria” for transformation, the literature therefore reflects the continuum of responses that was alluded to in the previous section, from that which is small scale and incremental to that which effects systems level shifts at a more rapid rate and at larger scales. This is represented in Figure 3.2 to indicate that, while transformation is increasingly shaping the resilience and adaptation discourses along the change response continuum of social-ecological systems, there is also a continuum emerging within the discourse of transformation itself, from those changes that are incremental towards transformation, to those that are transformative in and of themselves. As systems move from incremental towards transformational change, they are in “transition”.

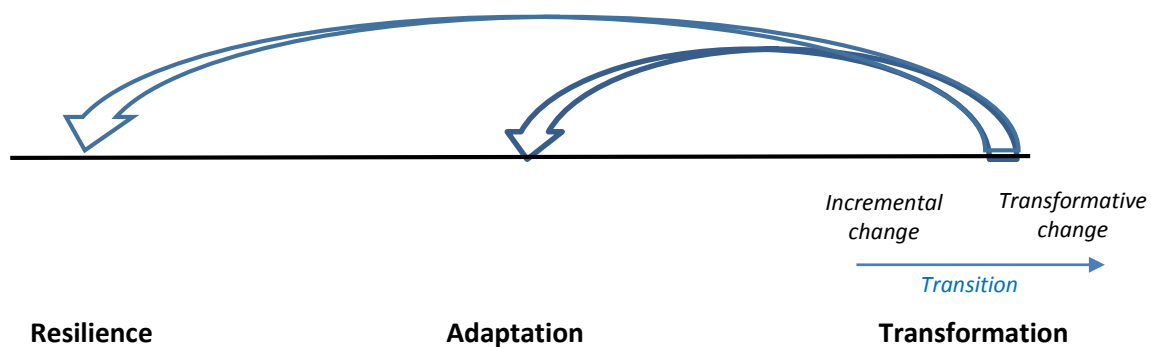


Figure 3.2¹²: Within the transformation discourse, there is a continuum of change that can take place, from incremental to transformative change. Systems are in transition as they move from incremental to transformative change.

Ultimately however, the common intention across this continuum is to bring about levels of change that move social, economic, environmental and political systems in a more positive and sustainable direction, and in a way that challenges the underlying systemic drivers of risk. This is equally true in the specific arena of climate change adaptation. These ideas are important in helping to assess the extent of the changes that have been seen in the eThekweni Municipality case study, the scale and rate at which these have occurred within that particular context, and whether these can be considered to demonstrate transformative adaptation. In understanding the nature of the change that has taken place, it is also critical to understand the factors that either facilitate or undermine transformation and transformative adaptation, and how these come about.

3.5 How does transformation and transformative adaptation come about?

The literature highlights a number of factors that contribute to the way in which transformation processes are catalysed and sustained, and the role of social learning and adaptive governance within this context. These ideas are detailed further in this section.

¹² It should be noted that Figure 3.2 is intended to show the links between the concepts of resilience, adaptation and transformation and not to represent a linear relationship between them. In reality, the relationships are likely to be more complex and less predictable.

3.5.1 *Catalysing and sustaining transformation*

A number of factors facilitate transformation. *Linkages and networks* for example, play an important role in addressing the challenges of global environmental change by convening people in interdisciplinary and inclusive ways (Leach et al., 2013). This can provide opportunities for individual perspectives to shift and for social learning to facilitate new, innovative and ultimately transformative thinking (Bahadur and Tanner, 2014). In relation to transformative adaptation specifically, Dowd et al (2014) note the importance of these networks reaching beyond existing social support systems, as this provides exposure to new ideas that can facilitate action that is different from established practices. They also note that those involved in transformative action generally demonstrate a more proactive approach in seeking out new information through alternative networks. Collaborative power is critical in this regard, in order to facilitate transformation across all scales (O'Brien, 2013a). O'Brien and Sygna (2013) also emphasise that personal change is leveraged through an ability to reflect, reinterpret and reframe one's worldviews and belief systems. This capacity is often catalysed and enhanced through engagement in networks where different perspectives and ideas are shared, and where existing notions are challenged.

In many instances, *innovation niches* and "*shadow systems*" of governance play an important role in creating safe spaces for experimentation with new ideas. O'Brien (2011) and Leck and Roberts (2015) highlight the fact that deliberate transformation is often initiated by small groups of committed individuals operating in "shadow systems". These "shadow systems" of governance are informal communities of practice that are able to cut across formal institutional structures and provide opportunities for social learning with peers, experimentation, communication and reflection (Olsson et al., 2006; Geels and Kemp, 2006; Pelling et al., 2008). In such environments, that are more protected from the "harsh selection criteria and resistance from prevailing regimes" (Westley et al., 2011, p. 769), innovation and experimentation are important in initiating transformation (Bahadur and Tanner, 2014).

Although innovation niches and "shadow systems" of governance might provide useful spaces to facilitate new thinking and innovation, O'Brien (2011) also emphasises the need for *change to happen across multiple levels* and highlights that without some change in the overarching system, broader transformation will not be successful. In this regard, Westley et al (2011) emphasise the importance of "institutional entrepreneurs and their networks" being able to work simultaneously at the level of the institution as well as at the level of the innovation niche (i.e. spaces within the broader institutional and policy environment where innovation can develop in a more flexible and unconstrained way). At the broader institutional level, it is critical to "nibble at the resilience of the dominant system, seeking opportunities in the market, the political/policy sphere and the cultural sphere, where resources can be redirected to the emerging innovation niche and where elements supportive of the new regime can be inserted" (Westley et al, 2011, p. 773). This needs to be accompanied by the nurturing of "innovative alternatives, through sense-making, building, and brokering partnerships between unusual suspects... and creating disturbances in existing regimes and landscapes" (Westley et al., 2011, p. 773).

An important concept emerging from this is that, although innovation at the level of individuals and “shadow systems” may be important, this needs to be supported and complemented by an appropriate institutional environment that can support and enable transformation to occur. In this regard, institutions themselves also need to change in order to accept and facilitate novelty and innovation that emerges at the level of individuals and small groups, regardless of how disruptive this may be. In turn, these same individuals and groups need to find ways to connect to opportunities that may emerge from this institutional environment (Westley et al., 2011).

Westley et al (2011, p. 769) summarise this need for change across multiple levels by suggesting that:

“At the macro institutional scale, we need to transform our global and national institutions, from a pattern that supports environmental destruction to one that favours long-term resilience and sustainability. At the meso or problem domain scale, we need to create opportunities to incorporate novelty and innovation. At the micro-scale of individuals and small groups, where invention originates... we must foster mechanisms and agency that can connect a healthy supply of invention, with the institutional opportunities that emerge.”

Transition and transformation take place through the interplay between processes at these different levels (Geels and Kemp, 2006). An additional benefit of working across multiple levels to effect transformation is that this proactively begins to connect policy level initiatives with grassroots interventions in a way that helps to facilitate connections and learning across these, which can help to influence and guide the way in which both policies and grassroots initiatives are developed (Leach et al., 2012). The literature provides no specific direction as to which of these (i.e. action at the policy level or action at the individual level) should come first, perhaps suggesting that elements of both are required almost simultaneously and that these need to consistently interact in relevant ways to advance implementation at both levels. However, the literature does suggest that it is often individual leaders who need to initiate new ideas and then engage with the broader system in which these will find a home (see text below on the role of leadership in transformation). These ideas are particularly relevant when considering the eThekweni Municipality case study, and its location within a bureaucratic institution where activities are initiated at both a project and a policy level in an attempt to transform the system.

Transformation and transformative adaptation can also be catalysed by *external events*. As Folke et al (2010) indicate, transformation can be a deliberate process that is initiated by people themselves or can be a forced process, for example when there are external factors that change the prevailing environmental and social conditions, or when the system is faced with the existence of complex problems like climate change (Mustelin and Handmer, 2013). These factors, along with clear evidence that the current way of operating is ineffective, can catalyse acknowledgement of the need to change. This recognition can be a powerful prerequisite for transformation (Walker et al., 2009).

Finally, the *role of leadership* is seen to be a major factor in catalysing and driving transformation (Dowd et al., 2013). Leadership in this instance requires an ability to perceive the need for transformation, communicate this clearly and provide alternative visions of what is possible (Walker et al., 2009). Leaders also need to be able to build trust, make sense of complex issues, manage conflict, link actors, initiate partnerships, compile and generate knowledge, and mobilise broad support for change (Folke et al., 2005). An important role of these “frontrunner” actors involves being

able to translate a vision for transformation into structured experimentation, whilst at the same time engaging with the broader system in which these new ideas need to find a home (Frantzeskaki et al., 2012). Such leaders play a critical role in recognising or creating “windows of opportunity” and in being able to prepare a system for change by exploring alternative systems and strategies for a different future (Olsson et al., 2006). For those key actors that are involved in initiating and sustaining transformation, personal motivations are important, as are knowledge and information support, social connections, networks and a willingness to take risks (Dowd et al., 2013).

Transformation happens over time as a result of the complex way in which factors can interact to either facilitate or undermine transformation. Building on this idea, Olsson et al (2006) highlight three apparent phases of transition: “Preparation” involves building knowledge, networks and leadership; “navigating the transition” involves finding a way through the unpredictable and turbulent change period and is characterised by a need for flexibility and an ability to improvise in response to changing conditions. This is followed by a need to “sustain the transformation”. They also note the existence of a “window of opportunity” between the preparation and transition stages (which could be anything from an environmental crisis to political and institutional change) and comment that it is often when the problem, the solution and the politics are aligned, that a “window of opportunity” is created. Recognising and navigating through these phases therefore becomes important in facilitating transformation.

Although the discussions above have largely focused on factors that *facilitate* transformation, consideration should also be given to the fact that in many cases there are existing stressors or factors that can *inhibit* the capacity of individuals or groups to transform (Shackleton et al., 2013), such as existing economic, cultural or governance systems (Westley et al., 2011). Dowd et al (2013) also emphasise the tension that exists between the transformation that is needed in the long-term, compared with what is required in the short term and highlight cash flow, effort and risk as possible constraints to transformative adaptation, along with the complexity and uncertainties related to longer-term strategic planning, all of which make transformation difficult. These ideas around factors that catalyse and sustain transformation, and those that act as potential barriers, will form part of the heuristic framework that will be used to assess the changes that have occurred in the eThekweni Municipality climate adaptation case study and the extent to which the catalysts and barriers that are evident in eThekweni Municipality in relation to transformative adaptation are similar to, or different from, those that are highlighted in the global environmental governance and climate adaptation literatures.

3.5.2 Social learning and adaptive governance in the context of transformation

A critical question that arises when considering the nature of transformation and the factors that catalyse and sustain such change, is what governance approach is needed that can support and enhance these factors. In a world where transformation is required in order to respond appropriately to the growing global sustainable development crisis, governments have a central role to play in holding a vision for the future and in ensuring that this vision is supported by relevant institutions and policies (Costanza et al., 2012). Within the context of cities, local government is critical in setting a vision for sustainable development (United Nations, 2012) and in exploring what governance model might be required to achieve this vision. Governance therefore has an impact in either enhancing or

undermining opportunities for transformation. It is therefore important to understand what forms of governance are best suited to facilitating the type of environment in which transformation becomes possible, given that the focus of the thesis is on transformation in a local government context.

In the face of an increasingly unpredictable future, governments in many places are being forced to re-think their management approaches. In the scientific community, the concept of adaptive governance has grown momentum in the last decade as an alternative to the traditional “predict-and-control” regime (Rijke et al., 2012). It is seen as a process of creating adaptability and transformability in social-ecological systems to ensure sustainability (Walker et al., 2004). Adaptive governance seeks to address uncertainty through continuous learning, involvement of multiple actors in decision making processes and self-organisation of the governance system (Rijke et al., 2012). Continuous learning and collaboration are seen as being critical in responding to complex systems and uncertainty (Pahl-Wostl et al., 2007; Folke et al., 2010) and can be stimulated by networks that facilitate interactions between individuals, organisations and institutions in order to draw upon the knowledge that each of these groups has in the development of relevant policies and practices.

Building on the ideas outlined earlier in relation to the role of networks and linkages in facilitating transformation, social learning is acknowledged to be a critical component of adaptive governance in the way that it links actors and provides platforms for knowledge sharing and innovation. Wals (2007, p. 39) describes social learning as learning that takes place when “divergent interests, norms, values and constructions of reality meet in an environment that is conducive to meaningful interaction”, and that promotes the experimentation and innovation that are critical contributors to transition and transformation (Pelling, 2011). Although it may appear as less effective than conventional command and control policy instruments in the short term, social learning may be a necessary component of good environmental governance when dealing with complex systems in times of rapid change (Nilsson and Swartling, 2009). From a social learning perspective, different sources of knowledge (not only the scientific and technical) are seen to be important in helping to address the challenge at hand. In addition, providing space within and between organisations to build relationships that can facilitate social learning, can be important in improving the adaptive capacity of organisations (Pelling et al., 2008). Numerous examples exist where social learning has been used to try to address complex environmental challenges and to develop innovative solutions to particular problems. Whatmore and Landström (2011) for example, describe the use of a “competency group” approach in solving the problem of flooding in a local town, by drawing together specialists and non-specialists in a facilitated process to co-produce new knowledge and new solutions to the flooding problem. Social learning processes have also been studied as a feature of international environmental governance (e.g. Nilsson and Swartling, 2009), as a way of fostering more effective environmental decision-making (e.g. Beierle and Konisky, 2000) and in promoting the sustainable management of environmental resources (e.g. Hahn et al., 2006; Pahl-Wostl et al., 2007 and Mostert et al., 2007), while other research has focused on the institutional systems and networks that are needed to support these social learning processes (e.g. Hahn et al., 2006) and on their role as an organisational learning tool (e.g. Andersson, 2008). The outcomes of such social learning processes can have significant impacts at a number of levels. These include an increased understanding of the issues that are being addressed and an opportunity to reframe the problem at hand and build trust. The nature and extent of the learning that takes place also varies from changes in skills, practices and actions to a fundamental transformation in thinking that can lead to underlying assumptions and values being critically examined (Yuen et al., 2010). In

this way, social learning processes impact on the participating individuals, who gain experience through their interactions with the group, and whose own identity is confirmed and shaped in the context of this social surrounding (Pahl-Wostl et al., 2007).

However, while social learning might play an important role in promoting adaptive governance, the establishment of such processes is not easy. Andersson (2008) argues that in order to understand why some social learning processes are effective and others are not, one needs to understand the formation of the social learning process, the individuals involved in the process, their motivations for being there and the roles that they play, as well as the way in which the social learning process is sustained and its effectiveness monitored. Nilsson and Swartling (2009) are also quick to point out that the implicit assumption that social learning necessarily promotes better environmental governance is not always correct, and so these processes should be approached in a critical manner.

In the face of a challenging and unpredictable future, social learning therefore has a potentially important role to play in promoting adaptive governance and transformation by strengthening networks, challenging existing thinking and sparking new and innovative responses to environmental challenges. In this thesis, these ideas will be explored further in order to understand the role that social learning plays in facilitating transformative adaptation in eThekweni Municipality and the extent to which existing institutional structures and practices in the local government context of eThekweni Municipality, serve to either facilitate or undermine the interactions and collaborations that are central to social learning and adaptive governance.

The literature therefore suggests that there are a range of factors that either facilitate or undermine the processes of transformation and transformative adaptation. Given that these factors are broad and that they need to be used in practical spaces to assess whether transformation and transformative adaptation have taken place, this thesis consolidates these into a heuristic framework for ease of reference and analysis.

3.6 Developing a heuristic framework to assess transformation and transformative adaptation

In order to be able to assess the changes that are emerging in eThekweni Municipality's climate adaptation case study, a heuristic¹³ framework based on the transformation and transformative adaptation literatures has been developed for this thesis. This framework (see Table 3.1) will be used to assess the changes in eThekweni Municipality and the extent to which they reflect the ideas contained in the transformation and transformative adaptation literatures. It is important to note that, although the literature identifies a number of characteristics of transformation and transformative adaptation, it also acknowledges the difficulty of applying a precise definition to the concept of transformation because of the very varied contexts in which transformation and

¹³ A 'heuristic framework' is a concept or formulation that serves as a guide in the investigation or solution of a problem. In this thesis, the heuristic framework is a summary of the characteristics of transformation that is used as a reference point against which to assess the changes that have taken place in the Durban case study, the extent to which these can be considered transformative, and the specific catalysts and barriers that have either facilitated or undermined transformation.

transformative adaptation take place. The ideas captured in the heuristic framework should therefore be considered as indicative, rather than exact. It should also be noted that the heuristic framework is a consolidation of the characteristics of transformation in environmental governance and transformative adaptation. Where characteristics relate to both transformation and transformative adaptation, this has been indicated. In instances where the characteristics are found only in the transformative adaptation literature, this has been distinguished in the framework. However, as noted earlier in this chapter, many of the characteristics of transformative adaptation are equally relevant in the broader context of transformation in environmental governance. References across both bodies of literature have also been included. Given that the eThekweni Municipality case study has a climate adaptation focus, it will be important to consider *all* these characteristics when assessing whether the case study represents transformative adaptation. The learning from the climate adaptation case study will later be used to comment on transformation in the broader context of environmental governance.

Table 3.1: A summary of the characteristics of transformation and transformative adaptation described in the literature, consolidated into a heuristic framework that can be used to assess the changes that are emerging in the eThekweni Municipality climate adaptation case study. (Where relevant, a distinction is made between references to transformation in the broad context of environmental governance, and transformative adaptation in the context of climate change).

Focus of the transformation literature	Transformation characteristic	Description	Examples of references
<p>Understanding the nature of transformation and transformative adaptation</p> <p><i>These characteristics are applicable to transformation in environmental governance and also to transformative adaptation. They are therefore described together.</i></p>	Transformation and transformative adaptation are characterised by a complete altering of an existing system (e.g. in the technical, social or political sphere) to reduce systemic risks.	The fundamental systemic shifts that accompany transformation, challenge established paradigms and the root drivers of risk, whether these relate to sustainable development in general or climate adaptation in particular, and also demonstrate new and innovative ways of operating. Transformation is one change response located on a continuum that includes resilience and adaptation. It is increasingly being recognised that transformation is shaping the adaptation and resilience discourses and needs to be considered as part of these responses, in order to respond effectively to the challenge of sustainable development. “Transformative adaptation” in the climate change field for example, considers (and may seek to change) the root causes of climate change risk that are reproduced by dominant development pathways.	<p><i>Environmental governance:</i> Folke et al (2010), O’Brien (2011), Solecki et al (2015)</p> <p><i>Climate adaptation:</i> Pelling et al (2011); Pelling et al (2015)</p>
	Transformation and transformative adaptation can happen in a number of ways in different parts of a system.	<p>Personal transformation involves a change in the perspectives, worldviews and values of individuals and may occur as a result of reflection, reinterpretation and reframing in relation to a particular issue. Practical transformation e.g. implementation, technical solutions and institutional change demonstrate new patterns of responses that are different from what was done in the past. Political transformation involves changes within established economic, political, social and cultural systems.</p> <p>Similarly, in the climate change context, transformative adaptation can happen within different components of the system (e.g. individual, technical, discourse, environment, institutions, livelihoods and behaviours) or as a result of the interactions between these components.</p>	<p><i>Environmental governance:</i> O’Brien and Sygna (2013)</p> <p><i>Climate adaptation:</i> Pelling et al (2015)</p>
	Incremental and transformative change.	There are differing views in the literature around how to achieve the level of fundamental systems change that characterises transformation and transformative adaptation. Some suggest that there is a clear distinction between <i>incremental</i> and <i>transformational</i> change and that the difference lies in terms of scale, novelty and impact. However, others argue that the cumulative impact of	<i>Environmental governance:</i> Geels and Kemp (2006); Folke et al (2010); Frantzeskaki et al (2012); Mustelin and Handmer (2013)

Focus of the transformation literature	Transformation characteristic	Description	Examples of references
		<p>incremental transitional changes at the sub-system level can ultimately result in an evolutionary transformation of the broader system.</p> <p>This change pathway can be regarded as “transitional”, which moves a system towards its full potential by making incremental changes, adjusting developmental goals and reframing problems, without causing irreversible and radical changes. Transition is also characterised by the development of new innovation in niches that eventually breaks through into the broader system, but without necessarily resulting in immediate systemic change.</p> <p>Incremental and transformative change are not always mutually exclusive and may in some cases occur simultaneously. Context is an important factor in considering whether an incremental or rapid transformational approach is most relevant.</p>	<p><i>Climate adaptation:</i> Pelling et al (2008); Pelling (2011); Kates et al (2012); Park et al (2012); Field et al (2014); Wise et al (2014); Solecki et al (2015); Jakku et al (2016)</p>
	<p>The extent of change needs to be evaluated to assess whether it can be considered transformative.</p>	<p>Evaluating the extent of change (and whether it is transformative) requires an understanding of the <i>starting point</i> for the change process, its <i>end point</i> and the <i>context</i> in which change occurs. Context defines the relative ease or difficulty with which transformation and transformative adaptation can occur. In an institutional context for example where there is a lack of flexibility and little innovation, small changes may in themselves be significant enough to be considered transformative in that context. Also, in different contexts, different scales and rates of change may be more appropriate to ensure the sustainability of those changes. Understanding this context and the starting point for change, provides a relative measure against which the extent of change can be assessed within a particular context.</p>	<p><i>Environmental governance:</i> Mustelin and Handmer (2013)</p> <p><i>Climate adaptation:</i> Dowd et al (2014)</p>
	<p>Transformation and transformative adaptation may occur in phases that take advantage of “windows of opportunity”.</p>	<p>In some cases, different phases of transformation can be distinguished. For example, “preparation” involves building knowledge, networks and leadership; “navigating the transition” involves finding a way through the unpredictable change period. This is followed by a need to “sustain the transformation”. At different times, a “window of opportunity” may emerge to help facilitate more rapid change.</p>	<p><i>Environmental governance:</i> Olsson et al (2006)</p>

Focus of the transformation literature	Transformation characteristic	Description	Examples of references
	Transformation and transformative adaptation are characterised by transformational <i>intention</i> .	Transformation processes usually share the characteristics of having an intentional vision and commitment to transformation, and are accompanied by innovation, experimentation and new ways of operating.	<i>Environmental governance:</i> Olsson et al (2006) <i>Climate adaptation:</i> Dowd et al (2013)
	The outcomes from transformation.	The outcomes from transformation should be positive and just and should promote greater social and economic equality, participation, rights and sustainable development.	<i>Environmental governance:</i> Leach et al (2013) <i>Climate adaptation:</i> Bahadur and Tanner (2014)
<p>Understanding the nature of transformative adaptation</p> <p><i>These characteristics are found in the climate adaptation literature specifically but some may also be relevant in the broader context of environmental governance.</i></p>	Transformative adaptation integrates the climate change adaptation, climate change mitigation, disaster risk reduction and development agendas.	Transformative adaptation needs to unite the climate change mitigation, disaster risk reduction and adaptation agendas with a development agenda that supports socially just and ecologically sustainable development. The critical challenge lies in integrating these four agendas in ways that maximise overlaps and minimise conflicts.	<i>Climate adaptation:</i> Rosenzweig et al (2015); Fraser et al (2016); Roberts et al (2016); Satterthwaite et al (2016)
	Transformative adaptation ensures that climate adaptation outcomes are socially just, equitable and environmentally sustainable.	Transformative adaptation policies and investments need to tackle issues of poverty, inequality and environmental justice in order to enhance social capital and increase adaptive capacity. These ideas are particularly important given that climate change impacts will be exacerbated for those that are already vulnerable through their socio-economic conditions. Placing ecological values at the centre of urban planning is central to transformative adaptation because of the way that this fundamentally addresses the underlying failure of development to recognise its dependence on environmental resources.	<i>Climate adaptation:</i> Taylor et al (2014); Revi et al (2014a); Rosenzweig et al (2015); Pelling et al (2015)
	Transformative adaptation facilitates decision-making that is	For climate adaptation to be considered transformative, engagement needs to include a broad diversity of stakeholders and scientists and must include communities themselves. In this way, transformative adaptation has the potential	<i>Climate adaptation:</i> Baird et al (2014); Archer et al (2014); Rosenzweig et al

Focus of the transformation literature	Transformation characteristic	Description	Examples of references
	collaborative, equitable and informed.	to challenge existing “top-down” governance systems and help re-shape how climate change problems are understood and how they are responded to.	(2015); Satterthwaite et al (2015)
	Transformative adaptation challenges and changes institutional and governance systems where this is necessary.	Addressing the complex challenges posed by climate change requires system-wide transformative thinking that may require changes to standard operating procedures, institutional structures, policies and systems. This is particularly challenging in a local government context, where the complexity and cross-cutting nature of climate change does not fit well into existing bureaucratic institutions. Responding to climate change may also require new partnerships for effective implementation, thereby also shifting governance relationships.	<i>Climate adaptation:</i> Leck (2012); Carmin et al (2012); Aylett (2013); Taylor et al (2014); Pelling et al (2015); Rosenzweig et al (2015)
	Transformative adaptation acknowledges the need to work across different spatial, time and governance scales to leverage the greatest impacts.	Transformative adaptation requires an ability to work across municipal boundaries, given that climate change impacts do not adhere to these human constructs. It also requires longer-term planning and supporting institutional systems that can facilitate interventions over long time horizons. Transformative adaptation requires an ability to work across governance scales from local government to national and international levels, to raise the profile of local action and inform national and international climate adaptation policies and programmes.	<i>Climate adaptation:</i> Revi et al (2014a); Rosenzweig et al (2015)
Catalysing and sustaining transformation and transformative adaptation processes <i>These characteristics are applicable to transformation processes in environmental governance and also to</i>	Networks, knowledge sharing and collaboration.	Bringing people together within and between organisations through social networks in interdisciplinary and inclusive ways can provide opportunities to build the capacity of those involved through information sharing, and for existing knowledge to be brought together in new, innovative and ultimately transformative ways. Social networks can also help shift existing worldviews through critical reflection, and even through disagreement and dissent. Networks that go beyond existing social support systems tend to challenge existing thinking and more often lead to transformational change.	<i>Environmental governance:</i> Pelling et al (2008); Nilsson and Swartling (2009); Folke et al (2010); Leach et al (2013) <i>Climate adaptation:</i> Dowd et al (2013); Dowd et al (2014); Bahadur and Tanner (2014)
	Innovation niches and “shadow systems” of governance.	Deliberate transformation is often initiated by small groups of committed individuals operating in informal communities of practice that provide opportunities to learn with peers, experiment, reflect, innovate and communicate. Innovation in such niches can ultimately break through to effect changes in the broader system.	<i>Environmental governance:</i> Geels and Kemp (2006); Pelling et al (2008); O’Brien (2011); Westley et al (2011) <i>Climate adaptation:</i> Bahadur and Tanner (2014)

Focus of the transformation literature	Transformation characteristic	Description	Examples of references
<i>transformative adaptation.</i>	The need for change across multiple levels.	Innovation in niches needs to be supported by a relevant institutional environment that both fosters and accepts this innovation. Policy changes play an important role in this space.	<i>Environmental governance:</i> Geels and Kemp (2006); Westley et al (2011); Leach et al (2012)
	External events trigger recognition of the need to change.	Acknowledgement of the need for change can be sparked by specific events or the existence of complex problems. It can also be catalysed by shifts in the perspectives and values of those who are influential in effecting change. These shifts can occur through reflection, reinterpretation and reframing of the status quo at the level of the individual or the collective.	<i>Environmental governance:</i> Walker et al (2009); Folke et al (2010); Mustelin and Handmer (2013)
	The role of leadership.	Leaders must be able to perceive the need for transformation, communicate this clearly and provide alternative visions of what is possible. They should also be able to recognise “windows of opportunity” and prepare the system for change.	<i>Environmental governance:</i> Folke et al (2005); Olsson et al (2006);
	Social learning and adaptive governance.	Adaptive governance facilitates and promotes social learning and networks in order to respond better to an ever-changing world.	<i>Environmental governance:</i> Walker et al (2004); Pahl-Wostl et al (2007); Folke et al (2010)

As indicated, the heuristic framework that is presented in Table 3.1 will be used as the framework against which to explore the changes that are emerging in the eThekweni Municipality climate adaptation case study. The tool has been used to frame the interview questions for the thesis in a way that helps understand the nature of the change that occurs in the case study, the extent to which this can be considered transformative adaptation, and the factors that facilitate and undermine this. The heuristic framework also allows a comparison to be made of the extent to which the characteristics of change in the eThekweni Municipality case study are similar to, or different from, the transformation and transformative adaptation characteristics in the literature, and whether the eThekweni Municipality experience can provide new insights into the form that transformation might take in a similar local government context.

Importantly, cities provide a significant locus for action in facilitating transformation and transformative adaptation, given the sustainable development challenges that are concentrated in these spaces (see Chapter 2). The selection of an urban local government case study for this thesis therefore provides an important lens through which to explore the characteristics of transformation and transformative adaptation that have been presented in the heuristic framework.

3.7 Cities and transformation

Cities have a critical role to play in addressing sustainable development and climate change challenges (see Section 2.4). However, as urban expansion continues at a rapid rate, this “window of opportunity” to transform the current development path in cities and re-shape urbanisation is closing rapidly (Seto et al., 2012; Friend et al., 2015; Hurst and Clement-Jones, 2016) and urgent action is required. This requires that cities and the local governments that are responsible for their management begin to consider alternative development pathways that are available to them, and that they put in place processes that better facilitate the conversations that are needed in order to navigate this challenging process. For many local governments, the established nature of their institutions and policies will make this process difficult and will require a willingness to explore opportunities for change and transformation within existing systems.

Aylett (2013) states that the silo-ised nature of many local government institutions and their embedded organisational cultures and technical practices, play a major role in undermining their ability to develop adaptive, innovative and cross-departmental responses to environmental challenges. In the context of climate change adaptation, Satterthwaite (2011) also questions the capacity of many local government institutions to respond to the crises being faced and attributes this to the relative absence of institutions, infrastructure and services that are required to facilitate this, particularly in low to middle income nations. At this local level, understanding how this navigation of alternative development pathways takes place, and the transformation that will be required as part of this, could help to build a broader understanding of what it will take to fully realize the transformation in environmental governance that is urgently needed at a global scale. Cities provide a useful starting point to explore and test these ideas, and to build this understanding. For these reasons, it is the intention of this thesis to explore climate adaptation more closely in the African city of Durban, in order to understand the changes that have happened to integrate climate adaptation into the planning and implementation of the local government responsible for managing the city.

3.8 Summary

It is clear that the world is an increasingly uncertain place where social, economic and environmental thresholds create an ever more challenging context in which to work towards sustainable development. This means that careful consideration needs to be given to the alternative development pathways that are available for navigating into the future. Increasingly, the global call is for urgent and transformative action in order to address sustainable development. Climate change represents a specific challenge within this which, particularly in the context of African cities, will require transformative adaptation responses in order to address issues of equity and justice and ensure that alternative development pathways for these cities are sustainable and climate safe. The challenge when speaking about the need for transformation and transformative adaptation however is that, although the need for innovative and alternative approaches may be acknowledged, there is not always a clear picture of what this means or what the end goal of transformation might look like in different contexts. Transformation and transformative adaptation in the environmental governance and climate change fields respectively, are generally associated with fundamental shifts that question existing practices, challenge the systemic causes of risk and demonstrate new and innovative ways of operating. Transformative adaptation in particular should: integrate the climate change adaptation, climate change mitigation, disaster risk reduction and development agendas; ensure that climate adaptation outcomes are socially just, equitable and environmentally sustainable; facilitate decision-making that is collaborative, equitable and informed; challenge and change institutional and governance systems where this is necessary; and work across different geographic, time and governance scales to leverage the greatest impacts. However, the exact nature of transformation and transformative adaptation and the scale at which this change needs to happen in order to be considered transformative is contested.

However, there is some understanding of the factors that help to catalyse and sustain transformation and transformative adaptation, with networks, collaboration, shadow systems for innovation, external events, strong leadership and social learning all playing an important role. The challenge is that these are often context dependent and different factors may be more or less relevant in different instances. It is also unclear whether action in these spaces of transformation (e.g. the establishment of “shadow systems” of governance or the emergence of critical leaders) is deliberate or whether these happen in a more unplanned manner, more through instinct than through proactive intervention. It is, however, clear that cities and the local governments that manage them are central to this debate. If the need for transformation in environmental governance is acknowledged, and if transformative adaptation is a particularly important focus for African cities within the context of high levels of vulnerability and increasing climate change risks, how then can local governments begin to better understand what transformation and transformative adaptation might mean in their context, the catalysts and precursors that are needed for transformation and transformative adaptation to occur, and the nature of the change that results? And if social learning, through its ability to connect people, challenge thinking and open up new knowledge and alternative approaches, is a potential tool to promote more adaptive forms of governance and to create platforms where transformative ideas and responses become possible, how can local governments use this to catalyse the transformation and transformative adaptation that is required? Despite the uncertainty surrounding the exact nature of transformation and transformative adaptation, and how to initiate non-linear transformation, the ideas presented in this chapter provide a useful starting point to understand the type of

transformation that might be required in a rapidly changing world, both from the perspective of environmental governance broadly, and in relation to climate change adaptation specifically. These ideas also provide a yardstick by which to critically assess the nature and extent of the change that takes place within systems that are trying to respond adequately to the challenges around them.

The thesis will use the eThekweni Municipality climate adaptation case study to begin exploring these ideas within a specific local context, and therefore the next chapter provides context for the case study.

CHAPTER 4: THE CASE STUDY CONTEXT

This thesis focuses on transformation in environmental governance, within the framework of sustainable development. Given that addressing climate change is a critical component of sustainable development, the thesis uses eThekweni Municipality's climate change adaptation work as a lens through which to explore the concept of transformative adaptation and, through this, to gain insights into the broader concept of transformation in environmental governance. The case study focuses on the changes that have taken place in integrating climate change adaptation into local government planning and implementation (and the extent to which these changes can be considered to demonstrate transformative adaptation), and the actors, practices, projects and processes that have been involved in either facilitating or hampering this. This case study focus is important in order to understand how theoretical ideas around transformation might translate into practice in the context of an African local government. This chapter provides the context of eThekweni Municipality so as to situate the climate adaptation case study.

4.1 Introduction

The city of Durban is located on the east coast of South Africa, in the province of KwaZulu-Natal (Figure 4.1). Durban is home to an estimated 3.7 million people (EThekweni Municipality, 2017a) and covers an area of approximately 2556km² (EPCPD¹⁴, EThekweni Municipality, Feb 2017), of which about 68% is rural or semi-rural in nature (EThekweni Municipality, 2017a). The 3.7 million people who reside within Durban consist of individuals from different race groups¹⁵. According to the 2011 national Census, the majority of the 956,713 households in the municipal area at that time were African (65.2%) followed by Indian community (18.7%), White (13.2%) and Coloured. (2.6%) (EThekweni Municipality, 2017a). The city has the largest and busiest port on Africa's east coast. The major industries contributing to the city's economy are finance (21.6% contribution to Gross Domestic Product), manufacturing (17%), community services (21.2%), trade (16.3%) and transport (16.1%) (EThekweni Municipality, 2017a). The manufacturing sector has seen a decline over the last twenty years, raising questions as to the way in which the city's economy may need to diversify in order to address the persistently high levels of poverty and unemployment in the city. EThekweni Municipality is the local government responsible for managing the city of Durban and is the primary agent responsible for development in the municipal area. This is achieved through the Integrated Development Plan (IDP), the strategic planning tool required of all municipalities in South Africa in terms of the Local Government Municipal Systems Act (Act 32 of 2000). As of August 2016, when South Africa held its most recent local government elections, eThekweni Municipality is the last remaining African National Congress metropolitan local government.

¹⁴ EPCPD refers to the Environmental Planning and Climate Protection Department of the eThekweni Municipality. The current area of the municipality was calculated by municipal officials in the Biodiversity Planning Branch of this department, to take into account the incorporation of Vulamehlo ward into the municipal boundary, in August 2016 following local government elections in South Africa.

¹⁵ While not wishing to perpetuate the categorisation of people according to race developed during apartheid, it is still critical to reflect on racial categories given the inequality produced by apartheid and the transformation agenda required to address the legacy of apartheid.



Figure 4.1: Map showing the location of Durban within eThekweni Municipality and KwaZulu-Natal, South Africa (Source: Environmental Planning and Climate Protection Department, 2017).

Drawing from a wide body of literature, Chapter 3 summarised the characteristics of transformation and transformative adaptation and the factors that may help to catalyse and sustain such change. The chapter also acknowledged that what constitutes transformation, and how this process unfolds, can vary considerably. This suggests that ideas around transformation and transformative adaptation remain relatively abstract unless there is a way to understand them within a particular context. Given the critical role that is played by local governments such as eThekweni Municipality in translating abstract and global concepts into the local city context (as discussed in previous chapters), they therefore provide useful “test sites” for the development of new ideas and policy.

In order to provide the necessary context for the case study, the current chapter describes the socio-economic and environmental characteristics of Durban. It then continues to consider the governance and institutional structures of eThekweni Municipality and the climate change predictions that are expected to affect the city. Durban’s particular socio-economic and environmental characteristics, within the context of climate change, highlight the urgent need to consider alternative development pathways that can begin to reduce risk and vulnerability for the poorest of the region’s population and ensure more sustainable use of environmental resources. The context also helps to frame eThekweni Municipality as a local government that already faces significant developmental and governance challenges, making the introduction of a new agenda (such as climate change adaptation) extremely challenging, but also absolutely necessary. The chapter goes on to provide the context in which the climate change adaptation work of eThekweni Municipality has taken place by outlining the national policy context for climate change and the role that local governments in South Africa have begun to play in driving the climate adaptation agenda. This provides important context when

assessing the changes that have been seen in eThekweni Municipality in the climate adaptation field, and the extent to which these can be considered transformative. Finally, the chapter will provide a brief overview of the elements of eThekweni Municipality's emerging climate adaptation work as a reference point for the thesis research.

4.2 Durban: A city of the global south

4.2.1 Socio-economic context

As an African city, Durban shares many of the characteristics of urban areas in the Global South and faces a range of social, economic, environmental and governance challenges, with much of the population living in conditions of poverty and underdevelopment (EThekweni Municipality, 2017a). These challenges are exacerbated by a legacy of formalized racial division that has created widespread environmental injustice, inequity and exclusion (Roberts and O'Donoghue, 2013). The rise of democracy in South Africa in 1994 was accompanied by expectations that the socio-economic imbalances of apartheid would be addressed and that past divisions would be replaced with equitable development and access to basic services such as water, electricity, and sanitation (Carmin et al., 2012). As a result, eThekweni Municipality has invested significantly in socio-economic development and basic service provision. However, Durban still faces significant challenges relating to high levels of inequality, poverty and unemployment, as well as unequal (and in many cases, inadequate) access to housing, water, sanitation and electricity.

EThekweni Municipality saw a marginal reduction (of 0.49%) in the number of people living below the food poverty line, to 36% of the population in 2015, but eThekweni Municipality still has the highest levels of poverty of the five major metropolitan areas in South Africa (EThekweni Municipality, 2017a), as well as a decrease in the rate of broad unemployment (meaning that the unemployed, non-job searching unemployed are included in the statistics) from 45.7% to 38.9% between the 2001 and 2011 national censuses (Posel, 2015). Despite the decreases seen in both these areas, the figures are still high and are accompanied by high levels of inequality, with the Municipality's overall Gini-coefficient remaining at 0.63 in 2015, unchanged from 2011 (EThekweni Municipality, 2017a). This inequality is still strongly manifested along racial lines with most of the poverty and unemployment being associated with the African ethnic group.

Although there has been significant investment in the provision of basic services and housing, there are still growing backlogs. The following statistics are taken from the 2017/2018 IDP for the Municipality (EThekweni Municipality, 2017a). In the case of housing for example, the eThekweni Municipality had delivered 186 000 homes by 2016 but, as of December 2016, the household backlog stood at 387 000 homes, with an estimated delivery timeframe of between 40 and 80 years depending on the provision of subsidies. Approximately 22.4% of the city's population currently lives in informal settlements¹⁶. In the case of water provision, although there has been an increase in the percentage of households with access to piped water in the home dwelling, there was still a backlog of 32 803 consumer units in 2014/2015. The situation is similar for sanitation, with a backlog of 159 228

¹⁶ According to the South African National Housing Code informal settlements are identified according to their inappropriate locations, limited public and private sector investment, illegality and informality, poverty and vulnerability and social stress.

consumer units in 2014/2015, despite a 24% reduction in backlogs from 2010/2011. This socio-economic context increases the vulnerability of much of the population, especially to issues such as climate change, because they are not buffered from these impacts by having good services and infrastructure, and often live at a closer interface with the environment.

4.2.2 Environmental context

The natural environment plays a critical role in supporting human wellbeing and development in Durban, with approximately 33% of the municipal area having been identified as important from a biodiversity perspective (EThekweni Municipality, 2017a). Durban is situated at the centre of the Maputaland-Pondoland-Albany Region, an area described by Conservation International¹⁷ as a “Biodiversity Hotspot¹⁸”, one of only 36 in the world. Ongoing development pressures threaten these natural systems and the ecosystem services they provide (e.g. water supply, soil retention, flood attenuation etc). Already more than 54% of the municipal area has been transformed, with the area of remaining urban green space declining on an annual basis (EThekweni Municipality, 2017a). Despite their value, virtually every terrestrial habitat in Durban has undergone significant levels of transformation. The monitoring of quantitative targets set for the protection of different vegetation types indicates that of the 11 key vegetation types in Durban it is already impossible to meet the conservation targets for five (McLean et al., 2016). This has significant implications for Durban’s ability to sustain growth and development and to meet the basic needs of the poor and vulnerable, some of whom are directly reliant on nature’s services for their survival. This is particularly true in the large rural areas of the city, and therefore an important strategic focus for the city needs to be on ecological restoration, management and protection. This loss of ecosystems could also severely undermine the ability of these natural systems to contribute towards ecosystem-based adaptation to climate change (Roberts and O’Donoghue, 2013). However, opportunities exist for enhanced ecosystem based adaptation in Durban, if remaining areas can be restored, managed and protected.

4.2.3 Durban’s institutional context

EThekweni Municipality is governed by a 220 member Council (www.durban.gov.za, accessed 03/07/2017), with the current municipal structure based on a number of functional clusters, each headed by a Deputy City Manager, with associated sectoral Units (Figure 4.2). Each Unit is comprised of a number of Departments. It should be noted that the municipal organogram does undergo changes and therefore is included here for illustrative, rather than absolute, purposes. Reporting is undertaken in a hierarchical manner within this structure. Details on the functioning of municipalities in South Africa can be found in the Local Government: Municipal Structures Act (Act 117 of 1998). The Council operates on an Executive Committee system, rather than having an Executive Mayor and the administration is headed by a City Manager. The City Manager and municipal officials within the administration are responsible for carrying out the technical work of eThekweni Municipality, and elected politicians (called “councillors”) are responsible for decision-making. The number of councillors that make up the full Council is determined by the number of voters, and representation

¹⁷ Conservation International is an American non-profit environmental organization. Its goal is to protect nature as a source of food, fresh water, livelihoods and a stable climate (www.conservation.org).

¹⁸A ‘biodiversity hotspot’ is an area that contains some of the most diverse, but also the most threatened, biodiversity in the world.

is proportional to political party votes. In eThekweni Municipality, municipal officials interact with political structures via Portfolio Committees, which in turn report to a political Executive Committee and to the full Council. In some instances, municipal officials report directly to the Executive Committee. The citizens of Durban are able to access this decision-making process via ward¹⁹ committees and their local ward councillors. The Municipality's current development priorities are outlined in its IDP and Spatial Development Framework 2012/2013- 2016/2017 (Taylor et al., 2014).

A number of characteristics are inherent in the way the eThekweni Municipality is structured, and these impact on the capacity of the institution for transformation. One of these factors is the lack of cross-sectoral interaction and integration within the Municipality. Although, in theory, the IDP is the tool to ensure integration of functions across different municipal departments, the reality is often very different, with departments often planning and working independently of each other. As an example, for the purposes of this thesis, interviews were conducted with officials from a number of municipal Departments and Units that will be affected by climate change. These included the Coastal Stormwater and Catchment Management Department (within the Engineering Unit), the Economic Development and Investment Promotion Unit, Disaster Management and Emergency Control Unit, EThekweni Water and Sanitation Unit, eThekweni Transport Authority, Human Settlements Unit and the Strategic Spatial Planning Branch of the Development Planning, Environment and Management Unit. These units are highlighted in grey in Figure 4.2. The Environmental Planning and Climate Protection Department or "EPCPD" (part of the Development Planning, Environment and Management Unit), which is responsible for leading the climate adaptation work for eThekweni Municipality, is shaded in yellow. The location of these technical functions across different Units and Clusters in the Municipality's structure is reinforced by hierarchical reporting and insufficient transversal coordination of work and strategies across these. Communication across such functions is critical, not only to ensure that projects are aligned in their overall objectives, but also to share insights and knowledge that will help to generate new ideas and possibilities. In many instances, existing institutional structures do not facilitate the kinds of interactions and cross-departmental linkages that are required in order to respond effectively and in a coordinated manner to the sustainable development challenges facing Durban. Local governments are also highly regulated, for example through the Municipal Finance Management Act 56 of 2003, Supply Chain Management Policy and Performance Management System which, although important, are increasingly being seen as punitive rather than facilitatory tools (discussed further in the results chapters of this thesis). This can hamper the willingness of individuals to be innovative.

¹⁹ A 'ward' is a spatial division within the city, for administrative and political purposes. In eThekweni Municipality, a ward councillor is elected for each ward.

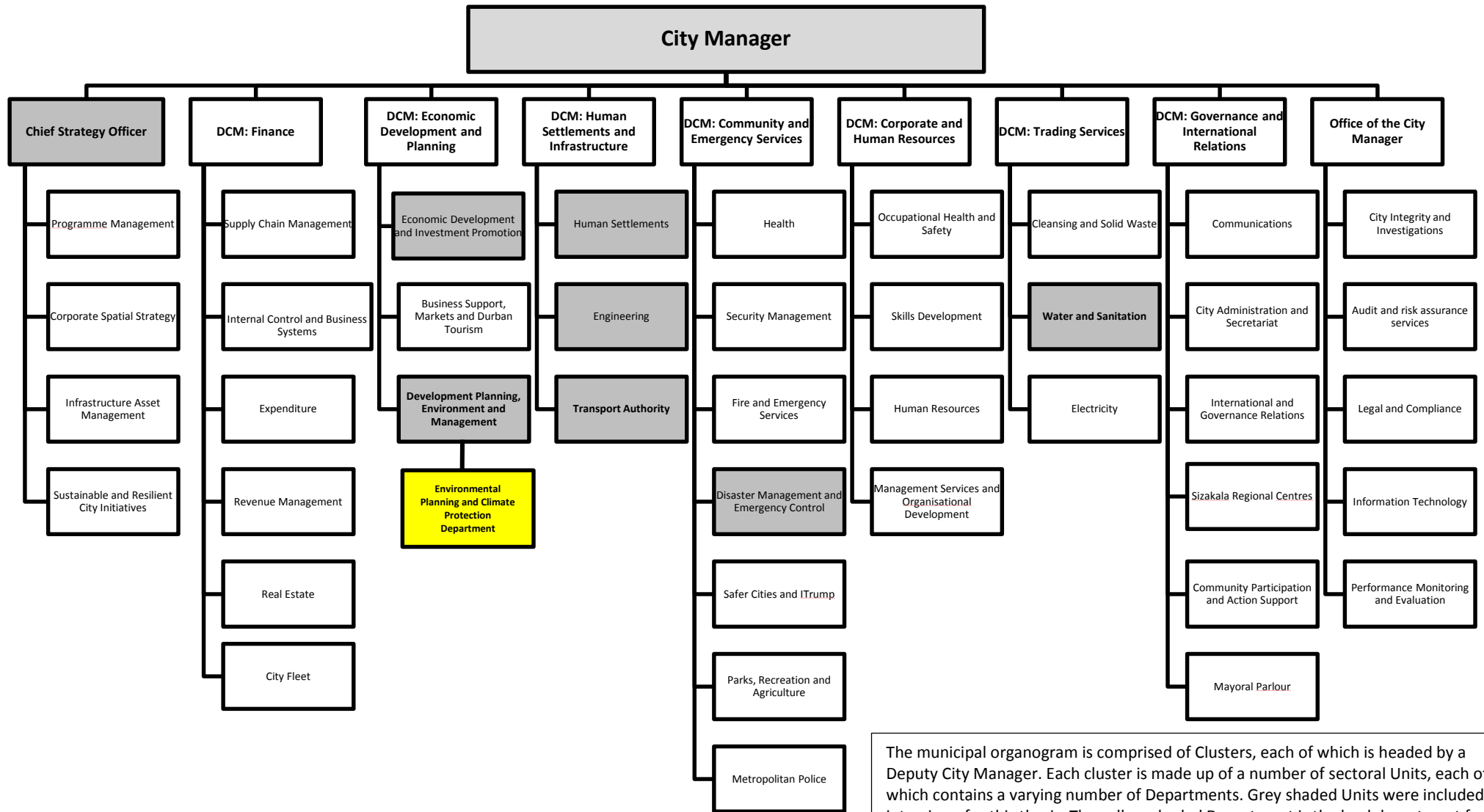


Figure 4.2: A representation of the eThekweni Municipality organogram

The municipal organogram is comprised of Clusters, each of which is headed by a Deputy City Manager. Each cluster is made up of a number of sectoral Units, each of which contains a varying number of Departments. Grey shaded Units were included in interviews for this thesis. The yellow shaded Department is the lead department for the climate adaptation work, the Environmental Planning and Climate Protection Department.

4.2.4 Climate change in Durban

Climate change is also a significant and increasing threat and is likely to cause a number of challenges for Durban. Climate change projections for Durban are that temperatures will increase by between 1.5°C and 2.5°C by 2065 (EThekwini Municipality, 2017a). Durban's rainfall patterns are also likely to be affected. Although the total amount of rainfall is likely to increase slightly, the distribution of that rainfall will change, with longer periods of no rainfall and an increased frequency in high intensity rainfall events (EThekwini Municipality, 2017a). These changes are likely to impact on water availability, agricultural productivity and food security. Temperature increases will also likely exacerbate heat stress and the spread of water and vector borne diseases such as malaria and cholera to previously unaffected areas in Durban, as well as exacerbating respiratory conditions. Current sea level rise predictions suggest that a number of economic and tourist areas may be affected and that infrastructure as well as coastal vegetation are at risk because of coastal erosion. Extreme events such as flooding and storm surges are expected to increase in frequency and could have significant impacts on infrastructure and on vulnerable communities who are susceptible to heat and to flooding risk. Climate change is also expected to impact on the distribution of plant and animal species (EThekwini Municipality, 2017a). For these reasons, climate change is perceived as a threat to sustainable development and to poverty alleviation and socio-economic development. In the context of a developing city such as Durban, where much of the population is already vulnerable due to poverty, unemployment, poor access to basic services, unsafe housing, health threats and an increasingly compromised natural environment (Roberts et al., 2016), climate change poses a serious threat not only to livelihoods, but also to governance and the economy within the municipal area. It is critical therefore that cities like Durban begin to prepare themselves for the likely changes that will take place, that climate adaptation strategies are a central part of local government planning and decision-making and that these are seen as a priority into the foreseeable future (Roberts et al., 2016). The eThekwini Municipality's climate adaptation function is currently located in the EPCPD.

The socio-economic, environmental and climate change context that has been described for Durban in this section, highlights the importance of considering alternative and transformative development pathways for the city that can begin to reduce risk and vulnerability for the poorest of the region's population and ensure more sustainable use of environmental resources. However, given the significant developmental challenges already facing the city, and the bureaucratic institutional structures that tend to limit, rather than facilitate, innovation, integrating a new agenda such as climate change adaptation into municipal planning and implementation in a way that challenges existing development paradigms towards more transformative pathways, is extremely difficult. This context is an important consideration when assessing the extent of change that has taken place in the Municipality in relation to climate change adaptation, and the interventions that might be needed to advance transformative adaptation. Although Durban's own characteristics and challenges are critical in understanding the context in which the climate change adaptation agenda has emerged in the city, an equally important framing element is the national policy context for climate change in South Africa.

4.3 The national and local context for Durban’s climate change programme

This section presents both the national and local policy context for climate change adaptation.

4.3.1 The national policy context for climate change

In South Africa, two significant policies frame the country’s climate change work. The National Climate Change Response White Paper (Republic of South Africa, 2011) was released by the country’s National Government in October 2011, just prior to Durban hosting the UNFCCC’s 17th Conference of the Parties (COP17). The National Climate Change Response White Paper calls for climate-resilient development and formally places climate change on the agenda of all government departments. Significantly, the National Climate Change Response White Paper foregrounds the adaptation imperative prior to discussing mitigation (Taylor et al., 2014). The sectors targeted for particular attention in the National Climate Change Response White Paper are water, agriculture and forestry, health, biodiversity and human settlements. The National Climate Change Response White Paper also makes specific mention of cities as key sectors in which climate action is needed, but acknowledges that the mandate of local governments in the climate change space is not clear and needs to be explored more carefully (Taylor et al, 2014). The National Climate Change Response White Paper also provides no direction on what climate change action might look like at the local level or where financing should come from (Roberts and O’Donoghue, 2013).

Around the same time, in November 2011, the National Strategy for Sustainable Development (Department of Environmental Affairs, 2011) was approved by South Africa’s National Government. The strategy aims to balance environmental protection, social equity and economic efficiency goals in development decision-making and identifies the need to “respond effectively to climate change” as a key strategic objective. It also highlights the issue of environmental thresholds and recognises climate change as a major challenge in the country’s National Development Plan (National Planning Commission, 2012). In addition to these policies, South Africa is a signatory to both the UNFCCC and the Kyoto Protocol. The coming into force of the Paris Agreement (which is a separate instrument under the UNFCCC) on 4th November 2016, will also have significant implications for South Africa’s climate change mitigation and adaptation activities, requiring the country to meet NDCs for greenhouse gas emissions reductions, and invest in relevant adaptation interventions. South Africa’s Intended Nationally Determined Contribution was submitted to the UNFCCC on 25th September 2015 (Department of Environmental Affairs, 2015) and summarises the current strategic direction for climate change mitigation over the short, medium and long term in the country. From an adaptation perspective, the first draft of South Africa’s National Climate Change Adaptation Strategy was circulated for internal comment in January 2017 (Department of Environmental Affairs, 2016). When compared with other countries also reporting to the UNFCCC, South Africa is over-reliant on its carbon economy and has high levels of vulnerability to climate change particularly in terms of water scarcity, species loss and aggravated poverty (Taylor et al., 2014), making climate change action an urgent priority for the country.

Although national government in South Africa has begun to produce climate change policies, local government and local political leadership have played a critical role in beginning to translate these policies into implementation. In eThekweni Municipality for example, a political “Climate Change

Committee” was established towards the end of the political term of former Mayor Cllr James Nxumalo and discussions are currently underway (as of March 2017) to reconstitute this committee under the leadership of Mayor Zandile Gumede.

4.3.2 *The role of local governments in responding to climate change in South Africa*

Within this context of a country with relatively new climate change policies, it has often been officials within local governments who have started developing both climate change adaptation and mitigation strategies and programmes. The high level of responsibility being taken up at the local level (particularly in the well-resourced metropolitan areas) is in spite of the fact that there is no legal mandate for climate change planning at this level (Roberts and O’Donoghue, 2013). The urban climate change agenda has therefore largely been driven “from the bottom up” in South Africa, with success in this arena often being dependent on strong local personalities rather than on institutionally embedded responsibilities and resources (Archer et al., 2014). An additional feature of these local government climate change strategies is that they have aimed to contribute to the broader development agenda (e.g. job creation and food security) whilst at the same time reducing vulnerability to climate change impacts. However, a critical challenge still lies in the tendency for local governments to prioritise immediate socio-economic challenges, with less consideration given to longer-term issues such as climate change. An added difficulty in the case of climate change, is the fact that this is often perceived as an “environmental” issue (Archer et al., 2014) rather than a developmental one.

4.4 The emerging climate change adaptation agenda in eThekweni Municipality

Within this context, eThekweni Municipality provides an interesting case study through which to explore and understand how the climate change adaptation agenda has emerged in local government planning, and the way in which this process has unfolded. EThekweni Municipality’s climate change adaptation work has been the subject of a number of research papers that have explored issues such as the policy, political and social context within which climate adaptation has been institutionalised (e.g. Taylor et al., 2014), the forces that have helped to introduce and then drive the adaptation agenda in eThekweni Municipality (e.g. Carmin et al., 2012) and the processes and projects that have unfolded (e.g. Roberts, 2008; Roberts, 2010; Roberts et al., 2012; Roberts and O’Donoghue, 2013; Roberts et al., 2016). This section provides a brief overview of this literature in order to help contextualise the outcomes from the research interviews that appear in Chapters 6 and 7.

Over a period of approximately thirteen years (2004-2017), a number of projects and interventions have been implemented to mainstream climate change adaptation into the planning and decision-making of eThekweni Municipality. The first step in this process was the participation of the Head of the (then) Environmental Management Department (later renamed the EPCPD) in an advanced international environmental management programme in 2004, which led to the initiation of the Municipal Climate Protection Programme (MCPP) in eThekweni Municipality (Roberts, 2008). EThekweni Municipality has led its climate change programme with a climate change adaptation agenda from the outset. This makes it distinct from other cities, both at the global level and in South Africa (e.g. Carmin et al., 2012) which have led with climate change mitigation. In this regard, the MCPP was the first of its kind in South Africa to focus on climate change adaptation (Roberts, 2010;

Carmin et al., 2012; Leck and Roberts, 2015) and this happened despite there being no formal requirement (i.e. in terms of legislation) at the time to do this. Key factors influencing eThekweni Municipality's decision to lead with climate change adaptation included the high levels of vulnerability in the city and the opportunity to link the adaptation agenda with development objectives (Carmin et al., 2012; Roberts, 2010) within a context of poverty, rapid urbanisation and deteriorating environmental conditions (Roberts and O'Donoghue, 2013). In eThekweni Municipality, the main responsibility for climate change currently lies with the EPCPD (with a focus on climate adaptation) and the Energy Office (with a focus on climate mitigation). The Climate Protection Branch in the EPCPD is small and, as of January 2017, consisted of a Manager, two Climate Protection Scientists, one Senior Environmental Technician and an embedded researcher. This last post is funded by the University of KwaZulu-Natal (UKZN) for a contract period of two years. A third Climate Protection Scientist post is currently vacant. At the time when the climate adaptation agenda was first introduced in eThekweni Municipality, the team was even smaller and, at its largest, comprised three individuals, including the Deputy Head of the department.

Since its inception, the development of the MCPP has been phased and opportunistic in nature, rather than being founded on any single theoretical or analytical framework (Taylor et al., 2014) and has comprised a number of interventions to mainstream adaptation. As outlined by Leck and Roberts (2015), key features of the MCPP included: sectorally focused Municipal Adaptation Plans or "MAPs"; adaptation activities focused on understanding and improving the adaptive capacity of local communities; a strong ecosystem-based adaptation component; urban management interventions to address specific climate change challenges such as the urban heat island and increased storm water runoff; attempts to develop locally appropriate tools (e.g. sea level rise models and benefit-cost models focused on human benefit and ecological integrity); actions taken to mainstream climate protection (e.g. mega-event greening); knowledge and data generation through the development of research partnerships; and networking at the local, subnational, national and international levels. This final area of work has included the operationalisation of the Durban Adaptation Charter or "DAC" (www.durbanadaptationcharter.org), which was produced as an outcome of the Durban Local Government Convention during COP17, and which provides guidance on priority focus areas for climate adaptation action in cities. Significantly, a major finding of the benefit-cost analysis, which was framed in terms of the "human benefit" associated with a range of climate change interventions was that the most efficient interventions across all futures and time frames are socio-institutional in nature (Cartwright et al., 2013), thus re-emphasising the need for socio-institutional change as a critical component of transformative adaptation.

These projects have all been initiated in a phased manner and have been implemented on the basis that they are experimental, include social learning and are "no-regrets" initiatives that have the potential to be beneficial under a range of climate change scenarios. This approach has been useful in ensuring that the experience and knowledge gained through early interventions has been used to inform subsequent thinking and actions (Roberts et al., 2012). Key events and projects are summarised in Table 4.1²⁰ as context for the interview responses in Chapters 6 and 7.

²⁰ The table has been compiled based on a number of sources, including Roberts et al (2012), Carmin et al (2012), Roberts and O'Donoghue (2013), Taylor et al (2014) and Roberts et al (2016).

Table 4.1: A summary of important events and projects along eThekwini Municipality's climate adaptation journey

Date	Initiative/action	Description
1999	First involvement of eThekwini Municipality in a climate change programme	Climate change was considered for the first time by the (then) Environmental Management Branch of eThekwini Municipality through its participation in ICLEI's ²¹ (Local Governments for Sustainability) "Cities for Climate Protection Programme".
2004	Recognition of climate change as a significant threat to biodiversity in eThekwini Municipality	Debra Roberts, as head of eThekwini Municipality's (then) Environmental Management Department ²² (EMD), attended a semester-long programme at Brown University in Rhode Island (USA). This provided an opportunity for deep engagement with the science of climate change and an understanding of the potential impacts of climate change on biodiversity, which was a core function of the EMD.
2004	Initiation of the MCPP	The MCPP was initiated in eThekwini Municipality in recognition of the seriousness of climate change for cities such as Durban.
2004	Climatic Future for Durban Report was commissioned (completed in 2006)	The "Climatic Future for Durban" report was commissioned in 2004, to understand the potential impacts of climate change in Durban. The report (which was finalised in 2006) served as a catalyst for the implementation of the MCPP, with the adaptation workstream of the MCPP focusing on: municipal adaptation (linked to line functions); community-based adaptation; ecosystem-based adaptation; urban management interventions and mainstreaming of climate change adaptation.
2006	Headline Climate Change Adaptation Strategy	The "Climatic Future for Durban" report led to the "Headline Climate Change Adaptation Strategy" after consultation with relevant municipal departments. The aim of the Headline Adaptation strategy was to identify key municipal departments that would be worst affected by climate change and to provide early recommendations on how these functions should respond to likely climate impacts.
2007 (-2009)	Institutionalisation of the climate adaptation function in eThekwini Municipality.	The Climate Protection Branch was formed in the EMD, with a specific focus on adaptation. Later, in 2009, the EMD changed its name to the EPCPD in acknowledgment of the fact that the department now had two core focus areas: biodiversity planning and climate change adaptation planning.
2007	Natural events raise awareness of the climate change agenda	Coastal storms caused flooding and coastal and infrastructure damage which added impetus to the urgency of the climate change agenda.

²¹ ICLEI - Local Governments for Sustainability is a global network of more than 1,500 cities, towns and regions committed to building a sustainable future (www.iclei.org)

²² The Environmental Management Department was previously called the 'Environmental Management Branch'.

Date	Initiative/action	Description
2008	Establishment of the Energy Office	The Energy Office was established in eThekweni Municipality in response to rolling electricity blackouts at the time. The Energy Office went on to coordinate the climate mitigation function for the Municipality from 2011.
2008-2009	Initiation and development of the Municipal Adaptation Plans (MAP's)	The vision for the MAP's was that each department would develop initiatives designed to maintain and improve the functioning of municipal systems, services and infrastructure, taking climate change into consideration. The selection of the Health, Water and Disaster Management functions in the Municipality as core MAP departments for this was based on their vulnerability to existing and projected climate change risk, their importance to the city's development agenda and the fact that the EPCPD had existing working relationships with key individuals in these sectors. A central reason for initiating the development of MAPs was that the Headline Climate Change Adaptation Strategy was not effective in mobilising sectoral level action, despite having helped to begin the climate adaptation conversation in some sectors.
2009	Climate Change Conference convened by eThekweni Municipality and held in Durban	A key outcome from this conference was endorsement for the creation of a Climate Change Partnership in Durban.
2010/2011	First dedicated municipal funding for climate change work	The first dedicated municipal funding for climate change work was received. This was supplemented at various points by external funding (e.g. from DANIDA, the Rockefeller Foundation and through a sister-city climate change partnership with the city of Bremen, Germany.)
2010	Fifa™ Soccer World Cup and the Buffelsdraai Landfill Site Community Reforestation Project	The Buffelsdraai Landfill Site Community Reforestation Project was a large-scale ecological restoration programme initiated ahead of the 2010 World Cup, as part of Durban's contribution to offsetting the carbon footprint associated with hosting the event. The project was implemented in the buffer zone around a regional landfill site. The reforestation project created jobs for local community members involved in managing the nursery and planting the trees on site, and for "trepreneurs" to grow locally sourced indigenous seedlings in exchange for credit notes that could be used at quarterly "tree stores" to "buy" food, building materials and other pre- ordered goods, or for school fees. Although this project was initially conceptualised as a carbon sequestration initiative, it was also recognised that functional ecosystems help to reduce many of the impacts of climate change and therefore need to be a central part of a city's climate adaptation response. This programme also recognised that generating community jobs and skills through ecological restoration could address human vulnerability as an equally important component of climate adaptation.

Date	Initiative/action	Description
2011	National Climate Change Response White Paper	South Africa's "National Climate Change Response White Paper" was approved but this did not include any requirements for action by municipalities.
2011	Cost benefit analysis of the MAPs	A cost benefit analysis was undertaken for the multiple initiatives that had been identified in the MAPs. The benefit metric used in this work was not derived from the economic value of the adaptation initiative but was rather a quantification of the human benefit, measured in terms of the number of people each adaptation initiative was likely to reach and the extent of the potential resulting benefit. This methodological approach highlights the importance that eThekweni Municipality's climate adaptation work has placed on delivering livelihood benefits to the most vulnerable members of society.
2011	Establishment of the Durban Climate Change Partnership	The Durban Climate Change Partnership was established with multiple stakeholder representation. However, this was ultimately disbanded due to factors such as distrust among the groups, the absence of strong leadership (the Municipality itself was limited in the extent of its involvement because of financial regulation restrictions) and the inability to secure sustainable and reliable funding.
2011	Durban hosted the 17 th Conference of the Parties to the United Nations Convention on Climate Change and the 7 th Meeting of the Parties to the Kyoto Protocol (COP17)	COP17 gave the climate change agenda more political support in eThekweni Municipality and also provided an opportunity for hosting the adaptation-focused Durban Local Government Convention. A key output from this was the DAC, which provided guidance on priority adaptation initiatives for cities around the world. The subsequent operationalisation of the DAC has been dependent on international funding and partnerships, but has played a critical role in advancing the global climate adaptation agenda, and highlighting the important role that cities have to play in the adaptation space. COP17 also provided an opportunity to offset the carbon footprint of the event and this led to the initiation of another reforestation project and the coining of the term "community ecosystem based adaptation". The community ecosystem-based adaptation concept highlights the mutually beneficial and positively reinforcing relationship that exists between ecosystems and people and the contribution that ecological restoration and associated job creation opportunities can make towards climate adaptation. This was also the point at which the Energy Office was assigned the mitigation function for the Municipality.
2011	Establishment of the Restoration Ecology Branch	The Restoration Ecology Branch was established to manage the large-scale ecological restoration programmes emerging from the work of the EPCPD.

Date	Initiative/action	Description
2011	Joint research partnership with UKZN on Global Change was established	The primary intention behind the initial establishment of the research partnership was to address the skills shortage in the biodiversity and climate change sciences, by building capacity in these spaces. The focus of the research was to explore the potential impacts of climate change on biodiversity in Durban and the implications of this for biodiversity protection and management.
2012	Durban's mayor established as a political champion for climate change adaptation	COP17 provided an important opportunity for Durban's mayor at the time (Cllr James Nxumalo) to play a strong leadership role in this space. He went on to play important roles as a member of ICLEI's Regional Executive Committee for Africa, where he was responsible for the Adaptation and Disaster Risk Reduction Portfolio. He also served as the African representative on ICLEI's Global Executive Committee and was elected in 2013 as vice-president, holding the Resilience, Climate Adaptation and DAC portfolio. He held this position until the end of his mayoral term in August 2016.
2012	Initiation of the Umhlangane Catchment Climate Adaptation Programme	This programme was initiated as part of a climate change partnership with Durban's sister city Bremen, Germany to explore how the guidelines from the DAC could be applied at a catchment scale and in a cross-sectoral manner to influence planning and decision-making in the Umhlangane area. The programme had a specific focus on the city's natural resources as the base for adaptation, and also aimed to better understand the governance aspects of managing climate adaptation programmes at scale. The programme recognised that there is no simple solution to climate change adaptation, and that the sharing of ideas and experience among different sectors that will be impacted by climate change, could help to inform better climate adaptation responses.
2013	Establishment of the UMngeni Ecological Infrastructure Partnership (UEIP)	The UEIP is a multi-stakeholder, trans-municipal boundary partnership to address the role of ecological infrastructure in increasing water security and adaptive capacity in the uMngeni River catchment. The initiation of this programme reflected a significant shift in thinking towards a "social-ecological systems approach" to managing water, biodiversity, climate and poverty challenges within the context of one of Durban's critical water supply catchments.
2013	Implementation guidance workshop on the DAC	Durban hosted an Implementation Guidance workshop linked to the DAC that was funded by USAID (United States Agency for International Development) and ICMA (International City/County Management Association)
2013	Establishment of the Central KwaZulu Natal Climate Change Compact	The Central KwaZulu Natal Climate Change Compact was established between Durban and surrounding municipalities to promote regional cooperation and learning around climate change.

Date	Initiative/action	Description
2013	Durban was selected to participate in the international “100 Resilient Cities” programme	Durban’s application to “100 Resilient Cities” was centred on the water-biodiversity-climate change nexus, which built strongly on the existing biodiversity and climate adaptation work of the EPCPD. This work has since broadened its scope, with potentially important implications for transforming city governance.
2014	Adoption of the Durban Climate Change Strategy	The Durban Climate Change Strategy lays out a city-wide approach to adapting to climate change and mitigating Durban’s contribution to climate change. This was approved by eThekweni Municipality’s full council in 2014.
2014	Establishment of the reforestation research partnership	A second research partnership between eThekweni Municipality and UKZN was established and focused on the large scale ecological restoration programmes that have been initiated in Durban. This partnership, combined with the research partnership on global change, formed the basis of the Durban Research Action Partnership (D’RAP), which has cemented the relationship between these academic and municipal institutions.
2014	Regional hub established for Southern Africa in Durban as part of the “network of networks” model for DAC implementation	An implementation model for the DAC was developed, focused on the establishment of a “network of networks” built around regional hubs and local compacts, anchored in cities that are climate change leaders. Regional hubs interact and learn from each other, and in some instances trans-national exchanges are also used to facilitate learning. Sub-national networks (or local compacts) have been established around the regional hubs to provide support to smaller local municipalities.
2014 – present (2016)	An important focus for the work has been on expanding networks and consolidating the local climate change adaptation work in Durban	Priorities have focused on: sustaining existing work; understanding the implementation gaps at the local level; strengthening knowledge partnerships to advance climate adaptation at the regional level (with less focus on managing the DAC at the global level); and consolidating the climate change work done to date in the Municipality.

Although eThekweni Municipality's climate adaptation journey is already relatively well described in the literature, the current thesis will build on the work done to date by conducting more detailed and analytical qualitative research that reflects on eThekweni Municipality's climate adaptation journey through the conceptual lens of transformation and transformative adaptation in order to assess whether the changes that have taken place in the case study demonstrate transformative adaptation. In this way, the thesis hopes to add to the existing literature by translating conceptual ideas on transformation into the context of a local case study, reflecting on whether eThekweni Municipality's climate adaptation journey demonstrates transformative adaptation, and then determining what lessons can be inferred from the case study regarding transformation in environmental governance, in a local government context.

4.5 Summary

Local government, as the institution responsible for the management of cities, has a critical role to play in driving transformation and transformative climate change adaptation. In the case of Durban, this is particularly important given the city's concurrent challenges of population growth, poverty, growing inequality, increasing informality, environmental degradation, poor governance and escalating climate adaptation needs (Roberts and O'Donoghue, 2013). Responding to these threats, risks and uncertainties requires responses from local government that involve an ability to strategise and coordinate across municipal functions, often with little precedent at the local, national and international level to guide decision-making. This is made more challenging by the fact that many local government institutions are structured in a way that does not encourage and facilitate integration, knowledge exchange and innovation. Under these circumstances, transformation in terms of integrating new agendas like climate change into municipal planning and implementation, is extremely difficult. However, it is in cities like Durban, where urbanisation is not yet complete and where there is still a chance to adopt an alternative and more sustainable development path, that the need to understand and implement transformation is most urgent. The case study for the current research therefore provides an opportunity to explore transformation and transformative adaptation through the lens of a city that is working to shift its own institution to mainstream climate adaptation into municipal planning and implementation, within a complex socio-economic and institutional context that is characteristic of so many local governments in the developing world.

CHAPTER 5: RESEARCH METHODOLOGY

5.1 An overview of the methodological approach

This research adopts a qualitative approach for data collection and analysis in order to explore the process of change that is emerging in the local government case study of eThekweni Municipality in Durban, South Africa, as the city works to integrate climate adaptation into municipal planning and implementation. The development of a heuristic framework, which articulated the main characteristics of transformation and transformative adaptation based on a review of the transformation and transformative adaptation literatures, formed the first stage of the methodology. The experience of eThekweni Municipality's climate change adaptation work was then used as the basis for comparing the change process that emerged in this local case study with the transformation and transformative adaptation characteristics that had been captured from the literature. The heuristic framework provided a reference point against which to assess the extent to which the process of change in the eThekweni Municipality climate adaptation case study reflected the transformation and transformative adaptation characteristics that are articulated in the literature.

In this research, the purpose of undertaking case study research was to test the theoretical concept of transformation (with a specific focus on transformative adaptation) in a practical case study. This was important given the very particular local government context in which the climate change adaptation work has been undertaken and the need, as noted by Hartley (2004, cited in Kohlbacher, 2006) to analyse the context and processes that help to demonstrate the theoretical issues that are being explored. However, it is acknowledged that the outcomes of case study research cannot necessarily be generalised, and that reflection is needed on the usefulness of the outcomes in similar contexts.

This chapter will provide an overview of the primary and secondary data that were used in this research and will describe how the data were collected, consolidated and analysed in order to produce the results that are described in this thesis. The chapter will also briefly consider some of the limitations of the methodology.

5.2 The collection of data

This section provides an overview of the data collection process for this thesis. The use of secondary data is described first, as this was the starting point for the research and helped to frame the way in which the primary data were collected.

5.2.1 *Secondary data*

Literature reviews formed the basis of the secondary data used in the thesis and focused primarily on the emerging body of literature on transformation and transformative adaptation in the environmental governance and climate change fields respectively. The literature review on transformation and transformative adaptation was used to identify characteristics relating to the nature of transformation and transformative adaptation, the factors that catalyse and sustain

transformation, and the outcomes from transformation. These characteristics were summarised in a heuristic framework that was used to assess the changes that have taken place in the eThekweni Municipality case study, the extent to which this can be considered transformative adaptation, how the case study experience reflects, differs from or adds to the existing body of related literature, and what this experience can contribute in terms of understanding transformation processes more broadly in the arena of environmental governance. The literature review and the development of the heuristic framework were undertaken before the interviews commenced. This was important in order to guide the development of the interview questions in a way that aligned with the characteristics of transformation and transformative adaptation that appear in the literature. Municipal reports, strategies and local government planning documents were also used to help contextualise the case study and the final outcomes from this thesis.

5.2.2 Primary data

Primary data comprised of twenty-three interviews conducted between September 2014 and June 2015 and purposive sampling was used to decide who would be interviewed. Purposive sampling is synonymous with qualitative research and implies that sampling is undertaken based on a set of strategic choices related to the objectives of the research, and that interview respondents are selected based on who they are and what perspective they might bring to the issue being researched (Palys, 2008). In this thesis, “maximum variation” purposive sampling was used in order to ensure that the selected interview respondents covered a spectrum of positions in relation to eThekweni Municipality’s climate change adaptation work (Palys, 2008). Given the predominant focus of the case study on changes that are emerging in the local government of eThekweni Municipality and the need to fully understand the extent to which climate change adaptation has been integrated into municipal planning and implementation, it was important to hear perspectives and insights from a range of respondents as follows:

Local government officials

Respondents ranged from those who were closely involved in leading the city’s climate change adaptation work to those who were either indirectly linked to the work or who did not have in-depth knowledge of how this agenda has developed in eThekweni Municipality.

External respondents

Individuals from outside the Municipality were also interviewed if they had been directly involved in at least one significant element of eThekweni Municipality’s climate adaptation work.

On the above basis, respondents were allocated to categories, as summarised in Table 5.1. A list of the individuals who were interviewed is provided in Table 5.2. Interviews were recorded (with permission from each of the respondents) and later transcribed.

Table 5.1: A summary of the respondent categories and the rationale for this categorisation.

Respondent Category	Category description	Rationale
1.	Leaders and coordinators of the climate change adaptation work in eThekweni Municipality. These municipal officials have generally adopted a strong scientific approach to the work.	These individuals understand the context and reasons for initiating the climate adaptation work in eThekweni Municipality. They currently hold (or have held) the vision for the climate adaptation agenda at both a local and global scale. They have also been directly responsible for testing various projects and approaches in relation to the adaptation work, and have a particular perspective to offer with regard to the changes that have taken place in initiating and sustaining the climate change adaptation work in eThekweni Municipality.
2.	The climate change adaptation “implementers”. Municipal officials and consultants involved in driving the implementation of the climate adaptation work within eThekweni Municipality.	These individuals have been directly involved in climate adaptation projects and programmes within eThekweni Municipality and provide important perspectives on their roles in this work, what motivated them to be part of it, the changes that have taken place with regard to the integration of climate adaptation into municipal planning and the extent of change within their respective sectors or spheres of influence.
3.	Municipal departments or individuals not directly involved in the climate adaptation work.	These individuals provide a municipal perspective on the extent to which climate adaptation ideas and principles have been integrated into sectors that have not been directly involved in the climate adaptation work, but which will be affected by it. This provides an important perspective on the extent of integration of adaptation into sectors across the municipal institution.
4.	Municipal officials who hold strategic planning and decision-making positions within the Municipality.	Given that these individuals should have a strategic, high level and more holistic perspective across municipal sectors and municipal planning, they provide a perspective on the extent to which climate change adaptation is being considered in strategic planning and decision-making in eThekweni Municipality
5.	Stakeholders external to the municipal institution.	These individuals had all been directly involved in at least one element of Durban’s climate adaptation work. They provide an important perspective on external perceptions of the Municipality’s climate adaptation work and its implementation.

Table 5.2: A summary of the interview respondents and their positions within or external to the Municipality

Category number ²³	Department/Unit	Position of respondent	Date of interview
1	Environmental Planning and Climate Protection Department (EPCPD)	Former Deputy Head	25.05.2015
	EPCPD	Former Climate Protection Scientist	27.09.2014
	EPCPD	Manager: Climate Protection Branch	31.10.2014
2	Coastal Stormwater and Catchment Management Department (CSCM)	Senior Manager	11.09.2014
	Engineering Unit (EU)	Project Executive	12.12.2014
	Futureworks Consulting Company (FW)	Consultant to EPCPD	06.11.2014
	Disaster Management and Emergency Control Unit (DMU)	Deputy Head	26.09.2014
	EPCPD	Manager: Restoration Ecology Branch	31.03.2015
	EThekwini Water and Sanitation Unit (EWS)	Professional technologist	15.09.2014
3	EPCPD	Specialist ecologist: Biodiversity Planning Branch	09.03.2015
	Economic Development and Investment Promotions Unit (EDU)	Project Manager, Investment Promotion Department	23.05.2015
	EDU	Former Researcher	10.09.2014
	EThekwini Transport Authority (ETA)	Senior Manager: Strategic Transport Planning	12.06.2015
	Human Settlements Unit (HSU)	Manager: Research and Policy	06.11.2014
	EWS	Former Head	03.03.2015
	EWS	Consultant Professional Engineer	07.10.2014
	Strategic Spatial Planning Branch (SSPB), Planning Unit	Senior Planner	22.04.2015
4	Economic Development and Planning Cluster	Acting Deputy City Manager	17.06.2015
	Strategy Office, Office of the City Manager (OCM)	Chief Strategy Officer	23.04.2015
	Corporate Policy Department (CPD)	Senior Manager: Programmes	03.10.2014
5	Wildlands Conservation Trust (WCT)	Chief Executive Officer (CEO)	08.05.2015
	Inter-religious Council (IRC)	Convenor	15.05.2015
	Durban Chamber of Commerce and Industry (DCCI)	Former Chief Executive Officer	05.05.2015

²³ See Table 5.1 for category descriptions

In addition to the interviews, primary documentary sources such as strategic planning documents for eThekweni Municipality, policy context information and meeting minutes were also used.

5.2.3 The interviews

In order to arrange the interviews, interview respondents were emailed or telephoned and provided with background information on the research project, before being asked to participate in the process. Wherever possible, interviews were held in municipal boardrooms to facilitate clear sound quality on the interview recording. The duration of these interviews varied between one and three hours, but most lasted for approximately one and a half hours each. Each interview was recorded and later transcribed by an external service provider. The researcher checked and edited all transcripts against the original recording. Three categories of interview questions were developed as follows:

Understanding of climate change and adaptation

The first interview questions probed respondents' understanding of climate change and climate change adaptation and the extent of their involvement in eThekweni Municipality's climate adaptation work. The responses were used to help confirm the interview categories to which respondents had initially been assigned.

Municipal context

These questions were designed to provide perspective on the municipal institution and its responsiveness to change. Responses provided important insights into the very specific local government institutional context in which changes have emerged in the case study, and the likely ease or difficulty with which transformation happens in such contexts. This served as a reference point against which to evaluate the extent of change that has taken place in eThekweni Municipality's climate adaptation work.

Changes²⁴ that have emerged in the eThekweni Municipality climate adaptation case study

Questions were developed to explore the characteristics of transformation and transformative adaptation identified in the literature, within the case study context. For example, in order to better understand the "nature of transformation and transformative adaptation", questions were framed to probe the type and extent of the changes that have happened in the climate adaptation work in eThekweni Municipality, in order to assess whether these demonstrate the system shifts that characterise transformative adaptation. Similarly, to understand how transformation and transformative adaptation are catalysed and sustained, specific questions were framed around the factors that have either catalysed or acted as barriers to transformative adaptation in the climate adaptation context in eThekweni Municipality. In instances where respondents had been involved in the climate adaptation work at both a strategic and an implementation level, they were asked to reflect on these questions from both a policy and a sectoral perspective in the municipal context.

²⁴ As indicated in Chapter 1, the word 'change' is used to describe the shifts that are being observed in the local adaptation work, until the point where an assessment has been undertaken of whether these changes constitute transformative adaptation. The word 'transformation' was not used in the interview questions as this may have influenced responses. This assessment is described in Chapter 6.

Abbreviated versions of the questions in each of the above categories are provided in Table 5.3 for illustrative purposes only. The complete questionnaire can be found in Appendix 1. Although the categories for the interview questions were the same throughout, the interview questions themselves were adapted slightly for some respondent groups and two questionnaires were ultimately developed that could be used as needed. The second questionnaire framed the questions in a more generic manner than the first and was more useful for respondents whose experience of eThekweni Municipality's climate adaptation work was less direct (Appendix 2). Generally, the questions from both versions of the questionnaire were used interchangeably during the interview, depending on the detail with which the respondent was able to answer the questions posed. In some cases, this had to be adjudicated during the interview. The interviews were semi-structured and an attempt was made to ensure that all questions were covered, whilst at the same time providing space for respondents to speak about issues that went beyond these, where they felt these to be relevant.

Table 5.3: A summary of the interview questions (abbreviated) for each category of questions (Complete questionnaire can be found in Appendix 1)

Category of interview questions	Summary of questions asked
Understanding of climate change and adaptation	<ul style="list-style-type: none"> • What do you understand of the term (a) climate change and (b) climate change adaptation? • To what extent have you been involved in Durban's climate change adaptation work?
Municipal context	<ul style="list-style-type: none"> • How would you describe the Municipality in terms of its ability to change when it needs to? • What factors in the Municipality do you think make it easy or difficult to change?
Changes that have occurred in the Durban case study (divided into the focus areas of the transformation and transformative adaptation literature)	<p><i>Understanding the nature of transformation and transformative adaptation</i></p> <ul style="list-style-type: none"> • How have you seen the climate change adaptation agenda emerging in the Municipality? Do you see these changes as significant? • Which projects have had the most impact and why? • Have there been any gaps and missed opportunities in eThekweni Municipality's climate adaptation work? • How have your own ideas about climate change adaptation shifted (or not) over time?
	<p><i>Catalysing and sustaining transformation and transformative adaptation</i></p> <ul style="list-style-type: none"> • What factors were important in getting the climate change adaptation work started? And in keeping it going? • What factors have been a constraint to change in the eThekweni Municipality case study? • What role does knowledge and experience sharing play in mainstreaming the climate change adaptation agenda? • Who have been the key actors involved in the climate adaptation work in eThekweni Municipality and what role have they played?
	<p><i>The outcomes of transformation and transformative adaptation</i></p> <ul style="list-style-type: none"> • Who/ what will benefit most from eThekweni Municipality's climate change adaptation work? • Have there been any negative outcomes from the work?

The responses to these questions provided important insights into the receptiveness of local government institutions to new ideas and transformation, the way in which transformation and transformative adaptation might unfold in such a context and the factors that facilitate or undermine these processes.

At the outset, the questions were tested on the researcher by her supervisor to ensure that the questions were framed in a way that generated the responses that were needed. Ten interviews were then conducted and analysed, again to assess whether appropriate responses were being generated. Minor modifications to the questionnaires were made at this point to ensure that the questions were clear. These changes were not substantial enough to make the subsequent interviews significantly different from those that had been conducted up to that point.

5.3 Consolidating and analysing the interview results

5.3.1 *The development of themes, storylines and storyline components*

In order to assess the eThekweni Municipality case study experience against the heuristic framework, themes, storylines and storyline components were developed, in order to categorise and synthesise the qualitative data emerging from the interviews and to analyse it. Themes were developed in a deductive way, based on the focus areas of the transformation and transformative adaptation literatures and the characteristics that were described for each in the heuristic framework (Table 3.1). The themes that were used in the analysis are summarised in Table 5.4 in relation to the focus areas of the transformation literature.

Table 5.4: A summary of the transformation themes that were developed deductively from the original focus areas of the transformation and transformative adaptation literatures

Focus area of the transformation literature	Transformation theme used in the analysis	Rationale for the transformation theme
Understanding the nature of transformation and transformative adaptation	The eThekweni Municipality context in which change occurs	Describes the context in which change takes place and provides a reference point for assessing the extent of change within this.
	The nature of change that occurs	Describes the specific changes that have been seen in the case study across the levels of both policy and practice.
	Gaps and missed opportunities in the climate adaptation work	Identifies gaps in the work so that these can be considered alongside the positive changes that have taken place, in order to more accurately assess whether the changes that have taken place can be considered transformative.
	Characteristics of the change process	Highlights the way in which the change process has unfolded in order to assess whether any of these characteristics align with those that usually accompany transformation and transformative adaptation.

Focus area of the transformation literature	Transformation theme used in the analysis	Rationale for the transformation theme
Outcomes of transformation and transformative adaptation	The outcomes of change	Used to assess whether the outcomes of the changes in the case study are positive or not, in terms of addressing issues of equity, justice and sustainability.
Catalysing and sustaining transformation and transformative adaptation processes	Catalysts for transformative adaptation	Explores the initial catalysts for transformative adaptation.
	Factors that facilitate transformative adaptation	Identifies those factors that have helped to facilitate and sustain transformative adaptation.
	The role of knowledge sharing and social learning in facilitating transformative adaptation	Seeks to understand what role knowledge sharing and social learning play in facilitating transformative adaptation.
	Barriers to transformative adaptation	Understand barriers that work against the catalysts and facilitating factors to undermine transformative adaptation.
	Key actors involved in transformative adaptation	Explores the types of actors involved, where they are located in the system and what role they play in facilitating or undermining transformative adaptation.

Within each theme, storylines and storyline components were developed in an inductive way through the application of only the “storyline component” of Hajer’s “discourse analysis” approach (Hajer, 1995). This was used to identify the dominant discourses in the interview transcripts, in relation to each of the themes. Storylines are short narratives that “help people to fit their bit of knowledge, experience or expertise into the larger jigsaw of a policy debate” (Hajer, 2003 p. 104) and in the context of the current research, they offer perspectives on a particular transformation theme. As an example, under the theme of “catalysts for transformative adaptation”, a strong storyline emerged around the “role of champions” as critical catalysts. In most cases, respondents also expressed a number of different elements relating to a single storyline and therefore these elements were captured as “storyline components”. For example, when respondents spoke about the important role of champions (a storyline) as catalysts for transformative adaptation (transformation theme), they described the role of champions in leading and driving a change agenda (storyline component 1), the characteristics that are common to champions (storyline component 2) and the fact that champions need to build a broader support base around them in order to sustain change (storyline component 3). These storyline components were important in capturing the breadth and depth of the interview responses. The storylines and storyline components were developed in an iterative way based on the content of the interviews and were captured in a reference sheet, an extract of which is shown in Table 5.5 for the theme of “catalysts for transformative adaptation”.

Table 5.5: An extract from the reference sheet that was used to develop the storylines and storyline components for each transformation theme, showing the storylines and storyline components that were developed for the theme “Catalysts for transformative adaptation” in the eThekweni Municipality case study

Theme	Storyline	Storyline component
Catalysts for transformative adaptation	Individual champions are key in catalysing transformative adaptation	Champions play a key role in leading and driving transformative adaptation
		Champions share key characteristics that assist them in playing a leadership role
		Individual champions need to build broader support around them in order to ensure that the transformative adaptation agenda is initiated and sustained
	Crises spark a recognition of the need to change	
	Maximising the value of “windows of opportunity” can be key to initiating transformative adaptation	It is important to be able to recognise “windows of opportunity” when they present themselves.
Events such as COP 17 and the Soccer World Cup provided key “windows of opportunity” to advance the climate change adaptation agenda in Durban.		

The reference sheet was initially completed for ten of the interviews so that the storyline and storyline components could be checked for accuracy and then consolidated, before the remainder of the interview transcripts were analysed in the same way.

5.3.2 Capturing the qualitative data from the interviews

In addition to the reference sheet, a separate data sheet in Microsoft Excel was developed to capture the detailed qualitative data emerging from each of the interviews (Figure 5.1). In addition to the storylines and storyline components emerging in each of the interviews, this sheet also captured quotes that supported these. The respondent’s name and interview category were recorded to allow for comparison of perspectives across the respondent groups.

	B	C	D	E	F	G
	STORYLINE	COMPONENT OF STORYLINE	QUOTE	Count	Interviewee category	Interviewee name
1	Crises spark a recognition of the need to change		I think sometimes you need to create mind pictures for the people in the organisation of the worst case scenario, so that they are shocked out of their 'oh it's just another issue that someone's raising' reaction... (Andrew Mather's sealevel rise work created a) kneejerk reaction from politicians... and so it opened up a dialogue.' (p5 interview)		2	Respondent 1
2	Crises spark a recognition of the need to change				1	Respondent 2
3	Individual champions are key in catalysing transformative adaptation	Champions play a key role in leading and driving transformative adaptation	It really has come down to key enabling individuals and actually this isn't something specifically unique to the developing world context, um, it's really if you look at any of the literature on where adaptation is happening, particularly at the Municipal level, it happens in places where people are passionate about adaptation and they are literally driving it despite whatever barriers around it being, for example, (an unfunded mandate) or for example not a priority when compared to the socio-economic challenges that are often the priority in developing countries... so it's individuals'		1	Respondent 3
4	Individual champions are key in catalysing transformative adaptation	Champions play a key role in leading and driving transformative adaptation	You still need an individual that's going to say "this is an interesting for me whether it be in my personal capacity, whether it be in technical capacity, I need to find out more."		2	Respondent 1
5	Individual champions are key in catalysing transformative adaptation	Champions share key characteristics that assist them in playing a leadership role	You know, when climate change first started to be talked about, there were various things that were said, but I think as a result of Debra to a large extent, I think because of the respect that I had for her because of the work she had done, and understanding her strength and knowledge – you tend to listen more to those people that you respect'		2	Respondent 1
6	Individual champions are key in catalysing transformative adaptation	Champions share key characteristics that assist them in playing a leadership role	It's a long the line there has been an interest at a personal level, whether it be their background, whether it be exposure to something they've seen or work done by somebody in their field.' (Geoff)		2	Respondent 1
7	Individual champions are key in catalysing transformative adaptation	Champions play a key role in leading and driving a change agenda	You need a champion first...none of this work works on work requirements, it actually works on a personality basis, so you need somebody to lead...		2	Respondent 4
8	Individual champions are key in catalysing transformative adaptation	Champions share key characteristics that assist them in playing a leadership role	So these champions, they can't be wimps. They can't be brow-beaten out. And sometimes it's tough because you feel like you're the only one beating the drum and everyone is against you. It's not an easy ride, especially in the institution like this one, can either be your friend or quite a big enemy.'		2	Respondent 4
9						

Figure 5.1: A screen grab from the data excel sheet, showing the categorisation of responses into storylines and storyline components, with supporting quotes from each interview.

In the figure, the respondent names have been removed for the purposes of anonymity. This data was captured for ten of the interviews first in order to ensure that storylines and storyline components had been consolidated before the remainder of the data from the interview transcripts were captured in the same way.

5.3.3 Analysing the data

The addition of a filter function to each column in the Excel data sheet provided a useful way to sort the data by any theme, storyline, storyline component, respondent, or respondent category. This helped in assessing the cross section of ideas emerging within, and across, each of these data categories. The organisation of the data in this way also facilitated some simple quantitative analysis using pivot tables. The pivot tables allowed an assessment of the number of respondents expressing specific storylines and storyline components in their interviews, thereby providing an indication of which of the storylines and storyline components were most commonly or least commonly expressed across the interviews. It was also possible, using pivot tables, to assess how these perspectives were similar or different across the respondent categories and whether, for example, an individual who had been directly involved in leading the climate adaptation work (respondent category 1) identified the same “catalysts for change” as someone in a city leadership position (respondent category 4). Further notes on the quantitative analysis can be found in Box 1 on page 98.

Once the data had been consolidated and analysed in this way, the results were then used to reflect on the extent to which the eThekweni Municipality case study reflects the transformation and transformative adaptation characteristics outlined in the literature, as presented in the heuristic

framework, and whether these similarities or differences provide new insights into processes of transformation and transformative adaptation in a local government context.

5.3.4 Describing the results

The objective of the current research is to explore the changes that are emerging in the eThekweni Municipality case study with regard to the integration of climate change adaptation into municipal planning and implementation and to understand these in relation to the characteristics of transformation and transformative adaptation that appear in these literatures. The research findings are therefore presented in two chapters. Chapter 6 uses the heuristic framework as a reference point against which to assess whether the climate adaptation work in eThekweni Municipality can be considered to be transformative adaptation. Chapter 7 explores the factors that catalyse, facilitate or act as barriers to transformative adaptation in the case study and compares these with the literature to identify areas of similarity and difference.

5.4 Limitations of the study

In undertaking any research, methodological limitations will be encountered. In this thesis, the main limitations related to challenges in securing certain interviews, elements of context specificity in the outcomes, and the positionality of the researcher. Wherever possible, means to overcome these limitations were implemented.

5.4.1 Challenges in securing interviews with certain respondents

Challenges were experienced in securing political leaders for an interview. This was due to political leadership transitions over the time that this research was undertaken, resulting in key politicians being less accessible than they would usually have been. In particular, this thesis would have benefited from a meeting with the former Mayor James Nxumalo, given his champion role in the climate adaptation work and his insights into the broader political landscape in which support for the climate work needs to be secured.

5.4.2 Limitations associated with a context-specific case study

Although most of the outcomes from this climate adaptation-focused thesis in eThekweni Municipality are likely to be generalizable to other geographies, there will always be context specific “nuancing” that limits the possibility of this. The political context is one such example, as are the context-specific factors that can help to facilitate transformation and transformation adaptation. For example, the developmental context of Durban means that climate adaptation has to maximise the potential for socio-economic opportunities in order to be considered transformative adaptation. In other contexts, such factors may vary. This thesis has not specifically explored the extent to which generalisation of the outcomes is possible across different cities.

5.4.3 *The positionality of the researcher*

As an employee in the EPCPD, and as the former coordinator of one of the projects that falls within the department's climate change adaptation work, the researcher is embedded in the context that is being researched for this thesis and this may influence the way in which the data are understood and analysed. However, as Mottier (2005) argues in her review of the field of qualitative inquiry, the "interpretive turn" is a legitimate conceptual break within this field. The "interpretive turn" accepts the subjectivity that is involved in the mutual construction of meaning between the researcher and his/her subject, and suggests that it is counterproductive to overemphasise the implications of the interactionist and contextual nature of data collection. In addition, an attempt has been made by the researcher throughout the thesis to provide adequate justifications for the interpretations that have been made and to appropriately contextualise these. Given that the potential subjectivity of researchers is now accepted in social science research, and that every effort has been made to provide a rationale for potentially subjective interpretations, no detailed consideration has been given to the implications this has for the research data in this thesis.

Despite the above-mentioned limitations, it is believed that these were not sufficiently significant to undermine the thesis outcomes.

5.5 Summary

This chapter has provided an overview of the methodology used for the thesis, the primary and secondary data that were collected, and the process that was undertaken to frame interview questions, decide on relevant respondents for interviews, and analyse the outcomes. Importantly, the heuristic framework that was developed upfront to summarise the characteristics of transformation and transformative adaptation from the respective literatures, and the factors that catalyse, facilitate and act as barriers to this, provided an important framework for the way in which the data collection and analysis was undertaken. The next two chapters describe the results from this process.

CHAPTER 6: ASSESSING ETHEKWINI MUNICIPALITY'S CLIMATE ADAPTATION WORK THROUGH THE LENS OF TRANSFORMATION AND TRANSFORMATIVE ADAPTATION

6.1 Introduction

The purpose of this chapter is to understand the changes that have taken place in eThekweni Municipality's climate adaptation work and to assess whether these constitute transformation and transformative adaptation, in relation to the characteristics of transformation and transformative adaptation that were summarised from the literature in Chapter 3. Given the importance of context when assessing the nature and extent of change, the current chapter begins by describing the context for eThekweni Municipality, based on the perspectives of the interview respondents. This context builds on the case study background that was provided in Chapter 4. The chapter then describes and analyses the changes that have occurred over a period of time with regards to the integration of climate change adaptation into municipal policy and practice. This description of the nature of change is supplemented with descriptions of the perceived gaps and missed opportunities in the climate adaptation work, the characteristics of the change process and its likely outcomes, in order to provide a comprehensive overview of eThekweni Municipality's climate adaptation work, from which a more accurate assessment can be made regarding whether the changes that have been seen constitute transformation and transformative adaptation. Chapter 7 then explores the factors that have catalysed, facilitated or acted as barriers in either advancing or undermining this work. It should be noted that the analysis of transformation and transformative adaptation undertaken in this chapter is at the scale of high level processes, rather than at the level of the detailed technical work that has been undertaken at the project level.

It is important to also acknowledge at this point that the distinctions between Chapters 6 and 7 are not always absolute. For example, in order to assess whether the case study demonstrates transformative adaptation in Chapter 6, it is necessary to understand whether eThekweni Municipality's climate adaptation work has happened across different governance scales, given that this is a characteristic of transformative adaptation. The work does demonstrate this, for example through the work of the DAC, which advanced the local adaptation work in the international arena through networks and an ability to work across governance scales. However, this same factor (i.e. eThekweni Municipality's championing of the DAC) was also identified as an important factor in facilitating transformative adaptation because of the way in which this ability to work across governance scales served to provide the context in which the local adaptation work could be more easily advanced. In another example, Chapter 6 identifies challenges in integrating the climate adaptation agenda across all sectors in the Municipality. A possible reason for such challenges related to the "moving on" of important champions before a sufficient support base could be built. The importance of "champions" as facilitators of transformative adaptation is discussed more fully in Chapter 7, where it is seen as an important facilitator of transformative adaptation. Although it could be argued that there is merit in recording such results together, the thesis deliberately separates them in order to distinguish the two focal areas of the results: firstly, exploring the changes that have taken place in the case study, and secondly identifying the factors that have facilitated or acted as barriers to these. The interview questions themselves were structured in this way, and therefore the

observations from respondents have been separated across the two chapters. However, where relevant, cross references have been made in both chapters to help facilitate better integration of these ideas. Chapter 8 synthesises the results from Chapters 6 and 7 in order to partially address this challenge.

6.2 The eThekweni Municipality context in which change occurs

The context in which change occurs has a significant impact on the extent to which transformation is possible and the ease or difficulty with which this can be catalysed and sustained. In a context of flexibility and acceptance of change, for example, transformation may be initiated more easily and rapid shifts may be possible. In systems that are more resistant, transformation may be more difficult. Context also plays a role in determining the rate at which change processes should unfold in order to be sustainable. In some contexts, rapid shifts may facilitate transformation, while in systems where change is viewed with mistrust, incremental change may be more appropriate in facilitating transformative outcomes in the longer-term.

Understanding Durban and the local government institution (eThekweni Municipality) in which the climate change adaptation work has been emerging, is therefore critical when assessing the changes that have taken place in the Municipality's adaptation work and whether these constitute transformative adaptation. Chapter 4 provided the background for the case study and described the range of social, economic, environmental and governance challenges facing Durban. It highlighted the fact that much of the population still lives in conditions of poverty, despite some improvements in levels of employment and basic service provision, and described the municipal institution as "siloesed", with little cross-sectoral interaction and integration. In the interviews for this research, respondents were asked to describe the Municipality in terms of its ability to change and to respond to change, and to elaborate on what institutional factors either facilitate or hamper the ability to effect change when this is required. These questions were posed in relation to the broader institution, and were not specifically climate change related. The interview responses provide important data on the context, which provides the socio-economic, environmental and political setting within which to understand and assess the changes that have taken place in the climate change adaptation case study in eThekweni Municipality. The storylines²⁵ that emerged in the interviews are summarised in Table 6.1 and then described in more detail.

It should be noted that some of the storylines raised by respondents in this section are explored again in more detail in Chapter 7, given that the municipal context itself was perceived by respondents to be one of the major barriers to transformative adaptation. For the purposes of the current section, the main ideas are summarised for context purposes only.

²⁵ Storylines and storyline components in the tables have been ordered in a way that ensures a logical sequencing of conceptual ideas, and are not necessarily ordered in terms of frequency of response.

Table 6.1: A summary of the storylines that emerged in the interviews for the theme relating to “the municipal context in which change occurs”.

Theme	Storyline
The municipal context in which change occurs	Storyline 1: The bureaucratic nature of the municipal institution is not conducive to change
	Storyline 2: Local government institutions are not well equipped to deal with multiple complex challenges
	Storyline 3: Party politics has significant influence in determining the development path of the municipality
	Storyline 4: EThekweni Municipality has the responsibility and capacity to initiate change

6.2.1 Storyline 1: The bureaucratic nature of the municipal institution is not conducive to change

For many respondents, the rigid systems and structures that are inherent in the way bureaucracies are designed are a significant barrier to innovation and change. In such contexts, effecting change is extremely challenging, not only because of the rigidity of the systems and standard operating procedures, but also because of the mind-set of those who have become accustomed to working and surviving within a heavily regulated environment, and who are reluctant to do things differently. As two respondents commented:

“It’s a bit like stopping a train ...Or turning around a ship, this is an established, large (institution) – the way people have always done things and continue to do them and think it’s the best way to do it” (Municipal official: HSU, 06/11/2014).

“But I’m telling you we’re like...bloody dinosaurs! To get a small change can take you months to years... and I think we miss a lot of opportunities because by the time we think about a change, we’re already caught with our pants down” (Strategic Executive: EU, 12/12/2014).

Others reflected that, in such a context, “it’s just very very hard to be innovative” (Former researcher: EDU, 10/09/2014) and “anything new is looked upon with suspicion” (Specialist ecologist: EPCPD, 09/03/2015). Within this bureaucratic context, introducing a new agenda like climate adaptation and driving transformation that challenges the very systems that are foundational to the institution, can therefore be a slow and difficult process, requiring long-term commitment and investment. In this context of system resistance, small changes could be considered significant.

6.2.2 Storyline 2: Local government institutions are not well equipped to deal with multiple complex challenges

Respondents also highlighted the fact that municipalities are more experienced in coping with immediate changes and challenges, rather than engaging with longer-term and more complex issues that may require risk-taking and fundamental change. Bureaucracies, by their design, are not flexible and adaptive. The characteristics of bureaucracies are important in responding effectively to predetermined and well-defined needs but can undermine effectiveness when the local context requires such institutions to respond to issues that require a longer-term perspective and an ability to

address a range of interconnected social, economic and environmental challenges, whose outcomes may not be predictable or time-bound. As one respondent commented:

“I think municipalities are better equipped at dealing with change that is like now, with change that you can react to...change that is slow and creeping change whatever sector that’s happening within, I think the Municipality is less equipped to deal with... we don't as a human race deal well with any change that happens slowly” (Former Climate Protection Scientist: EPCPD, 27/09/2014).

This tendency of local government institutions (particularly those that face immediate social and economic challenges) to favour investments that are low risk, short-term and predictable, does not predispose them to engaging in complex, longer-term challenges such as climate change adaptation, and makes transformation in this space challenging. It is likely to also undermine their ability to integrate climate adaptation with the other, equally complex, agendas of climate mitigation, disaster risk reduction and development, to ensure that adaptation is transformative. Again, in this context, small system shifts in relation to such agendas, could be considered to be important precursors for more significant systemic change.

6.2.3 Storyline 3: Party politics has significant influence in determining the development path of the municipality

A number of respondents commented on the politicised nature of the municipal environment and the influence that party politics has in determining the city’s development path. As one respondent commented:

“I just think these power struggles within the ANC are so disruptive at every level of the country...it does seem to me that what is a real risk for Durban and South Africa, not only for climate change but across the board...is the whole thing of disruptiveness and the sort of power struggles... (political interference is) taking time and energy away from people.” (Convenor: IRC, 15/05/2015).

This political influence has potentially significant implications, and may make it extremely difficult to initiate transformation that is seen to undermine the dominant political agenda. In eThekweni Municipality, the political focus on short-term service delivery and job creation can hamper efforts to integrate longer-term agendas such as climate change into municipal planning, particularly if it is perceived to undermine development. This reinforces the importance of integrating climate adaptation and development objectives.

6.2.4 Storyline 4: EThekweni Municipality has the responsibility and capacity to initiate change

Although respondents saw the municipal context as a challenging setting in which to initiate change, others emphasised that it is precisely such institutions that have the responsibility to lead change at the local level, given that: they have the scope to consider longer-term issues; they are not driven by profit; and they are mandated to plan in the interests of people.

One respondent emphasised this point, saying:

“But from the City point of view... it’s completely different and a lot of people miss this. When you’re working for the Municipality, you’re not designing as a businessman, you’re designing as though the City is going to be here for a long time still. And so you can’t just think about the near horizon, you have got to be thinking about it long term... officials within the departments have got that long term view and have accepted the responsibility of that's what they're tasked with doing, that's what they are entrusted to do” (Senior Manager: CSCM, 11/09/2014).

This responsibility, coupled with the fact that local governments such as eThekweni Municipality have the institutional depth, knowledge and good technical skills to be able to drive change (Convenor: IRC, 15/05/2015), provides them with significant potential to change when this is needed. In a context of high poverty and unemployment, where citizens and civil society might be focused on more immediate needs, this strategic “foresight” role for institutions like local government becomes even more critical.

6.2.5 Analysis and interpretation

The responses outlined above paint a picture of a municipal institution that is generally resistant to change and where the bureaucracy is designed to achieve specific (and often short-term) objectives, with clearly defined roles and responsibilities for those who work within it. EThekweni Municipality is also a highly regularised and controlled environment in terms of work programmes and this can impact on levels of innovation. Working “outside the system” requires significant energy and commitment from those who wish to explore alternative development pathways. These factors are compounded by a socio-economic context that is already overwhelming in terms of the magnitude of the challenges being faced. Party politics also plays a central role in influencing decision-making within the Municipality and can contribute to the way in which local challenges are prioritised. In this context, trying to initiate transformation that requires an ability to engage with complex (and often poorly understood) issues like climate change and integrate knowledge across multiple municipal departments, is extremely challenging. Such change processes are also slow, given the bureaucratic way in which the Municipality and its systems are structured. This highlights the potential challenges associated with initiating transformation in municipal institutions and raises questions as to the rate of change that is appropriate in a context that is generally resistant to change. It is within this context that the climate change adaptation agenda has been introduced in eThekweni Municipality.

6.3 The nature of change that occurs in the case study

Within the municipal context that was described in Section 6.2, the current section will provide a description of the changes that have taken place in eThekweni Municipality’s climate change adaptation work in terms of integrating adaptation into municipal policy and planning, and translating this into practice. Over the last thirteen years (2004 to 2017), significant advances have been made in these areas of work. However, there have also been significant challenges experienced in entrenching the importance of climate adaptation across all aspects of municipal planning and in securing sufficient leadership support to continue driving the climate adaptation agenda. Table 6.2

summarises the main storylines that emerged from the interviews in relation to the changes that have been seen in eThekweni Municipality over this period in the climate adaptation work.

Table 6.2: A summary of the storylines that describe the nature of change in the eThekweni Municipality case study

THEME	STORYLINE
The nature of change	Storyline 1: Climate change adaptation is included in city planning, policies and institutional structures
	Storyline 2: The climate change adaptation agenda has been developed in the international arena
	Storyline 3: Climate change adaptation has been included in sectoral planning, policy development and project implementation
	Storyline 4: The climate adaptation agenda has developed a strong focus on delivering co-benefits to ecosystems and vulnerable groups
	Storyline 5: A range of existing and new initiatives, which through their nature address the adaptation challenge, have now been framed under the climate agenda
	Storyline 6: The climate adaptation work has not been sufficiently integrated across all sectors at a local level
	Storyline 7: In some cases, change has had negative impacts

6.3.1 Storyline 1: Climate change adaptation is included in city planning, policies and institutional structures

At the level of municipal planning and policy development, an important shift has been the inclusion of climate change and climate change adaptation into eThekweni Municipality's IDP²⁶ and the development and approval of the "Durban Climate Change Strategy" (EThekweni Municipality, 2014a):

"We're starting to see climate change – climate change policy, climate change adaptation and so forth coming into the IDP, previously that wasn't there, so therefore I'm saying it's on the strategy and (from a) policy perspective we're starting to see a shift" (Senior Manager: CPU, 03/10/2014).

The Durban Climate Change Strategy is significant as it provides direction to eThekweni Municipality on how to address climate change through appropriate adaptation and mitigation responses and outlines the roles and responsibilities of various stakeholder groups (including the Municipality) for implementation (Manager, Climate Protection Branch: EPCPD, 31/10/2014). Given that the IDP and

²⁶ Climate change is also included in the text of the Municipality's Spatial Development Framework but, until recently, had not been translated into direct spatial implications for how Durban develops.

strategies like the Durban Climate Change Strategy require stakeholder consultation and ultimately political approval through relevant committees and a meeting of the full Council, the incorporation of climate change adaptation into these strategic documents also demonstrates a level of leadership and political support around these issues.

In support of these policy shifts, a “Climate Protection Branch” was established in 2007, in the previously named EMD (now the EPCPD) and has been resourced with staff and funds for the implementation of climate change adaptation work. As one respondent commented:

“eThekweni has been quite lucky from that perspective in that it has actually attracted quite strong human resources and has had the ability to garner quite significant (funds) for the adaptation work” (Former Climate Protection Scientist: EPCPD, 27/09/2014).

Although the inclusion of climate change adaptation in municipal policies and strategies, and the formalisation of institutional structures to guide the implementation of this work, suggest a high level of support for the work, this progress has been made through the strong leadership role played by the Former Deputy Head: EPCPD and supporting officials in the EPCPD, and has required intensive investment of time and effort to advocate for the required policy changes and associated resourcing. Resourcing also remains relatively limited, with the current organogram²⁷ for the Climate Protection Branch having only five permanent positions. Of these, only four are currently filled. Importantly however, entrenching climate adaptation into city planning, strategies and institutional structures in this way, has provided a critical policy framework for subsequent work. The thesis argues that this is a significant change within the Municipality’s climate adaptation work, particularly given the difficult local government context within which this has happened.

6.3.2 Storyline 2: The climate change adaptation agenda has been developed in the international arena

At the time when eThekweni Municipality began to explore the issue of climate adaptation in a more focused way (around 2004), the international climate adaptation agenda was relatively weak. In fact, in some instances, acknowledging the need for climate adaptation at the global level was seen as heretical because of its inherent admission that climate mitigation might not be a comprehensive solution to climate change (Former Deputy Head, EPCPD, pers. comm., 19.04.2016). At that time, the predominant focus of the global climate change agenda on climate mitigation was problematic for eThekweni Municipality and other South African cities working in the adaptation arena, in two respects: Firstly, it did not recognise that in the context of countries in the global South, where levels of vulnerability to climate change are high because of existing socio-economic conditions (Taylor et al., 2014), finding ways to adapt to these changes is an equally critical part of the climate change response. Secondly, the absence of a global adaptation agenda meant that there was no global policy environment that could help enable and support the shifts that were beginning at the local level, in a municipal context where these new ideas would be extremely difficult to embed. For these reasons, the early climate adaptation work in eThekweni Municipality focused very deliberately on working across governance scales to promote the adaptation agenda in the international arena. This was done

²⁷ Information was correct as at March 2017.

in order to influence and strengthen both the national and the international debate around these issues in a way that would not only advocate for the importance of adaptation, but that would also provide a global policy context that could help facilitate the local work that was unfolding in eThekweni Municipality and other cities.

The “17th Conference of the Parties to the United Nations Framework Convention on Climate Change” (COP 17) was hosted by Durban in 2011 and provided an important “window of opportunity” (discussed further in Chapter 7) to host an adaptation-focused local government convention which produced the DAC, as its main output. This work received significant support from organisations such as ICLEI, the South African Cities Network (SACN) and South African Local Governments Association (SALGA). The DAC has been a critical vehicle through which local and international climate change adaptation action has been mobilised, and as of the 13 February 2017, had achieved 1069 signatories, of which 341 are mayors or duly assigned representatives. The DAC has “put Durban on the map at least globally” (Acting Deputy City Manager: Economic Development and Planning Cluster, 17/06/2015) and has had extensive local, regional and international impact in terms of building networks and facilitating knowledge exchange around climate adaptation. As one of the lead actors in the local climate adaptation work commented:

“We’ve literally put adaptation on the international agenda in a way that is startling to me...So we’ve done this interesting local work but we’ve also become this huge global champion for adaptation which has opened other doors for us, which has been useful because we’ve been able to get really strong adaptation messages coming out of South Africa as a delegation and we still have a brand internationally that is useful...and so as I said it literally started from zero...Through to almost like global hero...and keeping a very marginalised yet absolutely vital issue on the table, on the table for cities and on the table for African cities” (Former Deputy Head, EPCPD, 25/05/2015).

This work has not only had significant international impact but has also facilitated knowledge sharing across neighbouring municipalities at the local level. In this regard, one respondent indicated:

“The Durban Adaptation Charter brings together our neighbouring municipalities in an effort for us to all work together on climate change so that it has a more – a subnational impact and then we are looking at working across different continents with cities, exchange visits and that has the impact of bringing further knowledge” (Manager: Climate Protection Branch, EPCPD, 31/10/2014).

The DAC has therefore become an important mobilising framework for climate adaptation, networking and learning at both the local and global scales. For eThekweni Municipality, the elevation of the adaptation agenda and the formation of networks, particularly amongst African cities, has played a critical role in building a local political champion and generating support and additional leverage to drive the local adaptation work forward. The work also demonstrates the “cross-scale” work that characterises transformative adaptation, through the intention of the eThekweni Municipality to work across governance scales (i.e. from local to global) and across spatial scales through the formation of networks with neighbouring municipalities for climate adaptation implementation. The thesis argues that these changes are significant, particularly given the initial lack of support for adaptation at the global scale, and the challenging municipal context in which these local advances have been made.

6.3.3 Storyline 3: Climate change adaptation has been included in sectoral planning, policy development and project implementation

Within eThekweni Municipality, investment has been made in working with municipal sectors to help translate the principles of climate change adaptation into on-the-ground action in the form of planning, sectoral policy development and project-focused implementation in response to a growing “realisation from all the sectors...that there is going to be an impact on their sector” (Senior Manager: CSCM, 11/09/2014). In 2008, following on from the failure of the Headline Climate Change Adaptation Strategy to promote broad “take-up” of its municipal-wide outcomes by departments, the focus of work shifted towards the development of MAPs. The vision was for each department to establish measures and protocols to ensure that the functioning of municipal systems, services and infrastructure would be able to continue even under projected climate change impacts (Carmin et al, 2012). At the start of the MAP work, the Water, Health and Disaster Management sectors were selected based on their vulnerability to existing climate variability and projected climate change risk, their importance to the city’s development agenda and the fact that the EPCPD had a good working relationship with key individuals within these sectors (Roberts and O’Donoghue, 2013). These sectors were also seen to potentially be able to provide the biggest wins in terms of adaptation and their impacts on residents (Project Executive: EU, 12/12/2014). In the water sector, respondents commented particularly on work undertaken to incorporate climate change predictions into stormwater policies in order to adequately address likely increases in runoff (Senior Manager: CSCM, 11/09/2014) and the need for alternative drainage systems under future climate predictions (Chief Strategy Officer: OCM, 23/04/2015):

“So what we’ve looked at is... how do we bring climate adaptation into what we do normally utilising the high intensity rainfall for design... (there is also) the Council policy, and in there we’re dealing with the issue of climate change and adaptation related to rainfall in terms of our stormwater policy that will be requiring people to design for that increased intensity for the post-development runoff...and by doing that it’s lots of little efforts” (Senior Manager: CSCM, 11/09/2014).

The aspect of “water demand management...which embraces alternative sanitation and more efficient water use” has also been seen as an important component of climate adaptation (Former Head: EWS, 03/03/2015), as has the need to better understand sea level rise predictions for Durban and the different scenarios of impacts on the coast (Project Executive: EU, 12/12/2014). In addition, the incorporation of a MAP task team into the legally mandated Disaster Management Advisory Forum that meets every three months has seen the elevation of climate change adaptation issues onto a strategic decision-making platform (Deputy Head: DMU, 26/09/2014).

The above suggests that, at least in some municipal sectors, climate change and its impacts are now being considered by departments and incorporated into policies and planning as part of their practice. Early work by the municipality’s Economic Development and Investment Promotion Unit in the “green economy” arena (Former researcher: EDU, 10/09/2014) and discussions between the EPCPD and the eThekweni Transport Authority regarding the development of an adaptation plan for the Integrated Rapid Public Transport Network (Manager, Climate Protection Branch: EPCPD, 31/10/2014) point to the potential expansion of the climate adaptation work into municipal sectors beyond those involved

in the original MAP work. However, much of this latter work is still small scale and in early stages, given the significant resources that need to be invested to advance the global climate adaptation agenda. The broader “take-up” of climate adaptation beyond those departments mentioned above has been limited. This may suggest that, without significant investment in building sectoral champions and working with these sectors to translate ideas into practice, the wide-scale integration of climate adaptation in the Municipality will remain limited. Even in those sectors where the MAPs were developed, ongoing engagement has been difficult to sustain. Initiatives with the Health Department progressed to a point but have not significantly advanced, and the Disaster Management Advisory Forum meets only intermittently and is not always well-attended by municipal leadership. In this last respect, although deliberate attempts were made to integrate the climate adaptation and disaster risk reduction agendas, this has not been adequately sustained.

6.3.4 Storyline 4: The climate adaptation agenda in eThekweni Municipality has developed a strong focus on delivering co-benefits to ecosystems and vulnerable groups

Importantly, the climate adaptation work in eThekweni Municipality has recognised the need to reflect the developmental context in which change is occurring and to “link agendas like climate change and basic needs” (Professional Technologist: EWS, 15/09/2014), given the high levels of poverty and unemployment that characterise Durban. As with many cities in the Global South, the adaptation agenda has also recognised that ecological infrastructure plays a critical role in Durban in supporting human wellbeing and development through the provision of free ecosystem services such as water provision, flood attenuation and waste treatment (EThekweni Municipality, 2015). This is particularly true in the large rural areas that characterise much of the periphery of Durban. Many of these services are foundational in helping cities to adapt to the impacts of climate change, and suggest that rural and ecological considerations will play a stronger role in influencing the climate adaptation agenda in cities like Durban than in many others around the world. As one respondent commented:

“I’ve said many times that traditional engineering solutions were not working...The thing is when you build things they are almost always in conflict with the environment...The river has an effect of slowing down the runoff and absorbing floods and allowing the water to spread...and then engineers come and say here is a nice piece of land and I’m going to build factories here, not realizing that that was the wetland, that was the flood absorption...so I just think the ecological infrastructure thing started me saying engineering does not always work... We dig up grasslands that are slowing down the runoff and we harden the surface areas and we wonder why we get intense storms further down. We don’t use nature” (Former Head: EWS, 03/03/2015).

It is for these reasons that the focus of eThekweni Municipality’s climate adaptation work “has been a lot more around ecosystem-based adaptation as compared to most other municipalities... the work that Durban is doing around ecosystem-based adaptation is very unique” (Consultant: FW, 06/11/2014). This focus on ecosystems is also strongly linked to the need to better understand the likely impacts of climate change on biodiversity and the design of the Durban Metropolitan Open Space System (Roberts and O’Donoghue, 2013), both of which are part of the core mandate of the EPCPD, the department that is currently leading the city’s adaptation work.

Attempts to implement adaptation initiatives that can generate co-benefits for both ecosystems and vulnerable communities have become a hallmark of eThekweni Municipality's adaptation work. The implementation of large scale ecological restoration programmes like the Buffelsdraai Landfill Site Community Reforestation Project (Roberts et al., 2012) for example, have focused on undertaking ecological restoration (through reforestation and the removal of invasive alien plants) as a mechanism to adapt to climate change and create jobs in the green economy. Such projects have captured the attention of various stakeholders "simply because (they are) at a scale where it's literally rebuilding a forest and that has a sense of hope and prospect... that captures imaginations" (Former Deputy Head: EPCPD, 25/05/2015). From this work, the concept of "community ecosystem-based adaptation" has grown significantly in an attempt to link the adaptation benefits of ecological restoration with the need to simultaneously provide opportunities for community up-liftment and improved wellbeing:

"The idea of CEBA (community ecosystem-based adaptation) grew out of our existing big implementation programs with the idea that communities come together and work in those catchment areas where they're living, removing alien plants, putting back indigenous trees...and at the same time they're building their livelihoods to earn something. Previously we might have had projects like that, that are maybe not critical, but now we are saying in fact if these communities are going to be suitably resilient, if they are going to suitably adapt to the sort of stresses that climate change is going to bring...they have to be happening if these people are going to survive" (Manager, Restoration Ecology Branch: EPCPD, 31/03/2015).

Such projects have helped to highlight the mutually beneficial relationship that can exist between ecosystems and human communities in the face of climate change (Roberts and O'Donoghue, 2013). These benefits have also played a critical role in building support for the work:

"It's had societal benefits which I think have been able to sway the political mind...you can tell the story around Buffels: there was nothing, we came, we built trees, those trees have built the community, by building that community we build their children, by building those children we build the opportunities for business, you know, so it's a 'build' story" (Former Deputy Head: EPCPD, 25/05/2015).

This approach is also being seen in municipal sectors that do not necessarily have a specific environmental mandate. Initiatives such as the "Sihlanzimvelo" project for example, involves a number of departments working collectively to improve stormwater management through invasive alien plant clearing, litter removal and community education. Apart from the positive benefits in terms of climate adaptation and improvements in human health (due to improved river management), such ecological restoration initiatives provide job creation opportunities for communities that are adjacent to the project area (Senior Manager: CSCM, 11/09/2014).

Pelling et al (2015) comment that addressing the underlying causes of vulnerability involves addressing issues of poverty, inequality, lack of access to employment and compromised ecological systems, and that placing ecological values at the centre of planning addresses the underlying failures of development. An intentional focus on both ecological restoration and vulnerability, for example through the initiation of projects that explicitly focus on them, is therefore transformational, as they begin to tackle the root drivers of systemic risk (as described in Chapter 3), rather than just its symptoms. This is particularly important in the context of cities like Durban, where poverty,

unemployment and ongoing environmental degradation are prevalent. Projects of the type described in this section that aim to achieve simultaneous benefits for vulnerable communities and for the environment, are therefore critical in challenging the systemic drivers of risk and in achieving the social justice and sustainable development outcomes that characterise transformative adaptation.

6.3.5 Storyline 5: A range of existing and new initiatives, which through their nature address the adaptation challenge, have now been framed under the climate agenda

Respondents commented that a number of areas of work initiated in the Municipality could now be incorporated within the framework of climate change adaptation, even though this may not have been an explicit intention of the work at the outset (Chief Strategy Officer: OCM, 23/04/2015). Others indicated that elements of the adaptation agenda (e.g. ecosystem-based adaptation) had provided their work with a useful monitoring and evaluation tool “because it forces you out of project mode... (even if you are not) definitive adaptation players” (CEO: WCT, 08/05/2015). For others, having an understanding of climate change helps in providing a filter against which to ensure that climate adaptation benefits are maximised across all municipal projects in a systemic way. As one respondent commented:

“So for me it’s about having a broader understanding of what are the (climate adaptation) issues and what’s relevant and not relevant so that (when) we do something, if we’re going to deal with transforming a wetland...as a quality public space...there’s an opportunity to enhance biodiversity, there’s an opportunity to deal with flood risk... so there are things that we can naturally do, that we would probably do anyway that have a relationship to climate adaptation” (Project Manager: EDU, 23/05/2015).

This suggests that for some officials, climate change adaptation is not a completely new agenda, but that applying a climate adaptation filter to existing work, can help to improve planning and project implementation so that climate risk can be minimised and the benefits maximised. However, although this may be true in many cases, there is also a danger that adopting this perspective can hide the need for the more fundamental shifts that are needed, for example in governance and economic systems, to address the root causes of the systemic risks that perpetuate vulnerability to climate change. This raises an important question as to the “depth” of change that exists in how some municipal sectors are responding to the climate adaptation challenge.

6.3.6 Storyline 6: The climate adaptation work has not been sufficiently integrated across all sectors at a local level

As alluded to earlier in this section, although there have been significant advances in integrating climate change adaptation into municipal planning and implementation, there is also evidence that this work has not been sufficiently integrated across all sectors and that the lack of “reaching out to the parts of the Council that are still not doing what they should be doing” (Former Head: EWS, 03/03/2015) could be a lost opportunity. As one respondent commented:

“While we have the municipal adaptation plans for three sectors, there are a whole lot more sectors that we really need to be engaging with, for example housing and transport... And down the line that could be our biggest failing, is our inability to at this

stage engage with them now” (Manager, Climate Protection Branch: EPCPD, 31/10/2014).

In addition, although climate change adaptation is captured in relevant municipal strategies and policies, there is still “limited budget that is associated to that aspect of the IDP...it is only the policy side that is coming through and the narrative” (Senior Manager: CPU, 03/10/2014). This suggests that, although climate adaptation has been notionally captured in city planning processes, there is now a need to move “beyond the talk show into implementation of the real work” (Deputy Head: DMU, 26/09/2014). This was reflected in the following comment:

“To be quite honest, I have not seen it filtering through our programs in any shape or form...We understand very broadly that there’s climate change, that we must all do something to prevent or mitigate...So, if you were to say to me I must talk about the extent to which we have streamlined climate change adaptation into our programs, my view is that we have done very little” (Acting Deputy City Manager, Economic Development and Planning Cluster, 17/06/2015).

This sentiment was echoed by the former Deputy Head: EPCPD in her observation that, despite the advances that eThekweni Municipality has made in the climate change adaptation arena, this work is currently at a critical point since there has not been the necessary take-up of the climate adaptation agenda by political and official leadership (Former Deputy Head, EPCPD, pers. comm., 19.04.16). As Davison et al (2016, p. 1064) point out, integration and mainstreaming remain key challenges for local governments despite policy level commitments, leading to a “deepening gap between policy and practice”. A possible reason for this includes the fact that political leadership is focused on other, more immediate, developmental priorities such as poverty alleviation and job creation. Municipal officials face similar urgent challenges, meaning that longer-term agendas such as climate adaptation are not prioritised. This is exacerbated if champions that were initially responsible for driving the climate adaptation work forward, move on into other spaces of work or if they are not continually “replaced” by new champions (discussed further in Chapter 7). An additional compounding factor is that climate change is often perceived to be an environmental issue (also discussed further in Chapter 7), rather than a developmental one, and there is insufficient recognition that, unless climate change is planned for, many of eThekweni Municipality’s developmental gains could be lost. These barriers to transformation are described further in Chapter 7 and highlight the importance of continually establishing new influence bases in local government, whether these are political or administrative, to continue to drive the climate adaptation work forward.

6.3.7 Storyline 7: In some cases, change has had negative impacts

Importantly, not all of the climate adaptation work undertaken in eThekweni Municipality has had positive outcomes. One example that was raised during the interviews was that of the Durban Climate Change Partnership. This partnership was established in 2011 in an attempt to coordinate a range of stakeholders to work together towards the implementation of climate change initiatives in their respective sectors. However, this was ultimately unsuccessful because of “a combination of factors including an early distrust among the groups, a lack of influential and uniting leadership, insufficient long-term commitment from participants and the inability to secure sustainable and reliable funding” (Roberts and O’Donoghue, 2013, p. 313), thus highlighting the difficulties associated with establishing

community-based participatory approaches in relation to climate change (Archer et al., 2014). In reflecting on the Durban Climate Change Partnership, the Former Deputy Head: EPCPD (25/05/2015) commented on the potential damage that comes with failure of this kind:

“But I think probably the most negative thing was the Durban Climate Change Partnership because of the expectation it set up. And it wasn’t in a controllable space ... it created a certain level of expectation and when that failed...it did two things, firstly it reconfirmed the suspicion of the cynics who wouldn’t come to the table ...so it will now be ten times harder to get them out to play with us. But (secondly) it broke the back of the tentative trust that kind of emerged in the other groups...” (Former Deputy Head: EPCPD, 25/05/2015).

And although failure no doubt comes with its own learnings for future work, repeated failure in such public arenas can significantly undermine the ability to garner support and drive significant change agendas (Former Deputy Head, EPCPD, pers. comm., 19.04.2016). A challenge lies then in taking the risks that are needed when experimenting with new areas of work, but also trying to manage the risk of failure so that the work is not fundamentally compromised. The experience of the Durban Climate Change Partnership also highlights the difficulties associated with building new multi-stakeholder partnerships for implementation, despite these being critical in driving the implementation of climate adaptation initiatives.

6.3.8 Analysis and interpretation

Over a period of approximately thirteen years, a number of changes have taken place in eThekweni Municipality to acknowledge the importance of climate change adaptation and to integrate adaptation into municipal planning and implementation, thus moving the agenda from one where it was only “the environment department of the City fighting a lone voice battle where it was raising flags and the general reaction ...was largely indifference or disbelief” (Former Head: EWS, 03/03/2015) to one where the agenda is more integrated. Some of these changes have taken place at the level of policy and strategy development within the institution, for example through the incorporation of climate adaptation into the IDP, the approval of a climate change strategy for Durban and the resourcing of a dedicated climate protection branch. The shifts that have happened across governance scales from the local to the international level through initiatives such as the DAC point to the broader political realms where the eThekweni Municipality work has begun to influence and shape the global agenda, which in turn has helped to shape the national and local adaptation agendas. This has also helped to facilitate the formation of advocacy and learning networks across local government boundaries. Work has also focused on facilitating cross-sectoral interactions through the development of MAPs in three critical sectors, thus challenging the usually silo-ised institutional structure of the Municipality. EThekweni Municipality’s focus on community ecosystem-based adaptation to deliver environmental and community benefits simultaneously as key project deliverables has also been important in contributing to climate adaptation work that is integrated with the development agenda of eThekweni Municipality in delivering socially just and environmentally sustainable outcomes.

Given the relatively rigid nature of the municipal institution, the range of urgent challenges at the local level that tend to distract decision-makers from longer-term agendas like climate change and the previous resistance to climate adaptation in the international arena, these shifts can be regarded as

significant. However, it is also clear that these successes have not been widespread and that in many instances, important municipal sectors are still not considering climate adaptation in the fundamental “systems change” way that is necessary. Even in sectors such as Health and Disaster Management, where focused investments were made to develop MAPs, there have only been limited advances in incorporating climate adaptation. Even where there have been advances (for example through the inclusion of climate adaptation in the Disaster Management Advisory Forum), these have not sustained the high level of strategic attention that is necessary. It is also worth noting that very few respondents spoke specifically about the climate mitigation work when describing the way in which eThekweni Municipality’s adaptation agenda has evolved, with most of the references to mitigation being made in the context of initiatives such as the Buffelsdraai Landfill Site Community Reforestation Project, which was originally initiated because of the need to offset the carbon footprint of the 2010 FIFA™ Soccer World Cup. This is important given that transformative adaptation should include an integrated focus on climate mitigation. What is also clear is that, despite notable advances, there is still a need for stronger strategic leadership at both an administrative and political level in order to advance the climate adaptation work in relevant ways. Additional gaps and missed opportunities that were identified by respondents are addressed in the following section.

6.4 Gaps and missed opportunities in the climate adaptation work in Durban

In addition to the challenges outlined in Section 6.3 in terms of fully integrating the climate adaptation agenda across all municipal sectors, respondents also commented on a number of other specific gaps and missed opportunities that they perceived to be present in eThekweni Municipality’s climate change adaptation work that may have prevented this agenda from gaining more attention and having greater impact. Understanding these gaps is important in order to assess the extent to which the changes that have been implemented in eThekweni Municipality can be considered to be transformative adaptation. Table 6.3 summarises the storylines that emerged under this theme and also indicates the number of respondents who spoke about each of these during their interview. Table 6.4 provides an indication of the percentage of respondents in each respondent category who discussed each of the storylines. A short note on this quantitative analysis is provided in Box 1 below. Quantitative analysis was not undertaken for the themes that were described in Sections 6.2 and 6.3, because these were descriptive in nature and quantitative analysis would not have added meaning to these.

Box 1: A note on the quantitative analysis of storylines and storyline components:

For some of the themes explored in this thesis, quantitative analysis has been undertaken to explore the number of respondents who discussed each of the storylines (and in some cases, also storyline components) during their interviews and to understand the distribution of these responses across the respondent categories. The intention is to understand the emphasis placed on storylines and storyline components and to assess whether there were differences in perspective across respondent categories. This is important given the diversity of respondents that were interviewed (twenty three respondents across five categories, described in Chapter 5) and their different views on climate adaptation. Distinguishing the responses across respondent categories creates more space for these perspectives to be seen. However, it is also acknowledged that this type of analysis can be misleading and that the less frequent responses are not necessarily less important. For this reason, the analysis is included but the commentary provided on this is limited to only high level observations that seem to align with the broader messaging emerging in this thesis.

When reviewing this analysis, it should be noted that:

- Storylines and storyline components in the tables have been ordered in a way that ensures a logical sequencing of conceptual ideas, and are not necessarily ordered in terms of frequency of response.
- Symbols have been used to summarise the frequency of responses for storylines and storyline components. A key is provided with each table for interpretation purposes.
- In instances where a single respondent discussed more than one storyline component within a single storyline, this reflects in the storyline 'count' as a single response, in order to avoid undue weighting. However, each storyline component mentioned would be counted separately at the storyline component level of analysis.
- The respondent category numbers align with those that are summarised in Table 5.1 in Chapter 5. These categories have been summarised in the key for each table, for ease of reference.

Table 6.3: Number of respondents that spoke about each of the storylines under the theme: Gaps and missed opportunities

THEME	STORYLINE (S)	Number of respondents
Gaps and missed opportunities in the climate change adaptation work	Storyline 1: There has been insufficient communication, education and engagement with stakeholders around climate change	11
	Storyline 2: A greater focus on community-level and household adaptation is needed	6
	Storyline 3: Existing policy and legislative frameworks have not been used sufficiently to integrate climate change adaptation into municipal planning	3
	Storyline 4: Greater focus on the international agenda has undermined local level implementation	2
	Storyline 5: Insufficient data recording undermines the climate change work	1

Table 6.4: Percentage (%) of respondents in each respondent category that spoke about each of the storylines under the theme: Gaps and missed opportunities

THEME: Gaps and missed opportunities	Storyline	% of respondents in each category				
	Respondent category	1	2	3	4	5
	Storyline 1: There has been insufficient communication, education and engagement with stakeholders around climate change	☺☺	☺	☺☺	☺☺	☺
	Storyline 2: A greater focus on community-level and household adaptation is needed	☺☺	☺	☺		☺
	Storyline 3: Existing policy and legislative frameworks have not been used sufficiently to integrate climate change adaptation into municipal planning		☺	☺	☺	
	Storyline 4: Greater focus on the international agenda has undermined local level implementation	☺		☺		
	Storyline 5: Insufficient data recording undermines the climate change work		☺			

KEY

Respondent categories

1. Climate adaptation leaders and coordinators
2. Climate adaptation implementers
3. Municipal officials not directly involved in climate adaptation work
4. Municipal officials involved in strategic planning
5. Stakeholders external to the Municipality

Frequency of response

- ☺: 0-33%
 ☺☺: 34-67%
 ☺☺☺: 68-100%

6.4.1 Storyline 1: There has been insufficient communication, education and engagement with stakeholders around climate change

It is interesting to note that much of the emphasis in this theme was placed on the lack of communication, education and engagement with stakeholders around climate change adaptation. This perspective was particularly common in the respondent group comprising municipal officials who were not directly involved in the climate change adaptation work, suggesting that perhaps the work

has been too focused on an internal “core” of people who have been more directly involved in implementation. This shortcoming was also acknowledged by the interview group of municipal officials who have been responsible for leading the climate adaptation work in eThekweni Municipality. In general, respondents felt that communication and education around climate change adaptation is central to sensitising leadership, citizens and other stakeholders to the climate change challenge and building an enabling environment in which there is support for the work that is being done. Respondents highlighted that communication is generally strongest when it is associated with “big events, like COP 17” (Convenor: IRC, 15/05/2015) but that more generally the city “fails terribly when it comes to communication and getting the message out there” (Specialist Ecologist: EPCPD, 09/03/2015). From a city leadership perspective, respondents felt that messaging around climate adaptation has been inconsistent and that this has resulted in a “lack of ownership” of this new agenda (Chief Strategy Officer: OCM, 23/04/2015). A possible reason for this lack of communication has been the shortage of human resources available to undertake this. Effective communication is resource intensive (especially given the small size of the climate adaptation team) and the early climate adaptation work in eThekweni Municipality prioritised other areas of focus in order to gain traction and support in the areas that were adjudicated to be the most strategic at the time. An additional challenge has been understanding *how* to communicate with critical target audiences in a meaningful way. One respondent commented, for example, that officials still struggle with how to transfer this knowledge to politicians (Former Deputy Head: EPCPD, 25/05/2015), emphasising some of the challenges related to communication.

6.4.2 *Storyline 2: A greater focus on community-level and household adaptation is needed*

A number of respondents felt that “we’re not involving people on the ground enough” (Senior Planner: SSPB, 22/04/2015) in the implementation of the climate adaptation work and that this is a major gap in terms of reducing the vulnerability of much of the city’s population. This was echoed by a second respondent, who commented that this is “a big hole in our work, being able to reach into communities and understand their needs and then work with them so that they can help themselves to reduce their risks” (Manager, Climate Protection Branch: EPCPD, 31/10/2014). This is problematic given that the impacts of climate change will be felt most intensely at the community and household level, particularly amongst the poorest and most marginalised of these, and that it is communities themselves that may provide important insights into the nature of the climate adaptation responses that may be most relevant in that context. Shi et al (2016) argue that climate adaptation planning at the municipal level does not focus sufficiently on the specific needs that exist at the community and household level, for example in terms of disaster evacuation processes, therefore re-emphasising the need for appropriate engagement with all stakeholders at this level.

Despite efforts within the Climate Protection Branch of EPCPD to better understand community needs directly, the lack of human resource capacity within the branch has often been a limiting factor, given the broad range of work that is required in this field. This raises questions regarding the role of the Municipality at this level and, if there is insufficient capacity within the Municipality to address this gap, what other mechanisms or partnerships (e.g. with community based organisations or non-governmental organisations) might be needed to help facilitate this work more effectively.

6.4.3 Storyline 3: Existing policy and legislative frameworks have not been used sufficiently to integrate climate change adaptation into municipal planning

In some cases it was also felt that existing policy and legislative frameworks, particularly in areas over which the Municipality has control, have not been sufficiently used to integrate adaptation into municipal planning and to facilitate implementation of appropriate action amongst all citizens. One example cited was the potential for the Spatial Planning and Landuse Management Act (2013) or “SPLUMA” to provide the framework for instituting specific climate adaptation and mitigation requirements for all new building plans that are approved by the Municipality (Acting Deputy City Manager: Economic Development and Planning Cluster, 17/06/2015). In this regard, existing legislation and relevant changes in municipal by-laws were also seen as being fundamental to enforcing change. As one respondent commented:

“We should have moved more quickly to environmentally sensitive legislation, whether it’s restricting when you can water your garden; whether it’s limiting toilet flushing; because you can legislate for many things. You know, no by-laws have been changed for 10 years, so a legislative underpinning is key to bringing about change” (Former Head: EWS, 03/03/2015).

However, one of the key challenges inherent in the above is the polar nature of legislation and climate change: legislation is by nature precise while climate change is inherently unpredictable. Although the incorporation of general principles of “good practice” in municipal by laws would likely have positive impacts, in some instances the uncertain nature of climate change poses significant challenges in translating this into fixed legislation (Former Deputy Head, EPCPD, pers. comm., 19.04.2016).

6.4.4 Storyline 4: Greater focus on the international agenda has undermined local level implementation

A number of respondents suggested that the dominant international focus of eThekweni Municipality’s climate adaptation work has significantly undermined local level action and that this could ultimately discredit the gains made in the international space. As one respondent commented:

“You can get the CEO in this organisation saying “well we’ve got nothing to worry about because we’re one of the most famous in the world for what we’re doing” but in fact it’s masking the fact that back at home you’re doing nothing, so take away that, you know, and it can also discredit the stuff that’s happening on the world stage...” (Project Manager: EDU, 23/05/2015).

This perspective was also shared by those leading the climate adaptation work who acknowledged that, in new change arenas where resources are scarce, deliberate decisions have to be made regarding where these efforts will be focused. In the eThekweni Municipality case, the decision was to invest significantly in the international arena (for the reasons which will be outlined in Section 7.3). The involvement of local actors in this global climate adaptation arena is seen to have been a significant factor in the evolution of eThekweni Municipality’s climate adaptation and mitigation programmes and in the growth of its institutional capacity around these issues (Taylor et al., 2014).

However, it has also come at a cost to the local, community-based, work. As one respondent explained:

“And so that for me is the big gap, the missed opportunity has been in the community based adaptation space...understanding the agency that we’ve got at community level, we haven’t got close to that, and it’s become almost impossible as we rally our resources around the international agenda...It’s taken the whole team to focus on that, to push it, and so we’ve made tough choices, we’ve chosen one literally over the other and that’s not sustainable...Because as the cracks start to appear in the local, that good news story that you’re using to lever will become problematic...how do we achieve the balance...” (Former Deputy Head: EPCPD, 25/05/2015).

An important message emerging from this is that, in a resource-constrained context, trade-offs need to be made regarding where to invest resources. Unfortunately, it is not always possible to predict where these decisions will lead, and therefore trying to proactively understand the potential risks associated with a particular decision, might help to manage these more effectively.

6.4.5 *Storyline 5: Insufficient data recording undermines the climate change work*

One respondent also raised the issue of insufficient data collection as a key gap in the climate adaptation work and commented:

“To me it’s a lack of understanding of why you collect data and we get a small amount of budget annually for expanding our rain gauge network so we are constantly looking to expand it because it’s really about reassessing, being able to reassess where you are at... and also to make decisions going forward.” (Senior Manager: CSCM, 11/09/2014).

The point made in this regard was that data recording is critical to understanding whether the climate predictions that have been made for Durban emerge as accurate. However, such needs are not seen as “core business” by decision-makers and therefore, as budget allocations for such initiatives are decreased, some of the foundational information that will help to build a more accurate picture of the likely impacts of climate change on Durban, is being lost. The lack of resourcing that is given to data collection related to climate adaptation reflects earlier comments relating to the fact that climate change (and related initiatives) are not seen as immediate priorities, in the face of other developmental challenges.

6.4.6 *Analysis and interpretation*

Much of the critique in this section (from those directly involved in leading the climate adaptation work and from those who have been more distant from it) has been on the insufficient attention that has been given to climate change communication and education and community-focused work. These perceived gaps seem to relate strongly to the greater emphasis that has been placed on promoting the climate adaptation agenda in the international arena, which had the intention of building a more enabling policy environment that could ultimately help to more effectively embed the agenda at the local level. However, a number of respondents highlighted that this may have come at the expense of the local work, which is seen for example in the gaps around communication and community level

adaptation. In the eThekweni Municipality case, this unequal implementation emphasis was the result of a conscious decision, given (a) the limited resources (both human and financial) of the small Climate Protection Branch; and (b) the potential for the international work to help promote the local work more effectively in the longer-term. Regardless of the rationale for the decisions made however, eThekweni Municipality is currently at a critical point in its work, where local awareness and political traction have not been what they should have, raising concerns around whether the local agenda has been compromised through the initial decisions taken around priority areas for intervention. The gap around community engagement is also significant, given that transformative adaptation is characterised by appropriate engagement of all stakeholders, particularly those who will be most affected by climate change. This raises important questions around initiating and sustaining transformative adaptation and finding ways to balance the need for action across multiple scales and levels, with the limited resources that are available in new areas of work. It also points to the need for appropriate implementation partnerships in areas such as community level engagement, where the Municipality may not have appropriate or sufficient skills and resources.

6.5 The characteristics of the change process in the case study

Although an important part of determining whether transformation and transformative adaptation is evident is to understand exactly what change has occurred and where the gaps and missed opportunities have been, the transformation literature also indicates that it is important to understand the *way* in which those changes have come about, the approaches and practices that underlie the change that has taken place and the *intention* behind these. In this regard, transformation is usually accompanied by intentional innovation, experimentation and new ways of operating. An exploration of the “characteristics of the change process” is therefore necessary within the context of the climate adaptation work in eThekweni Municipality, in order to assess whether the work demonstrates an intention to innovate, experiment and learn, and to do things in ways that are different from how they would normally be done within the municipal context.

A number of storylines emerged in the way respondents spoke about the way in which the climate adaptation work has been framed and integrated in eThekweni Municipality (Table 6.5) and what has distinguished this from other municipal practices. Given that these storylines have been broadly inferred from the interview responses, rather than being related to specific questions in the interviews, the number of respondents per storyline and across interview groups has not been quantified.

Table 6.5: The storylines that emerged to describe the characteristics of the change process in Durban

THEME	STORYLINE (S)
Characteristics of the change process	Storyline 1: The process of integrating climate adaptation into municipal planning has been seen as one part of a bigger process towards transforming the city
	Storyline 2: Change is seen as an ongoing process, requiring constant reflection, adaptation and learning in response to a changing context
	Storyline 3: There has been a recognition of the need for cross-sectoral work and partnerships to facilitate capacity building and implementation
	Storyline 4: Investments have been made in long-term initiatives, not only in short-term ones

6.5.1 *Storyline 1: The process of integrating climate adaptation into municipal planning has been seen as one part of a bigger process towards transforming the city*

It is clear in eThekweni Municipality's climate adaptation work that, at least on the part of those involved in leading the work for the Municipality, there has been a deliberate focus on the need to use the integration of climate adaptation into municipal planning as one part of a broader process to transform the city in ways that are sustainable and more responsive to a changing future. In this regard, respondents spoke about the way in which the climate adaptation agenda has grown from the primary biodiversity focus of the EPCPD, and has since expanded into the spaces of ecological restoration and resilience, with "all of these, while they are separate, they're all part of a bigger unit where we are looking at transforming the way our cities operate, how societies operate" (Manager, Climate Protection Branch: EPCPD, 31/10/2014). As another respondent commented:

"I think that's the value of that work is that you can look at it as a sort of isolated piece of work done by local government around an isolated issue, but it's becoming so much more than that. They're becoming flags that society is raising around different questions which really critique the system" (Former Deputy Head: EPCPD, 25/05/2015).

This foundational intention to critique and change systems is a central characteristic of transformation and transformative adaptation and suggests that, despite some of the gaps in eThekweni Municipality's climate adaptation work, this work has provided important foundations that could facilitate transformation in the longer-term.

6.5.2 *Storyline 2: Change is seen as an ongoing process, requiring constant reflection, adaptation and learning in response to a changing context*

Another important characteristic of eThekweni Municipality's evolving climate adaptation work has been its focus on learning. In any new area of work, there is an element of risk-taking as one begins the task of understanding what might be required to advance an agenda and effect change within a particular context. As one respondent explained:

"In Durban, there have been failures and there have been things that have gone wrong... It isn't black and white, you know, it's very grey and it's such a new field ...you need municipalities to be bold enough to try...Yes, maybe making mistakes, but how else (do you learn)?" (Former Climate Protection Scientist: EPCPD, 27/09/2014)

This willingness to take risks and to learn through doing has characterised eThekweni Municipality's work in the field of climate adaptation, at a time when there was little local, national or international precedent to guide the work being undertaken. As another respondent commented:

"(The advancement of the climate adaptation agenda) has really happened by putting stuff out there and not being afraid of the fact that that stuff wasn't perfect...that's another sort of modus operandi that I have is that I am very happy to jump feet first into something and not know what I'm jumping into...90 times out of a 100 you'll just flail around and not get anywhere but 10% of the time, you will make a breakthrough and it's through that 10% that you live" (Former Deputy Head: EPCPD, 25/05/2015).

Such “climate change experiments” (where there is a more or less explicit attempt to innovate, learn or gain experience) are becoming an increasingly important part of how adaptation and mitigation are understood and these play an important role in helping to enhance social learning, grow networks and create niches of understanding and experience that can ultimately “challenge regime dominance” (Bulkeley and Broto, 2013 p. 365). At the same time however, too many failures can undermine credibility and momentum (as seen in the earlier example of the Durban Climate Change Partnership) and so there is a difficult balance to strike when navigating new and often complex transformation processes.

eThekwini Municipality’s climate adaptation work has also been accompanied by structured research and knowledge sharing in order to: build greater understanding of the extent to which initiatives have been successful (or not) in achieving their objectives; share these learnings with others in order to help fast-track their own progress; and build relevant skills in the young people who will ultimately need to continue the work that has been started. A core part of this work has been the establishment of a research partnership between eThekwini Municipality and UKZN “that is helping directly by building capacity ...but also in terms of the knowledge products emerging from that...that’s bringing knowledge to the Municipality” (Manager, Climate Protection Branch: EPCPD, 31/10/2014). The knowledge that is emerging through this work is seen as being foundational in helping to understand and continue driving the climate adaptation work in eThekwini Municipality. As one respondent emphasised:

“So knowledge to me is absolutely vital. It lies at the heart of it and yet it’s the thing that we most easily overlook... But I am seeing a change in that, you know, the fact that we’ve got so many people invested in Masters, PhDs, it is that commitment to knowledge, to do that last very thoughtful concerted almost analytical creative step of saying all this is cool, but what does it mean? I think our research networks are a very clear hands up saying that we will back knowledge networks” (Former Deputy Head: EPCPD, 25/05/2015).

As Tabara (2013) points out, transformative knowledge production requires open knowledge systems that can facilitate collaborative learning and problem solving and requires the mobilisation of multiple sources of expertise to produce the required knowledge outcomes. Satterthwaite et al (2016, p. 255-256) emphasise this by highlighting that, if transformative adaptation is to successfully integrate the adaptation, mitigation, disaster risk reduction and development agendas, “there is a pressing need to build knowledge, capacity and learning in each urban centre and to generate the local data to support this... (and that this) involves expanding the global network of researchers and research institutions with competence on urban issues and climate change who can work together...”, thus also supporting the importance of research, deliberate learning and data collection.

This thesis argues that eThekwini Municipality’s climate adaptation work, with its intentional focus on knowledge generation and learning, through risk-taking in new project arenas, appropriate research, documentation, capacity building and partnerships, demonstrates the transformational characteristics of knowledge production described above. This is now being used to build the foundations for further change and transformation. This specific focus on learning and knowledge production also inherently acknowledges that adapting to climate change is an ongoing agenda, and

that remaining responsive to changing climate conditions over time-scales, will require an ability to continually observe, learn and adapt interventions.

6.5.3 Storyline 3: There has been a recognition of the need for cross-sectoral work and partnerships to facilitate capacity building and implementation

As discussed in Chapter 4, many local government institutions are by their nature silo-ised and do not actively facilitate cross-sectoral interactions. Climate change however, does not ascribe to such structures. This means that “in dealing with climate risks you’ve got to look outside your boundaries because you can’t deal with your risks on your own” (Consultant: FW, 06/11/2014). This has resulted in greater interactions across municipal departments, who have needed to sit together and hear each other’s perspectives in order to work out how to prioritise appropriate adaptation interventions (Former Climate Protection Scientist: EPCPD, 27/09/2014). These interactions, as well as partnerships that have formed with neighbouring municipalities, non-governmental organisations (NGOs) and research institutions, have become central to eThekweni Municipality’s climate adaptation work. They have also provided the foundation for initiating programmes such as the UEIP, which has involved the establishment of a multi-stakeholder, trans-boundary partnership to address the role of ecological infrastructure in increasing water security and adaptive capacity in the uMngeni River catchment (Roberts et al., 2016). As one respondent commented:

“Engaging in partnerships has been very, very important for our work, whether it’s partnerships between branches in our department or between departments in the municipality or between organisations across the continents...projects like our uMngeni Ecological Infrastructure Partnership also build on partnerships across boundaries to work outside of our catchments” (Manager: Climate Protection Branch, EPCPD, 31/10/2014).

This thesis argues that, given that the structures and regulations of local government institutions can restrict cross-sectoral interaction and innovation, initiatives that begin to challenge these, for example through building new partnerships and facilitating cross-sectoral learning and knowledge production, are critical in helping to facilitate transformative adaptation.

6.5.4 Storyline 4: Investments have been made in long-term initiatives, not only in short-term ones

A final distinguishing characteristic of eThekweni Municipality’s climate adaptation work has been the city’s willingness to engage in long-term and complex initiatives, rather than focusing only on projects that can deliver “quick wins”. One example of this is the Buffelsdraai Landfill Site Community Reforestation Project, which has required ongoing investment in ecological restoration and community upliftment. Another example is the “Climate Change Compact” work, which is focused on building climate adaptation knowledge networks (often with neighbouring municipalities) and champions who can drive climate adaptation (Manager, Climate Protection Branch: EPCPD, 31/10/2014).

The Compact work is distinguished by its strong focus on people (for example through capacity building and knowledge exchange) and governance structures, rather than on quantifiable implementation projects:

“This Compact thing is something else because it requires an invisible architecture and political support...and it takes human interaction to build that... so for me that’s probably our boldest – it’s the least visible of our things...because it requires those things that only humans can give - time and money and interest and inspiration in the dark days” (Former Deputy Head: EPCPD, 25/05/2015).

The willingness to engage in such work again demonstrates an understanding that transformation and transformative adaptation will take time and that building strong (and sometimes intangible) foundational elements such as knowledge and capacity building, skills development and job creation are critical in order to sustain this longer-term transformation agenda. In eThekweni Municipality, where the climate adaptation work has been led predominantly by scientists and engineers, the recognition that issues of governance are central to effective adaptation, has shifted individuals from their more traditional skills, to arenas that have required an ability to work across multiple fields of expertise. This is important, and highlights the need for multi-dimensional skills and expertise in these new and complex arenas of transformational work.

6.5.5 Analysis and interpretation

The transformation literature suggests that a key characteristic of transformation is its intentional focus on the need for change and the accompanying emphasis on innovation, experimentation and new ways of operating. From the perspective of transformational intention, it is clear that the climate adaptation work in eThekweni Municipality is being undertaken in a way that deliberately aims to use change in the climate adaptation space to leverage greater systems transformation, for example through establishing new areas of work such as ecological restoration and resilience. The focus of this work on challenging the existing development path of the city (for example through the re-creation of forests in urban areas, or through the emphasis of the resilience work on issues of inclusion and access), all contributes to bringing about the deeper systemic transformations that are needed. This approach acknowledges that deep change takes time. There is therefore a need to maximise the value of every opportunity that provides leverage for further change and ensure that initiatives continually evolve in ways that help to span the time-scales over which transformation processes need to operate. This is also reflected in the nature of the climate adaptation investments that are being made, with many of these focusing on longer-term issues relating to governance and sustainable livelihoods.

eThekweni Municipality’s climate adaptation work also demonstrates a commitment to innovation, experimentation and new ways of operating, for example through its approach of “learning through doing” and through its willingness to experiment with a range of climate adaptation initiatives at different scales. These have ranged from large-scale ecological restoration and sustainable livelihoods programmes to technical decision-making tools and governance initiatives focused on developing new models for networking and capacity building. The work has also spanned both the local and the international arenas and has resulted in additional institutional changes (i.e. over and above the establishment of climate specific functions), including the formation of a “Restoration Ecology Branch”

in the EPCPD to oversee the implementation of the large scale restoration programmes. The establishment of partnerships and the promotion of cross-sectoral interactions in a municipal context where this is uncommon, demonstrates a commitment to new ways of working and acknowledges that multiple inputs will be needed to address the challenge of climate change. Linked to this, learning and knowledge production have been seen as central in building the foundations for the change process and in ensuring that there is sufficient documentation, reflection, learning and sharing to help navigate the time scales over which transformation will take place.

The above factors demonstrate the transformational intention of the Municipality's climate adaptation work to promote development pathways that are more sustainable and just.

6.6 The potential outcomes from the climate adaptation work in eThekweni Municipality

Importantly, not all transformation is necessarily good. Neither is the end goal of transformation always clear. It is therefore important to consider the likely outcomes from transformation in order to assess whether these are sustainable and just. In considering the potential outcomes from the climate adaptation work in Durban, two storylines emerged for this theme (Table 6.6) and are discussed below.

Table 6.6: The storylines that emerged from interviews to describe the likely outcomes from Durban's climate adaptation work

THEME	STORYLINE
Characteristics of the change process	Storyline 1: The climate adaptation agenda is not sufficiently entrenched to deliver transformative benefits
	Storyline 2: Project level outcomes are delivering benefits to vulnerable groups

6.6.1 *Storyline 1: The climate adaptation agenda is not sufficiently entrenched to deliver transformative benefits*

In many ways it could be argued that the climate adaptation work in eThekweni Municipality is in too early a phase for the outcomes of this work to be assessed in relation to its transformative potential and benefits. As the former Deputy Head: EPCPD (25/05/2015) suggested:

“I think the primary beneficiary at the moment is the group of torch bearers...there are secondary beneficiaries from the work in the sense that, you know, we've got communities at Buffelsdraai who're employed...but I think at this point in time the key beneficiaries are the original torch holders in the sense that what we're doing is generating more grist for the mill in order to leverage the system...”

On this basis, and given the longer time horizons that are needed to begin to see real benefits emerge, it is difficult to assess these benefits in a comprehensive way at this point. However, initial outcomes do point to the fact that the work is moving in a positive direction.

6.6.2 *Storyline 2: Project level outcomes are delivering benefits to vulnerable groups*

However, despite the fact that a full understanding of outcomes and beneficiaries may not be possible at this point in the climate change adaptation work, there are indications that at a project level, there is a significant focus on delivering benefits to vulnerable groups:

“If you think about Working For Ecosystems...those communities that we have worked in, those are the people that are benefiting...and we’ve helped develop their skills, their businesses” (Manager: Restoration Ecology Branch, EPCPD, 31/03/2015).

The same could be said for projects like the Buffelsdraai Landfill Site Community Reforestation Programme. The potential benefits from these initiatives in terms of poverty alleviation, job creation, skills development and ecological restoration, were discussed in detail in Section 6.3. These outcomes suggest an approach that is just and fair in terms of its distribution of benefits, at least at this early stage in the climate adaptation work.

6.6.3 *Analysis and interpretation*

Although the climate adaptation work of eThekweni Municipality is in an early phase and cannot be fully evaluated in terms of its systemic outcomes, it is worth noting that early project level benefits seem to be particularly focused on two of the most vulnerable components of the city system: the natural environment and the poor. In addition, most respondents felt that, in the future, the greatest benefits of a comprehensive climate adaptation programme would be felt by the most vulnerable communities, even if this cannot be properly assessed at present.

6.7 Consolidation: Does eThekweni Municipality’s climate change adaptation work demonstrate transformation and transformative adaptation?

From the outset, the purpose of this chapter was to assess the extent to which the changes that have been seen in eThekweni Municipality’s climate change adaptation work, in terms of integrating climate change adaptation into municipal planning and implementation, can be considered to demonstrate transformation and transformative adaptation when compared with the characteristics of transformation and transformative adaptation that are outlined in the literature. These characteristics suggest that transformation and transformative adaptation involve systemic shifts that address underlying causes of risk and that such processes are usually accompanied by intentional innovation, experimentation and evidence of new ways of doing things. The literature suggests that transformation and transformative adaptation can happen in different ways at different levels, for example at the level of personal, practical or political change, and that these shifts can be either rapid or incremental. The literature also emphasises that much of how transformation unfolds is related to the particular context in which this takes place and that context, along with the potential outcomes of transformation, must be assessed when evaluating any change process. In the case of transformative adaptation, more specific characteristics relate to the fact that transformative adaptation should: integrate the climate change adaptation, climate change mitigation, disaster risk reduction and development agendas; ensure that climate adaptation outcomes are socially just, equitable and environmentally sustainable; facilitate decision-making that is collaborative, equitable

and informed; challenge and change institutional and governance systems where this is necessary; and work across different spatial, time and governance scales to leverage the greatest impacts. It is these characteristics that allow one to locate a change process, or a component of a change process, somewhere along a transformation continuum.

In order to evaluate the extent of change that has occurred in the eThekweni Municipality climate adaptation case study, each section in this chapter has explored one of these elements: the starting point for the change process and the municipal context in which the climate change adaptation agenda was introduced; the nature of the changes that have taken place; the gaps and missed opportunities in this work and its potential outcomes; as well as the characteristics of the change process. The current section summarises the chapter and provides concluding comments regarding the extent to which the climate adaptation work in eThekweni Municipality, when considered across the various elements covered in this chapter, can be considered to demonstrate transformation and transformative adaptation. This assessment against the characteristics of transformation and transformative adaptation is summarised in Table 6.7 and is briefly described below.

Prior to 2004, the climate change adaptation agenda did not exist in eThekweni Municipality. At a local level it was seen as a largely peripheral issue, while in broader policy arenas, incorporating adaptation into the climate change agenda was not seen as a priority. At a national level, there was also very little in the way of supporting policy that could provide an enabling framework for the local adaptation work to emerge. The municipal bureaucracy of eThekweni Municipality added to this context by providing an environment with an inherent resistance to change, where small shifts require a significant investment of time and energy along with a commitment to working outside the normal confines of the system. In spite of this challenging context, there has been a significant increase in the extent to which the climate change adaptation agenda has been acknowledged and integrated into the work of the Municipality through relevant climate change policy and strategy development (e.g. inclusion in the IDP, development of the Durban Climate Change Strategy), the resourcing of a climate adaptation function in the municipality and the implementation of cross-sectoral projects and initiatives that have focused on preparing municipal departments, communities and ecosystems for the predicted impacts of climate change. Significant emphasis has also been on building the adaptation agenda at the international level and this has contributed to major shifts in how the issue is regarded and prioritised in this arena. These changes have all happened within a relatively short timeframe and within a challenging institutional context. Despite these changes however, there are still significant gaps in the climate adaptation work, with many of the changes described above not having been as pervasive as required within the context of the Municipality. This has been reinforced by the limited leadership and political support to advance the agenda beyond where it currently is.

Despite some of the shortcomings described above however, the characteristics of the change process in eThekweni Municipality, including its transformational intention and accompanying efforts to leverage off existing work to build a broader landscape of change, its deliberate emphasis on building learning and knowledge and its significant focus on the poor and the natural environment as the truly vulnerable in the Durban context, suggest that the foundations are being established for the longer-term systemic shifts that could help to challenge underlying causes of risk in a much more fundamental way than is currently being seen.

Table 6.7: A summary of the climate adaptation case study in relation to the characteristics of transformation and transformative adaptation in the literature

Focus of transformation and transformative adaptation literatures	Transformation characteristic	Characteristics of the climate adaptation case study
<p>The nature of transformation and transformative adaptation <i>(Relevant in the context of environmental governance and climate adaptation)</i></p>	<p>Transformation and transformative adaptation are characterised by a complete altering of an existing system (e.g. in the technical, social or political sphere) to reduce systemic risks.</p>	<p>Systemic shifts that prioritise the poor and the natural environment are important in order to address issues of equity and sustainable development. The case study demonstrates elements of work (such as eThekweni Municipality’s community ecosystem-based adaptation projects), that deliberately and simultaneously target elements of human and ecological vulnerability and risk, in their focus on job and skills creation through ecological restoration. Institutional changes (including the creation of the Restoration Ecology Branch to manage these projects) also demonstrate a commitment to long-term investments in such initiatives. However, although a number of important changes have been seen at both a policy and project level in terms of how climate adaptation is integrated into municipal planning and decision-making, these changes are limited to a few departments and no fundamental changes are evident yet in the prevalent operations and economic systems of the Municipality.</p>
	<p>Transformation and transformative adaptation can happen in a number of ways at different levels within a system.</p>	<p>Political changes are evident in the integration of climate adaptation into policy through the IDP, Durban Climate Change Strategy and sector-specific policies such as the river setback guidelines. These have been supported by the resourcing of a climate adaptation function. However, additional political leadership is needed to continue driving the climate adaptation agenda. Technical changes are seen for example in the decision-making tools that have been developed to guide climate change decision-making in the Municipality (e.g. benefit-cost work, MAPs).</p>
	<p>Incremental and transformative change</p>	<p>Many of the changes in eThekweni Municipality’s climate adaptation work have happened incrementally through a “learning by doing” approach although, at times, change has been fast-tracked through specific “windows of opportunity” (discussed in Chapter 7). Importantly, the case study suggests that, although the objective of transformation and transformative adaptation is to effect fundamental systems change, in bureaucratic contexts where it is difficult to effect change, incremental changes in the early stages of the transformation journey may be critical in building a champion base and support for the work, and ensuring institutional “lock-ins”. These ideas are also discussed further in Chapter 7. Maximising the value of “windows of opportunity” can help to facilitate more rapid transformation at certain points. Importantly, the case study reiterates the fact that incremental and transformative changes are not mutually exclusive and that they should be seen as complementary and mutually informative, even sometimes occurring simultaneously.</p>
	<p>Transformation and transformative adaptation processes are characterised by transformational intention,</p>	<p>Given the fact that climate adaptation is a relatively new agenda and there is little precedent for much of the climate adaptation work that has emerged in eThekweni Municipality, this has evolved through a “learning by doing” approach. The transformational intention behind the climate adaptation work is evident in the discourse that is emerging around this work (which speaks specifically of transformation) and in the way that this work has been used to deliberately leverage opportunities to</p>

Focus of transformation and transformative adaptation literatures	Transformation characteristic	Characteristics of the climate adaptation case study
	experimentation and new ways of operating	introduce broader debates around “resilience”, which also has transformative potential. The focus on research, learning and knowledge sharing (for example through the establishment of research partnerships with an academic institution) provides evidence of this approach.
	The outcomes from transformation and transformative adaptation processes should be positive and just and should promote greater social and economic equality, participation, rights and sustainable development.	Although it is possibly too early to assess the outcomes of eThekweni Municipality’s climate adaptation work, early indications are that eThekweni Municipality’s adaptation focus will deliver benefits for the most vulnerable in society, and for the natural environment.
Understanding the nature of transformative adaptation	Transformative adaptation integrates the climate change adaptation, climate change mitigation, disaster risk reduction and development agendas	<p>Attempts have been made in eThekweni Municipality to integrate these four agendas. This is possibly most clear in the way the adaptation and development agendas have been aligned, for example through initiatives focused on community ecosystem-based adaptation, that have promoted job creation, skills development and ecological restoration in a city where poverty and levels of ecological degradation are both high.</p> <p>Although not specifically mentioned by respondents in their interviews, some attempt has been made to integrate the adaptation and mitigation agendas, for example through undertaking a carbon stock inventory of the city’s Durban Metropolitan Open Space System (which is also seen to be a key ecosystem-based adaptation asset), and through quantifying the carbon offset value of the large ecological restoration programmes, such as that at the Buffelsdraai Landfill Site Community Reforestation Project (Roberts et al, 2016). Discussions are currently underway regarding the location of the city’s climate mitigation function (currently located in the “Energy Office”), with one option being for this office to be re-located to the EPCPD, where the climate adaptation function is currently located.</p> <p>Initial integration of the adaptation and disaster risk reduction functions took place when one of the MAPs focused specifically on the Disaster Management function. Later, the adaptation work became a permanent agenda item on the agenda of the Disaster Management Advisory Forum. However, although the disaster management practitioners recognized climate change as a significant risk requiring immediate attention, “this is offset by the capacity and institutional mismatch that exists between the current role and function of the Disaster Management Unit and the scale and significance of the climate change challenges facing the city” (Roberts, 2010, p. 400). This has been exacerbated by the fact that disaster management is regarded by many as a responsive (i.e. a relief and welfare)</p>

Focus of transformation and transformative adaptation literatures	Transformation characteristic	Characteristics of the climate adaptation case study
		rather than a proactive function. These factors have meant that the ability to truly integrate the adaptation and disaster risk reduction agendas has been undermined.
	Transformative adaptation ensures that climate adaptation outcomes are socially just, equitable and environmentally sustainable	As previously indicated, a significant focus of eThekweni Municipality's climate adaptation work has been on community ecosystem-based adaptation, thus addressing issues of poverty, social justice, and ecological sustainability in a very direct way.
	Transformative adaptation facilitates decision-making that is collaborative, equitable and informed	A significant gap identified in eThekweni Municipality's climate adaptation work relates to community engagement to inform climate adaptation initiatives. Other projects (such as the UEIP) actively promote multi-stakeholder engagement. However, direct community involvement in this, is still lacking in some instances.
	Transformative adaptation challenges and changes institutional and governance systems where this is necessary	Attempts have been made in eThekweni Municipality's climate adaptation work to facilitate cross-sectoral interactions in the Municipality (e.g. through the development of MAPs) and the creation of new partnerships for implementation. The increasing focus on knowledge sharing and exchange across governance boundaries, is evidence of this. Institutional structures themselves (initially through the creation of a Climate Protection Branch and later through the establishment of the Restoration Ecology Branch) have also been changed and added to, where needed.
	Transformative adaptation acknowledges the need to work across different spatial, time and governance scales to leverage the greatest impacts	Increasingly, the climate adaptation work is happening across local and regional spatial boundaries (for example through the local and regional Climate Change Compacts and through initiatives like the UEIP) in acknowledgement of the fact that climate change and its impacts do not respect human spatial boundaries. The focus of the work on facilitating research and building knowledge and networks, also acknowledges that transformative adaptation will take time, and therefore the foundations need to be put in place to collate learning and use this to advance future work. This is further seen in the commitments made to long-term investments in projects such as the Buffelsdraai Landfill Site Community Reforestation Project. One of the difficulties however, in working over long time horizons, is the fact that this requires institutional memory and continuity in critical champions who can drive the agenda. Some of the challenges that have been experienced in this regard, and which have hampered a more rapid advancement of the climate adaptation work, are further explored in Chapter 7. EThekweni Municipality's ability to work across governance scales (which has been seen most dramatically in the advancement of the DAC at both a local, regional and international level) has also contributed to enhancing the potential for transformative adaptation.

When reflecting on the change process that has unfolded in eThekweni Municipality's climate adaptation work, it can be argued that components of this process could be located in different places along the transformation continuum. From a policy and project implementation perspective, significant changes are evident when one considers the shifts that have taken place over a short period of time in a difficult context, in terms of integrating climate adaptation into municipal policy and institutional structures. However, given the remaining gaps in this work, the climate adaptation work in eThekweni Municipality could be considered to be in a "transitional" stage in terms of transformative adaptation. Although a number of municipal departments have implemented climate adaptation work at the levels of both policy and practice, with many of these initiatives addressing issues such as vulnerability and ecological degradation at the project level, the larger system shifts that are needed to fundamentally alter the way in which the Municipality conceives its development path in the context of climate change, have not yet happened. In addition, there is still work to be done to properly integrate the adaptation, mitigation, development and disaster risk reduction agendas, and to promote more collaborative, informed and equitable decision-making. This suggests that the truly transformative impacts of the climate adaptation work have yet to be seen²⁸. As one respondent commented:

"I think we're at that stage of generating the knowledge and the systemic understanding of the torch bearers so that they can go out. So a lot still depends on a few at the moment...it's still about building the confidence, the trust, the systems to develop the knowledge that they can then lever the other systems out. And you know that's quite a difficult space to be because you know you're still one or two steps from big dramatic physical transformation and action, whatever that turns out to be...But you actually can't get there...until this other stuff is built, so we're in that foundation building" (Former Deputy Head: EPCPD, 25/05/2015).

From a process perspective however, the analysis looks somewhat different. The intentional transformational approach and the associated broadening of climate adaptation practices across governance, spatial and knowledge scales, suggests the existence of a transformative process in eThekweni Municipality. This process is slowly leveraging existing and new work to build both the conceptual and the institutional architecture that may ultimately provide the foundations for more significant changes than those that are currently evident in the climate adaptation work. The thesis argues that these process elements, which define the way in which the climate adaptation work is unfolding and the principles that guide it, demonstrate some of the characteristics of transformative adaptation. These process elements are absolutely critical, especially in contexts where the ultimate "end point" of transformation is very difficult to define and where the transformation "journey" and how this is conceived, may be as important as the destination.

Understanding the role played by incremental and transformative change in eThekweni Municipality's climate adaptation journey is also important. In this regard, various combinations of contextual factors have influenced whether incremental or rapid changes are most appropriate at different points in the case study. In the early stages of the journey, in the context of resistance and bureaucracy, incremental steps were important in building an understanding of climate change in eThekweni

²⁸ It should be noted that, in comparison with the climate adaptation work, it took almost three decades to integrate biodiversity into municipal planning and decision-making.

Municipality and creating institutional “bookmarks” within the IDP and organisational structure. This was also supported by demonstrable practical work, for example in re-determining floodlines and implementing community ecosystem-based adaptation projects. However, the Municipality has also managed to maximise the value of critical “windows of opportunity” to more rapidly advance the work at certain times (discussed further in Chapter 7), and this has helped significantly in building support and momentum for the adaptation work. The ability to strategically adjudicate these opportunities and which response is most appropriate at a given point in the change process, is critical.

Although the objective of transformation and transformative adaptation is to effect fundamental systems change, the eThekweni Municipality case study therefore suggests that, in instances where a particular context makes change extremely difficult, incremental changes in the early stages of the transformation journey may be critical in building a champion base and support for the work, and ensuring institutional “lock-ins”. However, incremental change may not ultimately be enough to advance transformative change at the scale and depth that is required. The current challenges in the climate adaptation space in eThekweni Municipality suggest that incremental change can be useful to a point, but that this quickly needs to be leveraged to advance more rapid and transformative change, if momentum is not to be lost. Understanding the changing context and times at which either incremental or rapid change is more appropriate, can help to maximise the potential for transformative outcomes.

Given the progress that has been made in advancing the climate adaptation work in eThekweni Municipality over a short time in a difficult context, and the characteristics of transformation and transformative adaptation that are evident in the way in which this has unfolded, the case study may also be able to provide insights into the factors that are important in catalysing, facilitating or acting as barriers to transformative adaptation in relation to the climate adaptation case study. These ideas are explored further in Chapter 7.

CHAPTER 7: CATALYSING AND SUSTAINING TRANSFORMATIVE ADAPTATION, AND OVERCOMING BARRIERS

7.1 Introduction

Chapter 6 presented the changes that have taken place in eThekweni Municipality to integrate climate change adaptation into municipal planning and implementation and explored the characteristics of this change process and its potential outcomes. It also reflected on the gaps and missed opportunities in the climate adaptation work. The chapter concluded by suggesting that, from a policy and project implementation perspective, the work could be considered to be in a transitional stage in terms of transformation and transformative adaptation. This points to the critical role that the climate adaptation work is already playing, and may continue to play, in laying the foundations to effect transformative adaptation in the city.

Given the advances that have been made in the climate adaptation work in eThekweni Municipality towards transformative adaptation and the recognition that eThekweni Municipality's climate adaptation work has positioned it at a critical transitional stage on the transformative adaptation journey, the purpose of the current chapter is to explore the factors that have either catalysed, facilitated or acted as barriers to transformative adaptation in this local government context. It is important to note that the IPCCs Fifth Assessment Report recognises that the factors that constrain incremental adaptation can also constrain transformative adaptation (Klein et al., 2014). It is therefore possible to infer observations about transformative adaptation in the context of a case study that still demonstrates incremental or transitional characteristics in some respects.

The chapter will also explore the extent to which these factors are similar to, or different from, the ideas that appear in the transformation and transformative adaptation literatures. Specific focus will be given to: factors that have helped to catalyse and facilitate transformative adaptation in eThekweni Municipality; the role of knowledge sharing and social learning in facilitating this; and factors that act as barriers to transformative adaptation within the case study context. Although traditionally one would look at "opportunities" and "barriers" to transformation and transformative adaptation, in this thesis, "catalysts", "facilitating factors" and "knowledge sharing and social learning" are discussed separately, rather than being grouped together as "opportunities". This distinction is made because the interview questions were framed specifically in relation to each of these, and because there are important theoretical ideas that emerge for each. Although the factors identified relate specifically to the climate adaptation case study on transformative adaptation, ideas will later be inferred from this regarding their applicability in broader processes of transformation in environmental governance.

7.2 Catalysts for transformative adaptation

Transformation and transformative adaptation usually begin with a catalyst that helps to initiate a new agenda. Table 7.1 summarises the catalysts identified by respondents during their interviews as having played a critical role in helping to initiate the integration of climate change adaptation into municipal planning and implementation in eThekweni Municipality. The table presents the storylines and storyline components that emerged and the number of respondents who spoke about each of

these during their interview. Table 7.2 provides an indication of the percentage of respondents in each respondent category who discussed each of the storylines and storyline components. Each of the storylines and storyline components is then described in more detail.

Table 7.1: Number of respondents that discussed each of the storylines and storyline components under the theme: Catalysts for transformative adaptation

THEME: Catalysts for transformative adaptation	Storyline	Storyline component	Number of respondents
	Storyline 1: Individual champions are key in catalysing transformative adaptation		12
		Storyline component 1.1: Champions play a key role in leading and driving transformative adaptation	8
		Storyline component 1.2: Champions share important characteristics that assist them in playing a leadership role	8
		Storyline component 1.3: Individual champions need to build broader support around them in order to ensure that transformative adaptation is initiated and sustained	4
	Storyline 2: Crises spark a recognition of the need to change		8
Storyline 3: Maximising the value of “windows of opportunity” can be key to initiating transformative adaptation		8	

Table 7.2: Percentage (%) of respondents in each interview category that discussed each of the storylines and storyline components under the theme: Catalysts for transformative adaptation

THEME: Catalysts for transformative adaptation	Storyline	Storyline component	% of respondents in each category				
	<i>Respondent category</i>		1	2	3	4	5
	Storyline 1: Individual champions are critical in catalysing transformative adaptation			☑☑	☑☑	☑☑	☑
	Storyline component 1.1: Champions play a critical role in leading and driving transformative adaptation		☑	☑☑	☑		☑
	Storyline component 1.2: Champions share important characteristics that assist them in playing a leadership role		☑	☑☑	☑	☑	☑
	Storyline component 1.3: Individual champions need to build broader support around them in order to ensure that transformative adaptation is initiated and sustained		☑☑		☑		☑
Storyline 2: Crises spark a recognition of the need to change			☑☑	☑	☑	☑	☑
Storyline 3: Maximising the value of “windows of opportunity” can be key to initiating transformative adaptation			☑☑	☑☑	☑	☑	☑

KEY

Respondent categories

1. Climate adaptation leaders and coordinators
2. Climate adaptation implementers
3. Municipal officials not directly involved in climate adaptation work
4. Municipal officials involved in strategic planning
5. Stakeholders external to the Municipality

Frequency of response

- ☑: 0-33%
 ☑☑: 34-67%
 ☑☑☑: 68-100%

7.2.1 Storyline 1: Individual champions are critical in catalysing transformative adaptation

Most respondents did not differentiate between champion “leaders” (i.e. the first individual/s to champion a particular issue) and “followers” (i.e. those who recognise the importance of the issue, possibly through being inspired by a leader, and who then work to advance the agenda in their own spheres of influence), but spoke more generically about champions. This could indicate that they saw all champions as important, regardless of their specific role. This is reflected in the broad suite of actors that respondents identified during the interviews as having played a critical role in the climate adaptation work in eThekweni Municipality, although many also spoke about specific individuals within this broader suite. The storyline components that were articulated, are described in more detail below:

Storyline component 1.1 Champions play a critical role in leading and driving transformative adaptation

Significant emphasis was placed by respondents on the role of individual champions in catalysing transformative adaptation in the municipal context and in helping to initiate, embed and advance agendas across a range of sectors (see Table 7.2). This was particularly evident in the first two respondent categories who have been more directly involved in the climate adaptation work and who have seen first-hand the role played by individuals in driving change. This response was also evident in the third respondent category of municipal officials who, despite having been less directly involved in the work, still recognised the critical role that has been played by champions in this work. It is interesting to note that this response is absent from the fourth interview group who, given their strategic leadership roles in the city, perhaps place more emphasis on the role of policies and strategies in driving change, rather than on the individuals behind these.

The critical role of champions was emphasised by one respondent who commented that “It’s always individuals...the policy framework basically just controls the runway direction for the individuals” (CEO: WCT, 08/05/2015). Respondents also emphasised that “none of this work (of champions) works on work requirements, it actually works on a personality basis, so you need somebody to lead...” (Project Executive: EU, 12/12/2014). This indicates that the role of champions goes beyond what would normally be required of officials in the Municipality and therefore attracts individuals who are committed to being front runners in testing new ideas. As a former researcher in eThekweni Municipality (EDU, 10/09/2014):

“The one thing is you need... champions, you need people who are going to persist and who are committed to ... doing things in a new way ... Because it’s not easy to do things in an old way, let alone in a new way and we’ve seen various examples with these projects... where officials are trying to be innovative and it’s just very very hard to be innovative in such a bureaucratic institution”.

In the case of eThekweni Municipality, the former Deputy Head of EPCPD, with the trust of the City Manager, Mayor Nxumalo (and Mayor Mlaba before him) was able to champion new concepts and programmes and link local priorities to international interests, with a growing support base of technical champions who have helped to lobby around these issues within their own sectors and with

municipal political leadership (Taylor et al., 2014). It can therefore be argued that, in a relatively inflexible municipal context, the role of individual champions in integrating new concepts into the institution in relevant ways, plays a critical role in driving new agendas “from the bottom up”. The role played by champions and leaders in supporting social processes and strengthening networks is also critical (Ziervogel et al., 2016a).

Storyline component 1.2: Champions share important characteristics that assist them in playing a leadership role

Linked to the previous storyline component, respondents also emphasised the importance of a number of characteristics that are usually common amongst these champions. For many, “it is skills, it’s passion and initiative... people who have got initiative who want to make a difference you know who don’t like to do everything like it’s been done before” (Chief Strategy Officer: OCM, 23/04/2015). These individuals are usually characterised by a proactive approach and a willingness to seek out new information and go beyond what is required in the course of their work and individual performance plans, even taking risks in an effort to find new ways forward. As one respondent commented:

“Sometimes you know there’s a project that’s going to add value. So it’s not backed, it’s not a high priority, it’s not even a KPA (Key Performance Area)...it’s just something you’re doing because you know it’s going to make a difference, and you’re hoping that when it’s reaching a certain stage of critical (mass), people will see this is going to work” (Professional Technologist: EWS, 15/09/2014).

Many of these champions have also been exposed to relevant global issues, either through the nature of their position in the Municipality, or through cross-disciplinary study, and this gives them a more integrated and strategic perspective that helps them to see the need for intervention in particular areas. Importantly, these champions are persistent and determined in pursuing what they believe to be important and are willing to “speak truth to power and not take no, and keep bouncing back and not give up” (Former Head: EWS, 03/03/2015). As municipal Project Executive (EU, 12/12/2014) commented:

“So these champions, they can’t be wimps. They can’t be brow-beaten out. And sometimes it’s tough because you feel like you’re the only one beating the drum and everyone is against you. It’s not an easy ride, especially in an institution like this one.”

These responses suggest that, in a local government context where new ideas may be rejected outright, or not accepted immediately, individuals who are intent on driving transformation and transformative adaptation, require tenacity and integrity and a willingness to go beyond their traditional work.

Storyline component 1.3: Individual champions need to build broader support around them in order to ensure that transformative adaptation is initiated and sustained

Individuals play a critical role in driving the climate change work forward. However, respondents, (particularly the first respondent category, who have been responsible for *leading* the climate adaptation work in eThekweni Municipality) argued there are inherent dangers in this, either if a

champion is driving an inappropriate agenda, or if champions do not broaden their support to ensure that the work can be sustained. Respondents cautioned that either of these factors can ultimately undermine the ability to sustain meaningful change.

With regards to personality-driven agendas, a former Climate Protection Scientist (EPCPD, 27/09/2014) commented that this is particularly common in South African municipalities because of the absence of a clear mandate and direction around climate adaptation at this level, resulting in the fact that “climate change has become in some ways associated with certain personalities... who tend to be passionate about it so they will drive it at all costs”. As this respondent observed, this comes with both positive and negative aspects: positive in that the agenda is driven with passion and commitment, but also potentially negative if the agenda that has been adopted is ill-conceived or is driven through the dominance of one individual. This point was emphasised by a former researcher (EDU, 10/09/2014) who commented on the importance of both charismatic leaders and the need to broaden this support base:

“In terms of charismatic leadership, so people who are able to garner resources and change an agenda, I think from a transformation point of view they are critical; they are the people who have an idea and ... drive it in that initial critical stage when you could just easily fall off the agenda...There’s an interesting thing about leaders and then first followers, and how first followers are as important as the leaders ... so I think for me when you are looking at transformation...I think the mistake that a lot of charismatic leaders make is to keep it circling around them”.

This suggests that initial leaders play an important role in initiating a new agenda such as climate adaptation, but that such individuals need to actively broaden their support through the identification of appropriate technical or sectoral champions. This is important, not only to ensure that the agenda is integrated in appropriate ways across other sectors (which can be done most effectively by technical champions who better understand their work context), but also to ensure a level of honest critique of the leader’s own ideas and motivations and the introduction of new ideas as part of the process.

In the case of eThekweni Municipality, one individual in particular has led the climate adaptation work, with support from the officials in the lead department (EPCPD) and from a small number of strong technical champions, largely in the Coastal Stormwater and Catchment Management Department, the Engineering Unit, the Disaster Management and Emergency Control Unit and the Health Department, who have played a critical role in encouraging “more integrative action and overlapping circles of influence” (Roberts et al., 2016, p. 106). This support base has also included eThekweni Municipality’s former mayor (Cllr James Nxumalo) who helped to advance the climate adaptation agenda at a political and international level through his advocacy role in COP 17 and through his positions on the ICLEI Regional and Global Executive Committees. Strategic partnerships with external organisations such as the Wildlands Conservation Trust²⁹, have also helped advance climate adaptation in the area of community ecosystem-based adaptation in eThekweni Municipality.

²⁹ The Wildlands Conservation Trust is a Non-Profit Organisation based in KwaZulu Natal, South Africa, that works to conserve South Africa’s biodiversity through the restoration and conservation of natural ecosystems, with a specific focus on pioneering socio-economic partnerships as part of this vision (www.wildlands.co.za)

However, what should also be noted is that, to a large extent, it is these same individuals who are still driving the work, mostly due to the fact that there is still insufficient ownership of this agenda by city leadership, politicians and critical municipal departments who will need to drive the climate adaptation work, well beyond what has been achieved by the climate champions to date (Former Deputy Head, EPCPD, pers. comm. 19.04.2016). This concern was echoed by a Deputy Head in the DMU (26/09/2014), who commented:

“I think we’ve done a pretty good job within the city of launching this; of sustaining interest (in climate adaptation). I do have a concern that there is a small group that are participating in this in various fields, that are showing interest... and many of this small group is my age and in a few years’ time will retire”.

This raises important questions around how far individual champions can advance an agenda before the broader policy and political environment prevents it from moving further, and what combination of champions and leadership support is needed at various points in order to gain sufficient traction to advance transformation and transformative adaptation.

7.2.2 *Storyline 2: Crises spark a recognition of the need to change*

In a municipality facing multiple challenges and where response times can be long, due to the inherent inertia of the bureaucracy, longer-term issues like climate change (where the impacts are not always immediately evident) do not always receive the attention they deserve. In this regard, respondents highlighted that visible crises help to raise awareness and drive more rapid action. As a Senior Planner (SSPB, 22/04/2015) commented:

“And so crisis I think is one of the things that really makes things happen in this city...And when that crisis is affecting the world’s view of the city...then leadership jumps...I don’t think pretty things like Earth Hour and Earth Day... make a big impact.”

In this regard, the increasing frequency of climate change related “physical change beginning to happen, the fact that we’re facing yet another sort of crushing drought” (Former Deputy Head: EPCPD, 25/05/2015) which more directly affects peoples’ lives, does help to inspire more rapid responses in the city. Durban’s particular context also plays a role in spurring the need for change, given that high levels of social vulnerability make citizens more likely to experience the impacts of climate change. Disaster events have therefore “highlighted the need for understanding what’s going to be happening in the future, because a lot of our vulnerable people are in vulnerable places, a lot of our poor people are in vulnerable places, both from the point of view of physical positioning as well as in terms of responding to those issues” (Senior Manager: CSCM, 11/09/2014).

In a municipal context where the impacts of longer-term issues such as climate change are not visible, events that highlight these potential impacts in a context of vulnerability, can be important catalysts to drive transformation and transformative adaptation.

7.2.3 Storyline 3: Maximising the value of “windows of opportunity” can be key to initiating transformative adaptation

For some respondents, “windows of opportunity” play an important role in opening up spaces and opportunities to catalyse more rapid (and in some cases, large scale) action that may not otherwise have been possible. Within the municipal context, a Project Executive (EU, 12/12/2014) commented that:

“You get a window, I reckon it’s about six months...And you can get your way in that six months. Don’t leave it too long...we all know we’ve got to just exploit that opportunity and get things changed”.

For eThekweni Municipality, two mega-events (COP 17 in 2011 and the Fifa™ Soccer World Cup in 2010) provided critical “windows of opportunity” to leverage additional funding, test new projects and use the visibility of the events to maximise the communication value around the outcomes of the local climate adaptation work. These events provided important “windows of opportunity” to significantly advance debate around the adaptation agenda, for example through the Buffelsdraai Landfill Site Community Reforestation Project and other community ecosystem-based adaptation initiatives, that built on the requirements for “carbon-neutral events” by delivering both climate mitigation and adaptation benefits. As a Consultant (FW, 06/11/2014), who assisted the Municipality in coordinating the event greening programmes for these events, commented:

“So the World Cup and then obviously the COP greening, essentially gave Durban a turbo boost in its adaptation thinking, theorising, testing out on the ground which otherwise would never have happened... We started from a platform...where climate change was a really peripheral issue...the fact that we used climate mitigation objectives that were coming from a global perspective to get the ball rolling was a key thing, and then as soon as that ball got rolling, as soon as we had funded it, it became evident that the basket of benefits that was coming out, or that potentially could come out from these projects was much (broader), and climate adaptation in fact was where the real benefits lay ...”.

This emphasises the importance of being able to recognise a potential “window of opportunity” and then to maximise its catalytic benefits to advance transformation and transformative adaptation.

7.2.4 Analysis and interpretation

In many ways, the catalysts that were identified by the interview respondents in relation to the climate adaptation case study echo the ideas that are found in the transformation and transformative adaptation literatures regarding the role of leaders, external events as triggers for action, and “windows of opportunity”, as critical catalysts for transformation. However, there are some distinctions that can be made and these relate to: (a) the different levels of emphasis and nuance that emerge around each of these catalytic factors; and (b) the linear way in which the role of catalysts within the change process is represented in the literature.

The differences in emphasis are seen mostly in relation to the way in which the literature describes the role of leaders as catalysts. In the literature, most of the focus is on the role of the initial leaders, with less emphasis given to the “followers” and additional champions that work across multiple

sectors to build a network of support and momentum that can drive the agenda into various parts of the institution in different ways (e.g. Roberts et al., 2016). The role of this broad suite of champions seems to be particularly important in cases like eThekweni Municipality, where policy changes alone are insufficient to drive real change and where individuals cannot drive institutional transformation single-handedly. There is also little documented in the transformation literature regarding the potential challenges associated with leaders. There seems to be an inherent assumption that strong leadership is an important catalyst (e.g. Folke et al., 2005; Olsson et al., 2006) but less critical commentary on the nature of that leadership, whether the agenda that is being driven by that leader is the most appropriate, and whether the leader is able to recognise the need to build others around them who can ensure that transformation is sustained. There is also little detail provided in the literature describing the common characteristics of leaders and champions. The perspectives of the respondents in the current thesis suggest that it is very specific people who, because of certain characteristics, are more likely to be predisposed to picking up new ideas and working outside their normal mandate to explore and integrate these within the broader system in which they work.

Within the context of eThekweni Municipality, the particular emphasis that was placed on the role of champions as a key catalyst for change suggests that, in contexts such as local government, where the policy and strategic environment takes time and energy to change, the role of individuals operating at a range of levels within the institutional environment plays a critical role in initiating the changes that could ultimately lead to broader policy shifts and transformation. However, the eThekweni Municipality case study also highlights that this type of “champion action” may have a limit in terms of its institutional impact and that, once that ceiling is reached, strong and embedded support in the policy and political environments is critical if the agenda is to be further advanced and then sustained. This is particularly true if these champions move on into other areas of work, without the champion base having been sufficiently broadened. In the absence of broad policy and political support, there is therefore an ongoing need to build new champions across different levels. This also raises questions around how to proactively identify and support new champions on an ongoing basis. An important message for leaders within the transformation space is to ensure that they build sufficient support around them, to ensure input and critique of their own ideas, and to ensure that transformation can be sustained.

A second area of distinction, over and above the differences in emphasis that are related to key catalysts, relates to the relatively linear way in which the role of some catalysts is described in the transformation literature. As an example, the suggestion that “leadership” is a key catalyst (e.g. Folke et al., 2005; Olsson et al., 2006), oversimplifies the fact that there is seldom one leader or champion who catalyses transformation. Rather, the case study suggests that it is a network of actors in different positions at different times, who play specific roles in leading and championing transformation in a particular way within their sphere of influence, and that it is this collective action that ultimately has the potential to generate the momentum to catalyse and advance transformation. Similarly there is seldom one “window of opportunity”, as described by Olsson et al (2006). More often there are multiple potential opportunities and the challenge lies in how to recognise these and adjudicate which opportunities have the greatest potential for impact. The case study also suggests that a number of these catalysts may be necessary to spark transformation and that, in isolation, these are not necessarily sufficient. In the case of COP 17 for example, it was a combination of the “window of opportunity” provided by the event to raise the profile of adaptation, the foresight of leaders and

champions who recognised the potential to use a mitigation objective (in relation to delivering a carbon-neutral event) to advance an adaptation objective, and the role of critical political champions such as the mayor, which collectively helped to catalyse a greater focus on climate adaptation in eThekweni Municipality. The ability to recognise and observe the evolving elements of the transformation journey, and to use leaders, champions and “windows of opportunity” in the most strategic way to leverage additional change, is therefore critical for transformation. An important question, in light of the need for the current climate adaptation work to move into a more transformative space, relates to identifying new champions to continue the work that has been started, and to explore where the next “window of opportunity” might lie.

7.3 Factors that facilitate and sustain transformative adaptation

Although champions, crises and “windows of opportunity” all play a critical role in catalysing transformation and transformative adaptation at the outset, a number of other factors are also important in helping to facilitate such change and ensure that this is sustained. Table 7.3 summarises the factors identified by respondents during their interviews as having played a critical role in helping to facilitate and sustain the changes that have been seen in relation to the integration of climate change adaptation into municipal planning and implementation in eThekweni Municipality. The table indicates the storylines and storyline components that emerged and the number of respondents who spoke about each of these during their interviews. Table 7.4 provides an indication of the percentage of respondents in each respondent category who discussed each of the storylines and storyline components. This distribution of responses, and the main ideas emerging for each of the storylines and storyline components is then described in more detail.

Table 7.3: Number of respondents that discussed each of the storylines and storyline components under the theme: Factors that facilitate and sustain transformative adaptation

THEME: Factors that facilitate and sustain transformative adaptation	Storyline	Storyline component	Number of respondents
	Storyline 1: Finding ways to work differently to facilitate the development of new ideas and innovation, can help drive transformative adaptation		11
		Storyline component 1.1: Shadow systems of governance facilitate networking and innovation	5
		Storyline component 1.2: Spaces need to be created for exploratory work and innovation	5
		Storyline component 1.3: Facilitating collaborative work, can help to drive innovation and transformative adaptation	5
	Storyline 2: An enabling institutional and policy environment can facilitate and guide transformative adaptation		11
		Storyline component 2.1: Leadership and political support helps facilitate transformative adaptation.	5
		Storyline component 2.2: The climate adaptation agenda needs to be integrated into relevant policies and legislation across multiple levels	8
	Storyline 3: Transformative adaptation is facilitated through building a landscape of actors and actions that build momentum to drive a system in a new direction		9
		Storyline component 3.1: Building a positive reputation and profile for adaptation in the global field builds momentum and support for further change	5
	Storyline component 3.2: Investing in a variety of actors within the change landscape is critical to drive transformative adaptation	1	
	Storyline component 3.3: Linking agendas and initiatives strategically creates leverage and opportunities for further change	4	
Storyline 4: Framing and communicating the change agenda in a way that resonates with the priorities of others, helps to build support for transformative adaptation		6	
Storyline 5: Adequate human and financial resources are needed to facilitate transformative adaptation		3	
Storyline 6: Thought leaders introduce new ideas into change processes		2	

Table 7.4: Percentage (%) of respondents in each interview category that discussed each of the storylines and storyline components under the theme: Factors that facilitate and sustain transformative adaptation.

	Storyline	Storyline component	% of respondents in each group				
			<i>Respondent category</i>				
			1	2	3	4	5
THEME: Factors that facilitate and sustain transformative adaptation	Storyline 1: Finding ways to work differently to facilitate the development of new ideas and innovation, can help drive transformative adaptation		☺☺	☺☺	☹☹	☹	☹
		Storyline component 1.1: Shadow systems of governance facilitate networking and innovation	☺☺	☺	☹		
		Storyline component 1.2: Spaces need to be created for exploratory work and innovation		☺	☹	☹	☹
		Storyline component 1.3: Facilitating collaborative work, can help to drive innovation and transformative adaptation	☺☺		☹	☹	
	Storyline 2: An enabling institutional and policy environment can facilitate and guide transformative adaptation		☺☺	☺	☹☹☹	☹☹	
		Storyline component 2.1: Leadership and political support helps facilitate transformative adaptation.	☺☺	☺	☹	☹	
		Storyline component 2.2: The climate adaptation agenda needs to be integrated into relevant policies and legislation across multiple levels		☺	☹	☹☹	
	Storyline 3: Transformative adaptation is facilitated through building a landscape of actors and actions that build momentum to drive a system in a new direction		☺☺☺	☺	☹☹		☹
		Storyline component 3.1: Building a positive reputation and profile for adaptation in the global field builds momentum and support for further change	☺☺	☺	☹		
		Storyline component 3.2: Investing in a variety of actors within the change landscape is critical to drive transformative adaptation	☹				
		Storyline component 3.3: Linking agendas and initiatives strategically creates leverage and opportunities for further change	☹	☺	☹		☹
	Storyline 4: Framing and communicating the change agenda in a way that resonates with the priorities of others, helps to build support for transformative adaptation		☹	☺	☹	☹	
	Storyline 5: Adequate human and financial resources are needed to facilitate transformative adaptation		☹		☹	☹	
	Storyline 6: Thought leaders introduce new ideas to facilitate transformative adaptation		☹				☹

KEY

Respondent categories

1. Climate adaptation leaders and coordinators
2. Climate adaptation implementers
3. Municipal officials not directly involved in climate adaptation work
4. Municipal officials involved in strategic planning
5. Stakeholders external to the Municipality

Frequency of response

- ☹: 0-33%
 ☺☺: 34-67%:
 ☺☺☺: 68-100%:

7.3.1 Storyline 1: Finding ways to work differently to facilitate the development of new ideas and innovation can help drive transformative adaptation

Significant emphasis (see Table 7.3) was placed on the need to “work differently” in order to be able to facilitate transformative adaptation in the municipal context, where the bureaucratic nature of existing systems can be restrictive in terms of generating new ideas, working across sectors and influencing policy change. In such a context, respondents highlighted the need to find ways to work outside of traditional structures in order to create the spaces and opportunities that are needed for innovation and transformation. This was acknowledged mostly by the first three respondent groups, all of whom are municipal officials who understand the way in which the municipal institution operates, and how to work effectively and creatively within this system.

Storyline component 1.1: “Shadow systems” of governance facilitate networking and innovation

For many, the role of “shadow systems” of governance (informal networks operating within formal governance structures) is critical in building the networks that help facilitate linkages, sharing of ideas and innovation outside of the formal structures for interaction. External sources of funding for climate adaptation work can, for example, help to facilitate “shadow systems” of governance, given that these opportunities generally come with more flexibility than is created within the municipal financial and project reporting processes. Such systems were perceived by respondents to be more “adaptable to strategic changes because you are able to pick up an idea and run with it” outside of official structures (Former researcher: EDU, 10/09/2014). This type of informal idea testing and relationship-building has been particularly important in the climate adaptation work in helping to build connections and partnerships across municipal departments where there may not have been an official mandate to do so. It has also helped to ensure that multiple perspectives are brought into discussions:

“...The enabler of the municipal adaptation work is partnerships within the Municipality... network partnerships in the Municipality that might not be institutionally or formally governed, like you know, you will talk to this person, and you will talk to that person but it’s...like relationships developed across the municipal functions and often I feel that those relationships are as, if not more important than being directly mandated to collaborate with the department” (Former Climate Protection Scientist: 27/09/2014).

Importantly, the emphasis within such arrangements is on issues of people and governance within that system, rather than on the technical concepts themselves. This can be inherently uncomfortable, particularly for those for whom linear technical solutions are far more familiar as mechanisms to effect change. As a former Deputy Head (EPCPD, 25/05/2015) commented:

“I’ve realised that I’ve got to take that understanding (of how to use informal networks to leverage what needs to be done) and use it at a societal level ... that has to play out at the bigger level because that’s what makes society work together...it’s who you trust, it’s who you know, it’s how you transfer information in those networks and so that for me has been quite disturbing...realising that that idea of networking and building a people system is probably where we are going to get most bang for our buck”.

In order to maximise the benefits of these governance systems and networks, it is therefore important for sufficient attention to be given to issues of governance, even within technical areas of work, and to be able to identify “who is able to facilitate the change or not and who do we work with to make the change happen” (Manager: Restoration Ecology Branch: EPCPD, 31/03/2015). However, building these networks comes with challenges in terms of negotiating power and personalities and making decisions around who is included in such processes and who is not (Leck and Roberts, 2015). Such relationships also require a significant investment of time and energy. As the former Deputy Head of EPCPD (25/05/2015) commented:

“How do we build these networks where we are talking, where we are all around the table sharing the project and it’s so hard...we’ve lost the nuancing simply because we’re too big, we’re too stressed, everyone is doing too many other things”.

This suggests that within the structured and regulated context of local government, where facilitating cross-sectoral interaction can be challenging, “shadow systems” of governance play a critical role in connecting people and ideas in ways that can facilitate innovation. Such mechanisms can play an important part in helping to embed new ideas within institutional structures by providing a “back door through which conceptual change can be introduced in a way that is not initially disruptive and provides a safe space for ideas to mature before being mainstreamed” (Leck and Roberts, 2015, p. 62).

Storyline component 1.2: Spaces need to be created for exploratory work and innovation

In the challenging context of local government, where there are multiple urgent development priorities to address, it can be difficult to step away from the day to day crises to consider longer-term strategic planning issues and alternative ways of operating, for example in relation to climate adaptation. As the Municipality’s Chief Strategy Officer (OCM, 23/04/2015) commented:

“Making space... within all structures for people to wrestle with some of these things that are maybe not as urgent as the things that are causing us to fight fires today but they’re actually critically urgent for tomorrow...”

A number of respondents raised concerns that there is often little incentive for risk taking and innovation in the Municipality and that, unless managers and relevant leadership provide the support that is needed for these ideas to emerge, change will not be possible. As the Deputy Head: DMU (26/09/2014) commented:

“I have too often seen very well thought out alternatives or solutions to challenges being rejected because it came from a level that’s not supposed to think...The only way you’re going to develop future managers is by allowing those thought processes to come”.

A key challenge in this regard is to give individuals the space to innovate without interference (Former CEO: DCCI, 05/05/2015) and to find, as Aylett (2013) suggests, the right balance between centralised leadership and decentralised innovation.

Storyline component 1.3: Facilitating collaborative work can help to drive innovation and change

Meadows (2008, p. 6) argues that, “at a time when the world is more messy, more crowded, more interconnected, more interdependent, and more rapidly changing than ever before, the more ways of seeing, the better”. Blackwell et al (2009) emphasise this, highlighting that current problems need more than one kind of knowledge to solve them. Connecting individuals in new ways can also play an important role in challenging beliefs and assumptions about how the world works (O’Brien, 2012), thereby opening up opportunities for collaboration. In a field such as climate change adaptation, where there is significant uncertainty about the path to follow and few reference points to guide decision-making, this suggests that building new partnerships and networks that can facilitate access to new knowledge is critical (Dowd et al., 2013). In eThekweni Municipality, examples of this have been seen in the collaborative and cross-disciplinary nature of projects such as the Umhlangane Catchment Climate Adaptation Programme and the uMngeni Ecological Infrastructure Partnership. However, this kind of collective thinking in the climate change arena is rare, with discussions often taking the “form of fragmented debates, where few are interested in hearing other perspectives” (O’Brien and Selboe, 2015b, p. 320). Reflecting these ideas, respondents pointed to the need for greater collaboration and “bridge-building” across disciplines in order to develop a more comprehensive and insightful understanding of the climate challenges being faced, and to facilitate learning and knowledge sharing that can challenge strongly-held positions and create opportunities for innovation. As the former Deputy Head: EPCPD (25/05/2015) commented:

“That’s the interesting thing about a knowledge network is that it allows other eyes to see the same facts which means you always get a different response... In these different responses you get innovations...You know we still need many eyes on the problem”.

A specific example related to the perceived need to strengthen bridges between science and policy in order to ensure that scientific solutions do not ignore the essentially social environment into which those ideas need to translate, and equally that the policy environment takes cognisance of the value that science can add in informing policy decisions. A previous official of the Municipality argued that:

“Where I want to fit is trying to bridge this gap between science and policy; this gap between academia and practitioners, because I think it’s within that that the changes are really going to happen... unless we, as scientists, better understand the way humans think and organisations function... (we won’t be able to solve the problem)” (Former Climate Protection Scientist: EPCPD, 27/09/2014).

This idea is supported by Patel (2014, p. 2) who argues that “the challenge of achieving urban sustainability rests on both research and policy innovation and on a much tighter interaction within and between the two”. However, this kind of collaborative and trans-disciplinary work is challenging (Ziervogel et al., 2016) and can run the risk of assuming that simply combining a series of professional skills will result in innovation (Blackwell et al., 2009). Facilitating meaningful collaboration also requires specific skills, in order to mediate across different conceptual positions to facilitate new ideas and innovation. A former municipal researcher (EDU, 10/09/2014) referred to the individuals who have these skills as “strategic intermediaries” and stated that:

“People who play this...middle man role when it comes to policy development, they...provide strategic input and they are able to mediate between parties in an effective way...and I think that's something else about information sharing and knowledge management, is (the importance of) that person ... who's trying, who is essentially managing multidisciplinary teams around the complex problem”.

An important question however, is whether individuals are being appropriately equipped with the “hybrid” skills that are needed to simultaneously hold a depth of knowledge and be able to apply this widely to address the increasingly complex and multi-faceted challenges facing the city (Former Deputy Head: EPCPD, 25/05/2015). If collaboration and trans-disciplinary work are seen to be important in facilitating and sustaining transformative adaptation, then further consideration needs to be given to how these skills can be developed and enhanced, and whether existing institutional structures in local government either facilitate or undermine collaborative work of this kind.

7.3.2 Storyline 2: An enabling institutional and policy environment can facilitate and guide transformative adaptation

Many respondents (see Table 7.3) commented on the importance of an enabling policy environment that can ultimately support and integrate the ideas that emerge from the more innovative work spaces into broader systems and processes to ensure their sustainability. As important as “shadow systems” of governance, networking and collaboration might be in helping to generate new ideas and innovation, respondents also acknowledged the importance of a receptive policy environment in providing a space for these ideas to be integrated into the political functioning of the system. In the municipal context for example, securing leadership and political support and ensuring that new agendas such as climate change adaptation are incorporated into relevant policy, has the potential to advance the change agenda further than if this were to be done in isolation from this broader policy environment. This response was understandably more common in the fourth respondent category, who are involved in strategic processes and leadership in the city and who see the value of policy level integration in advancing a change agenda.

Storyline component 2.1: Leadership and political support helps facilitate transformative adaptation.

Political buy-in was seen by respondents to be critical in ensuring the mainstreaming of new agendas such as climate change adaptation. The Chief Strategy Officer (23/04/2015) stated that:

“You’ve almost got to find some traction within political structures, because if political structures and politicians can’t speak knowledgeably about these sorts of issues, then when the administration tries to deal with it...it’s often seen as this is just some bourgeoisie upper class agenda” .

The level of political support that an agenda enjoys in turn affects the seriousness with which others regard this. In the case of eThekweni Municipality for example, one respondent felt that “the current mayor (former Mayor Cllr Nxumalo) is much more climate change adaptation friendly than the previous Mayor (former Mayor Cllr Obed Mlaba) was, so political interest makes a big difference in informing how the departments are motivated to follow up...” (Senior Planner, SSPB, 22/04/2015). Building and maintaining these institutional connections across multiple levels is important in order

to understand the changing municipal and political landscape and to ensure that agendas like climate adaptation remain relevant within that space:

“But we’ve always had a route back into City Hall ...you know there were people above us who allowed us to move that message on and gave us enough support...we have always, even under the difficult days remained connected, so we’ve been able to feed back. And so that institutional stuff is really important and so it reflects back on governance as an important issue” (Former Deputy Head: EPCPD, 25/05/2016).

These responses suggest that politics plays a critical role in either facilitating or undermining transformation, and that the dynamics in this space need to be proactively monitored in order to ensure that new agendas are framed in a way that resonates with political agendas. This has been the case in eThekweni Municipality, where the climate adaptation work has often been framed in relation to political priorities such as the socio-economic wellbeing of citizens, and where strong political leaders have helped to drive the climate adaptation agenda both locally and internationally. The absence of a strong political leader in the current climate adaptation work is of concern and efforts are currently underway to build the next political leader in this space.

Storyline component 2.2: The climate adaptation agenda needs to be integrated into relevant policies and legislation across multiple levels

In a similar way, incorporating new agendas such as climate adaptation into relevant policies and legislation has been critical, with one respondent commenting that “if you want to do something on a massive scale you have to go and change legislation for example, or policy to have a dramatic effect” (Senior Manager: ETA, 12/06/2015). In the climate adaptation space for example, the incorporation of climate change into the IDP and the adoption of the Durban Climate Change Strategy have been important achievements. These have been supported by sectoral level policy development, such as floodline determinations and sea level rise forecasting. These responses suggest that, as much as factors such as champions, “shadow systems” of governance, networks and collaborative approaches might be important in driving innovation and change, there is a need to “interact simultaneously with multiple layered entry points, across spheres and scales” in order to effect transformation (Ziervogel et al., 2016, p. 10), and that ensuring institutional “lock-ins” in the context of a local government that is driven by regulation and policy, is critical to achieve transformation.

7.3.3 Storyline 3: Transformative adaptation is facilitated through building a landscape of actors and actions that build momentum to drive a system in a new direction

An important observation that emerged in the interviews was that transformative adaptation is not necessarily a linear process effected by individual actions or actors but rather that in some contexts, it is important to understand the “landscape of change” that is required across these to produce a particular outcome. This cannot always be planned, and more often grows through a “complex web of things that one does often quite organically...through this evolution process, right people, right time, a little bit of money, right kind of a big thinker at the right moment, keeping enough continuity...” (Former Deputy Head: EPCPD, 25/05/2015). This idea is echoed by O’Brien and Selboe (2015a, p. 6) who highlight that “the solutions to adaptive challenges do not follow clear, linear pathways, nor are they amenable to expertise-based management approaches”. This idea was most prominent in the

group of respondents leading the climate adaptation work in eThekweni Municipality, who have observed the evolving elements of this landscape in driving the climate adaptation agenda.

Storyline component 3.1: Building a positive reputation and profile for adaptation in the global field builds momentum and support for further change

As indicated in Chapter 6, eThekweni Municipality has made significant investments in building a positive reputation and profile for climate change adaptation at the international level in order to provide momentum and support for the integration of climate adaptation into local planning and implementation.

“The reputation that Durban has got as a climate change leader and certainly a climate change adaptation leader on an international level means it’s admired elsewhere for what it does, so the chances of the (local) adaptation work being dropped is less because there’s now this sort of international expectation...” (Former Climate Protection Scientist: EPCPD, 27/09/2014).

As another respondent suggested, eThekweni Municipality’s involvement in driving this agenda internationally and in positioning the former mayor (Cllr James Nxumalo) as a key climate adaptation champion, has also helped to facilitate greater attention and resources being considered for this work:

“Climate change adaptation, especially a few years ago, that wouldn’t have been your core mandate and so...raising the profile of the issue to the mayoral level and international level through the Durban Adaptation Charter...has made it not a side issue, so then you can put resources behind it and...do the great work” (Former researcher: EDU, 10/09/2014).

This thesis argues that eThekweni Municipality’s investment in the international climate change arena has been critical in facilitating access to new networks, generating funding and focusing global attention on the climate adaptation work of eThekweni Municipality. This has attracted a range of interesting actors to this space who have brought with them research opportunities, new ideas and critical thought. These elements have all become an important part of the evolving landscape of change in eThekweni Municipality. Similar ideas are discussed in the next storyline component.

Storyline component 3.2: Investing in a variety of actors within the change landscape is critical to driving transformative adaptation

It is also important to consider that it is not only the range of *actions* implemented that will help determine whether transformative adaptation takes place, but also the actors involved, how they are positioned within the change landscape and the role they play in helping to advance the agenda in unique ways. An initial leader for example, may play a critical role in introducing new ideas, establishing the foundational structures that are needed for transformative action and opening up opportunities for that agenda to advance. However, if the transformation agenda is to be influential, the actors involved need to broaden significantly. In the eThekweni Municipality case study specific political champions have played an important role in raising the profile of the adaptation agenda and in influencing others to lend support to the work. In addition, a range of academics, partner organisations and individuals (many of them outside the Municipality itself) have helped to advance

the climate adaptation work through: facilitating access to broader networks and funding opportunities; providing opportunities for implementation partnerships; and contributing academic input that has helped ensure appropriate documentation of eThekweni Municipality's climate adaptation work in the peer reviewed literature. This combination of actors has been critical in lending credibility and momentum to the work, providing necessary critique and giving access to appropriate resources to facilitate continued implementation and advances in the local climate adaptation space. The former Deputy Head of EPCPD (25/05/2015) summarised this, saying:

“There’s the internal inner sanctum...of early adopters...they tend to draw in others by their influence...then you’ve got our leadership support (who) really are important in that particular space...in allowing us action. And then the layer of outside players has been vital to our ecosystem as well ... in a way that’s allowed our voice to echo in other places, and because that voice echoes in other places...the work gets known and it opens up other opportunities, you know, so they’ve been absolutely critical”.

The evolving landscape has also required actors with different skills. The initial scientific foundation of the work for example, has evolved over time to include a stronger focus on social-ecological and governance elements which has required a broadening of the actors involved, to include individuals who have skills in these arenas. This requires different skills from what may have been anticipated at the outset of the work. This suggests that, in order to facilitate and sustain transformation and transformative adaptation, careful consideration must be given to the range of actors needed across different levels and scales, and their role at points in the process. These ideas are echoed by Roberts (2016, p. 1) who emphasises that transformative action will “depend on champions at all levels, working across institutional boundaries to sustain action and increase momentum over time”.

Storyline component 3.3: Linking agendas and initiatives strategically creates leverage and opportunities for further change

It is also clear, however, that these activities and actors do not connect in neat and linear ways to effect transformation and that part of navigating any landscape of change involves “taking advantage of opportunities that arise and creatively weaving this emerging (climate adaptation) agenda into existing goals, plans, and programs” (Carmin et al., 2012). This is important in order to leverage additional opportunities and give strategic direction to the often organic process of transformation. The former Deputy Head of EPCPD (25/05/2015) commented on the variety of initiatives that are underway in the climate adaptation space in eThekweni Municipality, saying:

“We’ve got tentacles everywhere – it’s so messy and it’s so clumsy...but the thing is we keep the momentum and that for me is the important thing and...it does give you these unique moments of insight...it’s those first steps on the rope and you can’t even see the other side of the canyon...”

In this space, the ability to link actors and initiatives in strategic ways and with a consistent narrative is critical. One respondent highlighted that it has largely been the former Deputy Head: EPCPD “who has held the threads and drawn the threads of a number of different workstreams together to keep a common thread of conversation and ideas going around climate adaptation” (Consultant: FW,

06/11/2014). This has played an important role in giving strategic direction to work that could otherwise have remained as separate pieces in the evolving change landscape.

7.3.4 Storyline 4: Framing and communicating the change agenda in a way that resonates with the priorities of others, helps to build support for transformative adaptation

Given the multiple challenges facing eThekweni Municipality, it is critical that any new agenda is framed in a way that resonates with local priorities. In the eThekweni Municipality context, where poverty and unemployment are high, key motivators for some of the climate adaptation work relate to the job creation opportunities and the potential for adaptation initiatives to reduce vulnerability to these likely impacts. Framing and articulating these links is critical in building support for the work and in securing funding for implementation. As a municipal planner stated:

“So for example things like rehabilitation of our rivers and making our estuaries and our wetlands more able to carry increased water, it’s really very low (priority) unless that was serving a particular role for the people, that it has a very definable role for the people in the surrounding communities...” (Senior Planner: SSPB, 22/04/2015).

O’Brien and Hochachka (2010, p. 9) reiterate this and indicate that “it is important to be aware of whom one is talking to, and to inquire deeply into what they believe and why, and how they construct meaning” in order to frame the message appropriately. This is particularly important in a context like eThekweni Municipality, where politics can either support or act as a barrier to new ideas.

7.3.5 Storyline 5: Adequate human and financial resources are needed to facilitate transformative adaptation

Although human and financial resourcing was not always specifically mentioned in the interviews, some respondents did acknowledge that the “initial traction of the funding” can provide the impetus for initiating new and exploratory projects that may not otherwise have been possible (Professional Technologist: EWS, 15/09/2014). This is also evident in the fact that the very early beginnings of eThekweni Municipality’s climate work were linked in 2000 with USAID’s funding of the South African pilot of ICLEI’s Cities for Climate Protection campaign, and a number of national and international funding sources have subsequently supplemented the Municipality’s own allocation of funds to the climate adaptation function (Roberts et al, 2016). It was also acknowledged that in emerging and complex fields like climate change adaptation, it is “by and large the skills issue and ...you know, some people are very important, you need the right people” (Chief Strategy Officer: OCM, 23/04/2015) in order to sufficiently advance the work.

However, the relative lack of emphasis given explicitly to this issue is interesting, and suggests that, although funding may be a critical catalyst at the outset, that over time, other actions in the policy arena and at the level of shadow systems of governance for example, become equally important in contexts such as eThekweni Municipality.

7.3.6 Storyline 6: Thought leaders introduce new ideas to facilitate transformative adaptation

Thought leaders who can introduce new ideas and perspectives can help to challenge existing approaches and provide a platform for new steps to be taken in unfamiliar territory. As one respondent commented:

“(He) became kind of a thought leader for us and he spurred ideas in our heads and that was really important. So you need people who can kick the door open but then you must have a universe of people who think interesting things around them so they can keep the door open long enough for those interesting things to go through” (Former Deputy Head: EPCPD, 25/05/2015).

Given that transformation often requires different ways of thinking, the injection of new ideas that can challenge and motivate for alternative approaches, is important.

7.3.7 Analysis and interpretation

In reflecting on the extent to which the ideas under the theme of “facilitating and sustaining transformative adaptation” in the climate adaptation case study reflect those found in the literature, a number of observations are important. There are a number of areas where the ideas emerging from the interviews reflect those found in the literature regarding factors that facilitate transformation and transformative adaptation. Concepts such as “innovation niches” and “shadow systems” of governance for example, are well documented (e.g. O’Brien, 2011; Westley et al., 2011) and support the views of respondents that, in bureaucratic systems, there is a need to find ways of working in the grey institutional spaces where there are greater opportunities to network, be creative and work in less restricted ways. The literature also emphasises that transformation requires change across multiple levels, supporting the ideas in the eThekweni Municipality case study regarding the importance of an enabling institutional and policy environment, where new and innovative ideas can be integrated into relevant policy and planning processes in order to facilitate and guide transformative adaptation. These ideas recognise that, despite the important role played by leaders and champions within rigid institutions, there is still a need for overarching policies that can provide the formal framework within which the work that may have been happening less formally can be mainstreamed. A challenge, however, is how to achieve this effectively across these different levels.

There are two areas where the case study responses reflect different emphases from the ideas in the transformation and transformative adaptation literatures. Firstly, respondents highlighted the need to build a “landscape of change”, suggesting that transformative adaptation is neither linear nor predictable and that a range of initiatives and actors are needed in a number of spaces in order to maximise the chances of transformation being facilitated and sustained. One of the challenges with new processes and ideas is that there is no clear pathway to follow and no clear goal. It is one thing to initiate such a process, but sustaining and navigating it requires an ability to find the balance between “focus and serendipity” (Blackwell et al., 2009): having a vision and sufficient initiatives and supportive actors to advance transformation, whilst at the same time creating space for opportunities to emerge that could alter the direction being followed. Being sufficiently aware and reflective to read

this changing landscape (including the issues of politics and governance that are inherent in it) and to maximise the strategic opportunities that present themselves, requires specific skills. These ideas are highlighted by Wise et al (2014) who suggest that the process of decision-making involved in selecting an adaptation pathway is critical, and that in complex systems, decision-making and responses are not linear. In such cases, contextual factors, complexity and the perspectives of multiple stakeholders need to be considered in adjudicating what the likely outcomes from a particular pathway choice might be. They also reiterate the need for regular reflection on the evolving transformation landscape by emphasising that biophysical changes and changes in social and institutional contexts will mean that the outcomes of responses will also change over time.

What becomes clear in the case study is that part of navigating this landscape involves understanding that a range of catalysts, barriers, actors and implementation activities will interact at different points to advance or undermine transformative adaptation, and that the relative importance of these factors may change over time. For example, at the outset of eThekweni Municipality's climate adaptation journey, given the bureaucratic nature of the institution and the absence of dedicated resources for climate adaptation, the catalytic role of an initial leader who could drive the agenda through position and influence, was critical. However, over time, factors such as institutionalisation of the agenda (e.g. through inclusion in the IDP and the creation of a climate adaptation branch in the Municipality), building the champion base and spheres of influence, and ensuring political support for the work has become increasingly important in sustaining and advancing the climate adaptation work. Similarly, the "sequencing" of a range of implementation activities has also been important. For example, focusing in the early stages on pilot implementation activities and projects that could demonstrate success, was important in gaining attention and support. In subsequent stages, the focus has shifted to the need to scale up the climate adaptation work, integrate it more broadly in the Municipality and support it with appropriate research that can help build the necessary evidence base to support future interventions. The "landscape of change" in the case study is therefore never static and there is a constant need to critically assess what is needed to advance transformative adaptation at each point.

Within this landscape, there is also a need to adjudicate potential trade-offs in decision-making. The decision to invest in driving the climate adaptation agenda in the international arena, for example, was a deliberate decision in eThekweni Municipality in terms of how resources would be allocated. However it is likely that prioritisation of work in this area, came at the expense of being able to drive community-based work at the local level. The decision to lead the Municipality's climate adaptation work with a predominant focus on ecosystem-based adaptation (largely because of the location of the climate adaptation function in a department with a core biodiversity mandate), is another example of a trade-off that has been made. Although there have been advantages to this, for example in the ability to build off the strong biodiversity work already being undertaken by the department and to maximise benefits to the environment and the poor, this focus may have strengthened the perception that climate change is an "environmental" issue and has reduced opportunities to engage a broader range of municipal departments in the local adaptation work.

Respondents also placed emphasis on the need to facilitate collaborative work within and across disciplines. These ideas are not new to the literature, but within the context of transformation, the emphasis often rests on the need for "networks" and less attention is given to the processes of collaboration that follow from this. The emphasis that respondents placed specifically on the

importance of collaborative work reflects a growing acknowledgement that, in an increasingly complex and connected world, “the right knowledge to solve a problem is in a different place to the problem itself” (Blackwell et al., 2009, p. 3) and that actively finding ways to facilitate collaboration in a variety of contexts will be important in bringing different skills together to find new solutions to these challenges. The case study responses also suggest that collaborative and trans-disciplinary work requires specific skills in those individuals who are required to facilitate such processes. Important questions therefore relate to the extent to which institutions such as local government are able to facilitate such processes and whether learning institutions and organisations are training for, and developing, the relevant cross-boundary skills that are needed to facilitate these interactions.

These observations also raise questions around what opportunities might exist in the next phase of eThekweni Municipality’s climate adaptation work to: facilitate innovation and collaboration; advance climate adaptation policy frameworks and associated practice; and navigate more proactively through the “landscape of change” that has already been established, in order to advance transformative adaptation.

7.4 The role of knowledge sharing and social learning in facilitating transformative adaptation

In order to better understand the role of knowledge sharing and social learning in driving transformative adaptation and shifting individual perspectives, respondents were asked a specific question in relation to this. For this reason, these results have been presented separately from the sections focused on catalysing and facilitating transformative adaptation. Table 7.5 summarises the storylines and storyline components that emerged and the number of respondents who spoke about each of these during their interviews. Table 7.6 provides an indication of the percentage of respondents in each respondent category who discussed each storyline and storyline component.

Table 7.5: A summary of the storylines that emerged from respondents when describing the role of knowledge sharing and social learning in facilitating transformative adaptation

THEME: The role of knowledge and social learning in facilitating transformative adaptation	Storyline	Storyline component	Number of respondents
	Storyline 1: Sharing knowledge and experience can change mindsets and spark innovation		12
		Storyline component 1.1: Exposure to expert information at the national and international level has significant influence in lending legitimacy to a new agenda	5
		Storyline component 1.2: Involvement in, and exposure to, climate adaptation projects and dialogue encourages different thinking and motivates action	8
	Storyline 2: Knowledge needs to be shared in a way that people can identify with and own it, rather than be threatened by it		12
		Storyline component 2.1: New knowledge needs to be made relevant to the work that people are doing	10
		Storyline component 2.2: Knowledge sharing needs to be done in a way that builds ownership of the change agenda	6

Table 7.6: Percentage (%) of respondents in each respondent category that discussed each of the storylines and storyline components under the theme: The role of knowledge sharing and social learning in facilitating transformative adaptation.

THEME: The role of knowledge sharing and social learning in facilitating transformative adaptation	Storyline	Storyline component	% of respondents in each category				
	<i>Respondent category</i>		1	2	3	4	5
	Storyline 1: Sharing knowledge and experience can change mind-sets and spark innovation		☺☺	☺☺	☹☹☹	☹	☹
		Storyline component 1.1: Exposure to expert information at the national and international level has significant influence in lending legitimacy to a new agenda	☹	☺	☹	☹	
		Storyline component 1.2: Involvement in, and exposure to, climate adaptation projects and dialogue encourages different thinking and motivates action	☺☺	☺	☹☹		☹
	Storyline 2: Knowledge needs to be shared in a way that people can identify with and own it, rather than be threatened by it		☺☺☺	☺	☹☹	☹☹	☹
		Storyline component 2.1: New knowledge needs to be made relevant to the work that people are doing	☺☺	☺	☹☹	☹☹	☹
		Storyline component 2.2: Knowledge sharing needs to be done in a way that builds ownership of the change agenda	☺☺☺		☹	☹	

KEY

Respondent categories

1. Climate adaptation leaders and coordinators
2. Climate adaptation implementers
3. Municipal officials not directly involved in climate adaptation work
4. Municipal officials involved in strategic planning
5. Stakeholders external to the Municipality

Frequency of response

- ☹: 0-33%
 ☺☺: 34-67%:
 ☺☺☺: 68-100%:

All respondents who answered this question agreed that knowledge sharing and social learning play a critical role in helping to advance transformative adaptation because of the way in which such processes help to change mind-sets and spark innovation. Respondents placed emphasis on the role of “expert” information and direct involvement in climate adaptation projects as interventions that were most effective in facilitating the sharing of knowledge and experience but also emphasised the need to share information in a way that allows people to identify with and take ownership of it.

7.4.1 Storyline 1: Sharing knowledge and experience can change mind-sets and spark innovation

Knowledge was seen to be an important part of laying the foundation for lasting change, with one respondent commenting that:

“Isn’t the knowledge a bit like reinforcing...when you lay the concrete and unless you’ve got reinforced steel rods, the concrete never sets...if you are going to build strong foundations, you know this reaching out to people, the accommodating, I think all of that you could sort of lay concrete pillars that crumble, to me the knowledge is the reinforced steel...so people will get cross with each other, people will come and go and so on, but the knowledge remains the thread that links” (Former Deputy Head: EPCPD, 25/05/2015).

The ways in which knowledge is shared were described by respondents in a number of storyline components.

Storyline component 1.1: Exposure to expert information at the national and international level has significant influence in lending legitimacy to a new agenda

Respondents acknowledged that when innovation and change are required, sharing of knowledge is critical and that exposure to expert information is important in lending legitimacy to new agendas. One respondent (Senior Manager: CPU, 23/04/2015) cited the involvement of eThekweni Municipality’s former mayor (Cllr James Nxumalo) in chairing a number of global committees as important in enhancing the mayor’s understanding of climate change issues and promoting him as a climate change champion. For others, involvement in international conferences and engaging in related debates played a critical role in shifting their ideas about climate change. For one respondent, “...that international (Resilient Cities) conference changed it all for me, and I came back realising if we’re going to work on a global arena, you’d better learn to know the subject, you know” (Deputy Head: DMU, 26/09/2014). Another commented:

“I enjoy sitting and listening to someone like Roland Schulze because he’s a smart man, you know, and asking him questions and testing things, and trying to hear his thought processes of where it’s come from. All those sorts of exposures add to helping you make decisions” (Senior Manager: CSCM, 11/09/2014).

These various forms of exposure and the opportunity to engage with peers and experts around specific issues, plays an important role in providing the context within which individuals can challenge their own ideas and perceptions and make decisions regarding strategic issues such as climate change adaptation.

Storyline component 1.2: Involvement in, and exposure to, climate adaptation projects and dialogue encourages different thinking and motivates action

Practical projects also play an important role in providing opportunities to demonstrate how difficult concepts such as climate change adaptation can be translated into implementation, and in creating spaces for people to be directly involved. As one respondent commented:

“I was just purely operational and climate change was something that will happen, you know, but it was something that didn’t impact directly in my sphere of work... but now being involved in the project has personally affected the way I think about it” (Professional Technologist: EWS, 15/09/2014).

This form of “demonstrating is such a powerful form of knowledge sharing because people want to experience things, and they want to see things” (CEO: WCT, 08/05/2015) in order to understand issues and position themselves in relation to them.

7.4.2 Storyline 2: Knowledge needs to be shared in a way that people can identify with and own it, rather than be threatened by it

Respondents highlighted the importance of knowledge being shared in a way that people can relate to it and be empowered by it, rather than being undermined (see Table 7.5).

Storyline component 2.1: New knowledge needs to be made relevant to the work that people are doing

One respondent summarised this, saying: “It (climate change) is overwhelming and so we kind of tend to avoid it, you know, and I understand that but we have to make ways of helping people to discuss it in a way that links in with their own lives” (Convenor: IRC, 15/05/2015). A critical factor in this regard is being able to understand the perspectives of the target audience for knowledge sharing so that new knowledge can be shaped and communicated in relevant ways. In eThekweni Municipality, spending time with critical departments who would need to be involved in the implementation of the climate change adaptation work was important in helping to deepen understanding around these sectoral perspectives and their links to climate adaptation. As a former municipal Climate Protection Scientist (EPCPD, 27/09/2014) emphasised:

“...so it actually required me going and trying to spend as much time as I possibly could in these different sectors...so that when we’re speaking about how adaptation could be incorporated into what they do.... your knowledge has got to be based not just in your understanding of climate change adaptation, but based in who you are speaking to”.

In other cases, respected peers played a critical role in bearing messages that would otherwise not have gained traction within a particular sector. According to a senior official “Engineers are generally suspicious of every other professional... so you have to have a mole basically in that sector that understands the environmental issues, that can explain to their colleagues the benefits...” (Project Executive: EU, 12/12/2014). Not only does new knowledge need to be professionally relevant, but it also needs to be context relevant, as outlined in storyline 4 under “Facilitating transformative adaptation”. This suggests that, when introducing new ideas, careful thought must be given to how communication happens and to whom, in order to maximise its potential to garner support.

Storyline component 2.2: Knowledge sharing needs to be done in a way that builds ownership of the change agenda

What is also important to consider is that “knowledge is power” (Former Deputy Head: EPCPD, 25/05/2015) and that it can therefore be used either for good (if knowledge helps to build capacity and generate new ideas) or for bad, if knowledge is used to overwhelm others. The latter can push people away and undermine their ability to take on board new ideas, and this in turn undermines support for new agendas. The Former Head of EWS (03/03/2015) emphasised this point, saying:

“That’s another very difficult thing, how do you bring a new idea to a person and make them think it’s theirs...And not feel that they’re being preached at which is something I had to learn in what I’m doing now...Don’t use knowledge as a power, use it as a learning – as a sort of starter of a conversation and be vulnerable and admit your mistakes and your learnings... admitting that you’ve had failures makes you more real and easier to listen to and engage”.

This approach helps to increase the opportunities for new ideas to be effectively integrated and owned. This is particularly important in contexts where the new ideas are complex, and could have the effect of disempowering individuals, if concepts and potential responses are not understood.

7.4.3 Analysis and interpretation

Respondents echoed much of what is captured in the literature and highlighted the importance of knowledge sharing and social learning in creating opportunities for mind-sets to change and for innovation to emerge. However, they also placed significant emphasis on the *way* in which this knowledge sharing takes place, highlighting for example the importance of external sources of information (such as international conferences, subject experts and professional peers) as being important in validating and lending credibility to the information that is being shared. The importance of this information being made relevant within a particular developmental or professional context was also seen to be critical in helping to build support and ownership. An important consideration within this is the relationship between knowledge and power and the need to be aware of the potential for knowledge to be used in ways that either build capacity or that serve to alienate and disempower. Understanding these dynamics is critical if knowledge sharing is to be used effectively as a foundational tool for transformation and transformative adaptation.

7.5 Barriers to transformative adaptation

A number of factors were identified by respondents as being barriers to transformative adaptation in the context of integrating climate change adaptation into municipal planning and implementation. Table 7.7 summarises these and indicates the storylines and storyline components that emerged and the number of respondents who spoke about each of these during their interviews. Table 7.8 provides an indication of the percentage of respondents in each respondent category who focused on each of the storylines and storyline components. It should be noted that some of the barriers highlighted in this section were also mentioned when describing the municipal context in which change occurs (Chapter 6) but are described in more detail here, given that these same factors (which had been articulated generically when describing the municipal context) were also seen as very specific barriers to transformative adaptation. It should also be noted that, in instances where respondents articulated barriers that were the “mirror image” of the ideas expressed for the factors that catalyse, facilitate and sustain transformation, these are described in less detail. For example, respondents cited the need for “an enabling institutional and policy environment that can facilitate and guide change” as a critical factor in facilitating and sustaining change and, in the barriers to change section, cited the *absence* of this enabling environment, as a significant barrier.

Table 7.7: Number of respondents that discussed each of the storylines and storyline components under the theme: Factors that act as barriers to transformative adaptation

	Storyline	Storyline component	Number of respondents
THEME: Barriers to transformation	Storyline 1: The bureaucratic nature of the municipal institution is not conducive to change		15
		Storyline component 1.1: Rigid systems and structures limit innovation and change	13
		Storyline component 1.2: Target driven systems do not facilitate innovation and cross-sectoral interaction	4
		Storyline component 1.3: There is a lack of willingness to facilitate engagement and debate around difficult issues	4
	Storyline 2: Immediate priorities and short-term agendas can undermine the prioritisation of longer-term and less visible issues such as climate change		15
		Storyline component 2.1: Municipalities are more experienced in coping with immediate challenges, rather than engaging with longer-term and more complex issues that may require risk-taking and fundamental change.	2
		Storyline component 2.2: Multiple developmental and service delivery priorities can distract attention from the climate adaptation agenda.	10
		Storyline component 2.3: Political priorities are generally short-term focused	6
	Storyline 3: Limited understanding of climate change and possible responses, can act as a barrier to engagement and decision-making around key issues		10
		Storyline component 3.1: People don't understand climate change and are intimidated by its scientific nature	2
		Storyline component 3.2: Climate change can be seen as an environmental agenda	5
		Storyline component 3.3: The absence of accurate and downscaled data makes decision-making difficult	4
	Storyline 4: The absence of an enabling and supportive institutional and policy environment can limit the potential for transformative adaptation		4
	Storyline 5: Resource constraints limit the potential for transformative adaptation		4

Table 7.8: Percentage (%) of respondents in each respondent category that discussed each of the storylines and storyline components under the theme: Barriers to transformative adaptation

	Storyline	Storyline component	% of respondents in each respondent category				
			<i>Respondent category</i>				
			1	2	3	4	5
THEME: Barriers to transformative adaptation	Storyline 1: The bureaucratic nature of the municipal institution is not conducive to change		○○○	○○	○○○	○○	○
		Storyline component 1.1: Rigid systems and structures limit innovation and change	○○○	○○	○○○	○	○
		Storyline component 1.2: Target driven systems do not facilitate innovation and cross-sectoral interaction	○		○	○	
		Storyline component 1.3: There is a lack of willingness to facilitate engagement and debate around difficult issues	○		○○		
		Storyline 2: Immediate priorities and short-term agendas can undermine the prioritisation of longer-term and less visible issues such as climate change	○○○	○○	○○	○○	○○
		Storyline component 2.1: Municipalities are more experienced in coping with immediate challenges, rather than engaging with longer-term and more complex issues that may require risk-taking and fundamental change.	○				○
		Storyline component 2.2: Multiple developmental and service delivery priorities can distract attention from the climate adaptation agenda.	○○	○	○○	○○○	○
		Storyline component 2.3: Political priorities are generally short-term focused		○○	○	○	
		Storyline 3: Limited understanding of climate change and possible responses, can act as a barrier to engagement and decision-making around key issues	○○	○	○○○	○○	
		Storyline component 3.1: People don't understand climate change and are intimidated by its scientific nature		○		○	
		Storyline component 3.2: Climate change can be seen as an environmental agenda	○		○○	○	
		Storyline component 3.3: The absence of accurate and downscale data makes decision-making difficult	○○		○		
		Storyline 4: The absence of an enabling and supportive institutional and policy environment can limit the potential for transformative adaptation		○	○	○	
		Storyline 5: Resource constraints limit the potential for transformative adaptation	○	○	○		

KEY

Respondent categories

1. Climate adaptation leaders and coordinators
2. Climate adaptation implementers
3. Municipal officials not directly involved in climate adaptation work
4. Municipal officials involved in strategic planning
5. Stakeholders external to the Municipality

Frequency of response

- : 0-33%
 ○○: 34-67%
 ○○○: 68-100%

7.5.1 Storyline 1: The bureaucratic nature of the municipal institution is not conducive to change

Storyline component 1.1: Rigid institutional systems limit innovation and change

Significant emphasis was placed on the fact that the municipal institution itself is a barrier to transformative adaptation in the way that it is structured and in its predominant focus on immediate priorities rather than longer-term strategic issues that may also be important (see Table 7.7). These ideas were expressed most strongly in the respondent categories consisting of municipal officials who are working within this system. For many respondents, the rigid municipal systems and the inability to open up conversations to explore alternative ways of operating were central to this barrier. As one respondent commented:

“There are so many standard operating procedures that one has to go through, you know that kind of thing, so it just does not create initiative and innovation by and large... you come up with certain ideas and they get bashed down so quickly.” (Manager: HSU, 06/11/2014).

As discussed previously in this thesis, the scale and structure of bureaucracies like eThekweni Municipality also means that the work of departments is defined by their core function and there is little opportunity for cross-sectoral interaction and sharing of ideas. This can act as a significant barrier to innovation and change. As Aylett (2013) emphasises, this structure is a “fragmentation of the world into isolated and supposedly manageable areas of activity (where) problems are reduced to their component parts and organisational units created to address them”. Although such systems have their place in determining rules and ensuring stable and predictable behaviour across all levels of an organisation, they do not facilitate the interaction, collaboration and potential for transformation that is required to address increasingly complex challenges in the current context. According to the Former Deputy Head of EPCPD (25/05/2015):

“I think the big problem is institutional in the sense that we work in an institution where change was not in its DNA... local government emerged as something that provided stability... and local government has been very good at doing that... and now we’re saying to local government all bets are off. I think the big problem is that the kind of messaging we bring with this vast universe of sea of opportunities and change and networks and so on, it’s confusing to the DNA of the system”.

Along with highlighting specific systems such as the municipal procurement system as a barrier to innovation (because of its complexity, regulations and the considerable timeframes that such processes require), respondents also emphasised the barrier that municipal processes create in being able to amend personnel and organogram positions in the institution to be more responsive to a changing context. From one respondent’s perspective, “if the people and posts in a bureaucratic structure can’t be changed quickly when this is needed... you can’t change actually” (Former CEO: DCCI, 05/05/2015). The slow pace of change in local government institutions that results from such systems, is problematic within the context of transformation (Aylett, 2013).

Storyline component 1.2: Target driven systems do not facilitate innovation and cross-sectoral interaction

A specific system that was perceived by respondents to be a significant barrier to transformative adaptation in eThekweni Municipality, was eThekweni Municipality's Performance Management System and the way in which its linear and quantitative nature limits peoples' ability to experiment, innovate and take risks in new areas of work where the outcomes cannot always be defined and measured. In this regard, the emphasis of the Performance Management System on achieving success around quantifiable targets does not incentivise the collaboration, innovation and risk-taking that usually underlie the ability to effect change (Dalberg, 2015). This can also exacerbate the "silo-isation" that is evident in many bureaucracies. As a former official highlighted:

"...you only work within your sector and you don't work across sector boundaries, and you have a very clear mandate as prescribed by your individual performance plan or your SDBIP (Service Delivery and Budget Implementation Plan) and that's what you do and you don't do anything else... It's only like really exceptional municipal staff that are going to do a whole bunch of things that aren't on their KPIs (Key Performance Indicators)" (Former Climate Protection Scientist: EPCPD, 27/09/2014).

In addition, the open-ended, unpredictable and complex nature of change and transition, means that such processes cannot be governed in a linear way with simple objectives and targets (Frantzeskaki et al., 2012). A key challenge therefore lies in finding the balance within these structures that "make sure staff do their jobs and serve the community...But then structures that are flexible enough to cope with the change, with the ever changing world that we are facing..." (Former Climate Protection Scientist: EPCPD, 27/09/2015). A further challenge is that, in a system that is already strained and where there are multiple priorities to address, there is little space and time to reflect on and critique the systems that are in place and whether they are strategic in addressing the heart of the challenges facing cities. As one municipal official (Project Manager: EDU, 23/05/2015) commented:

"I just look at the whole issue of performance management, you're just getting more and more levels and layers plugged in to try and ensure that people are working...It's like you've got a thing and you just keep sticking plasters on it. But my sense is the people driving those things are so on this bus...That it's like how do you drive the bus and then get off the bus to see where the bus should be going..."

It could be argued that the linear focus of such systems also contributes to the "silo-isation" of municipal functions and does not encourage officials to explore and collaborate beyond their core areas of work. This reinforces the notion of "trained incapacity" referred to by Merton (1940, cited in Aylett, 2013), whereby the narrow focus of an individual's training and work experience results in "blind spots" where it is no longer possible to see beyond the scope of one's own specific professional arena. Merton argues that this trained incapacity is necessary in order to ensure the conformity that is necessary for large organisations to function, but that it results in them being highly resistant to change. This also undermines the ability of municipal officials to collaborate and to share experience and knowledge, which was argued previously in this thesis as an important factor in facilitating transformation. These challenges are evident in eThekweni Municipality and are a significant barrier to transformation and transformative adaptation.

Storyline component 1.3: There is a lack of willingness to facilitate engagement and debate around difficult issues

The lack of institutional flexibility to respond to complex and changing needs is further undermined by a perceived lack of willingness in the Municipality to engage in debates around these difficult issues. One respondent suggested that this could be the result of fear, saying “I think it’s fear...Fear of changing the status quo, fear of changing a system maybe because we don’t want to be accountable, we’re afraid of the repercussions of that’ (Specialist Ecologist: EPCPD, 09/03/2015). This inability to acknowledge new challenges, and engage in dialogue around these, can hamper the initiation of transformation and creates the perception of an institution that does not like people to speak out and that is “opposed... to opening up debate and dialogue” (Project Manager: EDU, 23/05/2015). This is deeply problematic because such conversations are a key part of challenging assumptions and creating space for dissent and disagreement, which can in fact become a positive force for local innovation and adaptation (Pelling et al., 2008). Therefore if space is not created to engage in such discussions, this minimises the chance for opening up possibilities to hear new ideas (O’Brien, 2012) that facilitate innovation and transformation.

7.5.2 Storyline 2: Immediate priorities and short-term agendas can undermine the prioritisation of longer-term and less visible issues such as climate change

Storyline component 2.1: Municipalities are more experienced in coping with immediate challenges, rather than engaging with longer-term and more complex issues that may require risk-taking and fundamental change

The Municipality appears to be better equipped to deal with immediate and visible challenges, rather than the slower and more pervasive challenges such as climate change. This is also evident in Section 6.2 of the previous chapter. There is a tendency to be distracted by investments in large and visible infrastructure projects, rather than in initiatives that address the root causes of systemic risks such as inequality and environmental degradation. Citing examples such as the Moses Mabhida stadium and Durban’s potential hosting of the 2022 Commonwealth Games, one respondent cautioned that “it distracts us from the reality that the world is in a very dangerous situation... We are only too ready to jump at something like, you know, the Commonwealth Games... because they are wonderfully distracting...” (Convenor: IRC, 15/05/2015). This suggests that it is perhaps simpler to focus on immediate short-term initiatives rather than having to grapple with the deep systemic challenges of the city that require transformational change.

Storyline component 2.2: Multiple developmental and service delivery priorities can distract attention from the climate adaptation agenda

Another significant barrier (also reflected in Section 6.2) in cities like Durban, where a high proportion of the population is focused on meeting basic needs, is that there is little opportunity to consider less immediate threats such as climate change (Archer et al., 2014). In such instances, where “basic needs are not satisfied, you can’t expect people to be concerned about higher level needs and aspirations...” (Former CEO: DCCI, 05/05/2015). This is equally true for those politicians who are under pressure to help their constituents to access basic resources and who may see longer term issues like climate

change as “esoteric” (Chief Strategy Officer: OCM, 23/04/2015). The challenges are similar for the municipal officials operating in this environment, where the significant number of immediate crises distracts attention from the ability to think and act strategically and to consider longer-term challenges. As one respondent commented:

“It’s the balance between crisis and non-crisis, so the ability to stop the organisation to focus on bigger things – we’re too much of a crisis driven organisation at the moment, and when you’re dealing with crises...you can’t see the wood from the tree sometimes. I think it makes it difficult to deal with things like adaptation because you’re dealing with bread and butter issues and you’re fighting crisis all the time” (Chief Strategy Officer, OCM, 23/04/2015).

For many officials, it is overwhelming to simply deal with the basics and this prevents them from engaging beyond this. As the Former Head of EWS (03/03/2015) highlighted:

“A lot of the managers are in survival mode so they’re struggling to do their basic job. So don’t come and load me with that other stuff when I can’t even deliver houses...Now you want me to deliver houses in an environmentally friendly way and deal with climate change and look at energy reduction...I can’t even get the thing built using traditional blocks and corrugated iron roofs...”.

For those officials who do recognise the importance of ensuring investment in longer-term research and initiatives, there are significant hurdles in motivating for this within a context that has different priorities. An important question therefore lies in how to gain sufficient attention around the climate adaptation agenda in this context, so that it is seen as an equally important and immediate priority, and what messaging “hooks” might help to achieve this.

Storyline component 2.3: Political priorities are generally short-term focused

The prioritisation of immediate and visible interventions is further exacerbated by the short political term of office of politicians in the Municipality. This challenge was summarised by a Senior Municipal Manager: CSCM (11/09/2014) who argued that:

“(Integrating climate change into decision-making) is not so much in the politicians, and I think that’s because their time horizon is so short and they’re trying to understandably meet the needs of their constituencies that exist now, and so that’s the hard thing of getting that disjuncture, between getting them to make a hard decision which will be right for the City for the long term, but is wrong in terms of getting you re-elected.”

In this way, short-term interests have the potential to exacerbate the vulnerability of the city in the long term and to reduce the likelihood of appropriate planning for climate change, despite tools being available to do this (Jarvie et al., 2015). This is the case in eThekweni Municipality for example, where climate change is still given very low priority, except in sectors where champions are active (Taylor et al., 2014).

7.5.3 Storyline 3: Limited understanding of climate change and possible responses, can act as a barrier to engagement and decision-making around key issues

The difficulty in understanding climate change and in making decisions around unpredictable issues appears to compound the tendency to focus on immediate and more visible problems. This was seen across a number of interview groups but was expressed most strongly by the group of municipal officials not directly involved in the climate adaptation work.

Storyline component 3.1: People don't understand climate change and are intimidated by its scientific nature

For some respondents the science of climate change was seen to be a barrier, with a perception that “people are afraid of the language used...that's the one disadvantage of it being academically driven” (Deputy Head: Disaster Management, 26/09/2014). This tendency to use heavy and often confusing terminology can have the effect of alienating non-scientists (Somerville and Hassol, 2011). In some instances there was also a perception that the EPCPD, as the lead department in the climate change adaptation arena, had maintained the climate adaptation space as an area of specialist expertise, thus limiting the ability of others to engage effectively. As a senior official stated:

“What you guys (EPCPD) have done, that has been an exclusive preserve of yourselves...So, I'm not necessarily blaming you per se, for being specialists. But, I'm saying as an organisation we should have taken a strong leadership responsibility to ensure that we popularise these things” (Acting Deputy City Manager: Economic Development and Planning Cluster, 17/06/2015).

This perception is a potentially dangerous one, as it suggests that the location of the climate adaptation work in an environmental function, with a particular scientific focus, has created a sense of alienation for some in relation to this work. This barrier is discussed further in the next storyline component.

Storyline component 3.2: Climate change can be seen as an environmental agenda

Linked to the previous storyline component, a significant barrier also lies in the common perception that climate change is an “environmental” agenda. This is problematic given “the perception among politicians and among senior decision makers that anything related to environmental issues doesn't address economic improvement and poverty alleviation” (Manager, Restoration Ecology Branch: EPCPD, 31/03/2015), which are seen to be the current developmental priorities of the city. This perception exists despite the fact that much of eThekweni Municipality's climate adaptation work has focused on vulnerable groups and job creation. The perception of climate change as an environmental agenda ignores the very cross-cutting nature of the challenge and its impacts across the social, economic and environmental spectrum. As Taylor et al (2014) point out, the separation of environment and development goals continues to shape the extent to which stakeholders such as the state, business and citizens engage with the issue of climate change adaptation. A former Climate Protection Scientist: EPCPD (27/09/2014) summarised this, saying:

“Climate change adaptation – it’s most often in the Environmental Department...that can be a barrier in that it’s couched sometimes as being additional, a bit fluffy, a bit ‘tree hugger-ish’ as opposed to actually what climate change...is which is a developmental issue, as much as it is a socio-economic issue and an environmental issue”.

In eThekweni Municipality, this perception is exacerbated by the location of the climate adaptation function in one of the city’s environmental departments, the EPCPD. Patel (2014, p. 178) emphasises this point, saying that “interventions that are confined to the environmental wings of local authorities hold less influence in the broader political machinery”. Apart from the effect this has in further entrenching the notion that climate change is an environmental issue, the location of the climate adaptation function in any one department can undermine the need for *all* sectors to be considering climate change as a key component of their own planning and decision-making.

Storyline component 3.3: The absence of accurate and downscaleable data makes decision-making difficult

The “inability of global circulation models to be downscaled to the local level where there aren’t these huge uncertainties” (Former Climate Protection Scientist: EPCPD, 27/09/2014) also means it is challenging to make predictions about the exact impacts of climate change. In essence, “there are no nuts and bolts, there are no numbers” (Professional Technologist: EWS, 15/09/2014). This contributes to climate change remaining an abstract concept for some, and is particularly problematic in disciplines such as engineering where data are critical in order to model likely scenarios for design purposes.

Storyline 4: The absence of an enabling and supportive institutional and policy environment can limit the potential for transformative adaptation

In Section 7.3 of this chapter, respondents highlighted the importance of a receptive policy environment in providing a space for new ideas to be integrated into the political functioning of the system. In the municipal context for example, securing leadership and political support were seen to be critical in this regard, as was the need to ensure that new agendas such as climate adaptation are adequately incorporated into municipal policy and structures to ensure institutional “lock-ins”. Similar issues were raised when respondents spoke about barriers to change, with emphasis being placed on the inadequacy of national level support in providing a policy framework for the climate adaptation work and the lack of high level city leadership in relation to the climate change challenge. It is not clear why this lack of leadership should be the case, other than in relation to the challenges already mentioned in this section (e.g. the existence of multiple urgent developmental priorities, the dominance of short-term thinking in municipal planning, the perception of climate change as an environmental issue etc).

7.5.4 Storyline 5: Resource constraints limit the potential for transformative adaptation

Although the challenge of appropriate resourcing was not raised by a high number of respondents, the value of *catalytic* funding and the ability to secure sufficient human resources to be able to sustain the integration and implementation of the climate adaptation agenda was seen to be important (see

also Section 7.3). In the case of implementing the DAC for example, “the difficult thing with the DAC is being able to follow through with the plans because we simply don’t have the capacity and the numbers to do that kind of thing” (Manager, Climate Protection Branch: EPCPD, 31/01/2014). A concern was also raised regarding the sustainability of projects that are reliant on funding, with another respondent commenting that “we might have had a lot of success with (these programmes) but we’ve thrown a lot of money in... and that’s not an ideal situation...how do we achieve what we have achieved without that sort of funding?” (Manager, Restoration Ecology Branch: EPCPD, 31/03/2015). A challenge therefore may lie in the form of funding that is acquired and whether this can be made at least partly self-sustaining through relevant mechanisms. The challenge also relates to human resources, with the lack of skilled and experienced adaptation professionals having been a significant factor in delaying the filling of posts in the Climate Protection Branch of the EPCPD (Roberts et al., 2016).

7.5.5 Analysis and interpretation

The transformation and transformative adaptation literature focuses far less attention on “barriers to transformative adaptation” and yet these are often fundamental issues which, if not addressed, can undermine a range of efforts. In the context of institutions such as local government many of the most significant barriers seem to be systemic in nature, with the bureaucratic nature of the institution itself being a barrier to the introduction of new ideas and innovation within an entrenched system. This can be through specific systems such as the procurement and performance management systems or through existing patterns of operation such as the often silo-ised approach to municipal planning. This context provides additional explanation for the emphasis that respondents placed on the role of individual champions in initiating and driving transformative adaptation and on the importance of finding ways to “work differently” within this context in order to facilitate the emergence and integration of new ideas within this system. The lack of understanding around climate change was also an important issue raised by respondents as a barrier to transformative adaptation and could be symptomatic of the relative under-resourcing of the climate adaptation function and the inability to allocate sufficient resources to communication. Although the responses given were made specifically in relation to eThekweni Municipality’s climate adaptation work, there are important messages emerging that are likely to be relevant in the context of transformation more broadly. In this regard, the barriers that have been emphasized in this section highlight the very real challenges involved in effecting transformation in contexts where the structural nature of the institution, combined with the multiple and urgent developmental priorities that demand attention, have the potential to undermine work that requires innovation, integration and cross-sectoral involvement, and which is longer-term in its impacts. These barriers flag important considerations regarding the ability of existing bureaucratic institutions to facilitate transformation, with the inherent design of these systems being contradictory to the flexibility, risk-taking and collaboration that is likely to characterise transformative work.

7.6 Summary

In reviewing the catalysts, facilitating factors and barriers that contribute to either enhancing or undermining transformative adaptation in the eThekweni Municipality climate adaptation case study, a number of similarities exist in relation to the broader transformation and transformative adaptation literatures. However, there are also some interesting differences which provide insights not only into transformative adaptation in eThekweni Municipality, but which also begin to provide pointers regarding transformation in environmental governance more broadly. On this basis, Table 7.9 summarises the similarities and differences between the case study observations and the transformation and transformative adaptation literatures, and makes suggestions regarding the potential implications of these findings in understanding transformation and transformative adaptation in the context of environmental governance and climate change respectively, for a local government such as eThekweni Municipality.

As outlined in Chapter 6, the climate adaptation work in eThekweni Municipality has advanced significantly over a relatively short timeframe and in a challenging local government context. This has been catalysed and facilitated by a range of factors including: strong champions; strategic use of important “windows of opportunity”; the ability to form departmental networks and “shadow systems of governance” that have allowed innovation to emerge in a context where there is no formal mandate for climate action; and the ability to establish a landscape of actors, initiatives and partnerships that have provided a firm foundation for future work. However, a number of significant barriers also exist that have limited the potential to advance transformative adaptation. In the local government context, many of these barriers relate to the characteristics of the municipal institution itself. What is also clear in reviewing eThekweni Municipality’s climate adaptation journey is that, in a resource-constrained environment, choices and trade-offs have to be made regarding where and how to invest at different points.

Table 7.9: A summary of the factors involved in catalysing, sustaining and acting as barriers to transformative adaptation in eThekweni Municipality’s climate adaptation work, and what this means in terms of understanding transformative adaptation and transformation in environmental governance

Catalysing and sustaining transformation and transformative adaptation	Similarities of the eThekweni Municipality climate adaptation case study with the transformation and transformative adaptation literatures	Distinctions of the eThekweni Municipality climate adaptation case study from the transformation and transformative adaptation literatures	Potential implications of these similarities and differences for understanding transformative adaptation and transformation in environmental governance in a local government context.
Catalysts for transformation and transformative adaptation	Strong leaders, external events (that raise awareness of the need for change) and “windows of opportunity” are important catalysts for transformative adaptation.	<p><i>1. Additional emphasis is placed on the role of “champions” in supporting initial leaders.</i> The case study placed significant emphasis on the critical role that is played by “followers” and sectoral champions who support the initial leader and embed transformative agendas. The case study also describes the specific characteristics of such champions, who need to be brave, determined and willing to work beyond their “traditional” scope of work to advance transformative adaptation.</p> <p><i>2. The potential challenges associated with strong leaders are highlighted.</i> Although the case study reiterated the importance of an initial leader who can drive transformative adaptation, a caution was also raised regarding the potential dangers if the agenda being driven by this leader is not an appropriate one and if that leader is not willing to build leadership support to ensure sustainability.</p> <p><i>3. The role of catalysts is not linear.</i> Single catalysts may not necessarily be effective in driving transformative adaptation. Rather, multiple catalysts, interacting in different ways, can be more effective. In this context, it is important to recognise potential “windows of opportunity” that could be catalytic and to use these strategically to advance transformative adaptation.</p>	<p>In the context of bureaucratic institutions, where changing the policy environment takes time, leaders and champions are needed at multiple levels, acting across different spaces in different ways, in order to drive a transformation or transformative adaptation agenda. The same can be said of other catalysts, which interact in often unpredictable ways to produce a particular outcome. The ability to observe an evolving transformation journey, and to use leaders, champions and catalysts in the most strategic way to leverage additional change, is critical for transformation and transformative adaptation.</p> <p>An important message emerging for leaders is to ensure that they build sufficient support around them, to ensure input and critique of their own ideas, and to ensure that the transformation or transformative adaptation agenda can be sustained.</p>

Catalysing and sustaining transformation and transformative adaptation	Similarities of the eThekweni Municipality climate adaptation case study with the transformation and transformative adaptation literatures	Distinctions of the eThekweni Municipality climate adaptation case study from the transformation and transformative adaptation literatures	Potential implications of these similarities and differences for understanding transformative adaptation and transformation in environmental governance in a local government context.
Factors that facilitate and sustain transformation and transformative adaptation	The importance of shadow systems of governance, innovation niches and multi-level change (i.e. across the levels of both policy and practical project implementation) in driving transformative adaptation, are all seen to be important in the case study. The role of politics and the need for political champions and support in the policy arena, is particularly important in the local government context.	<p><i>1. The importance of building a “landscape of change” to facilitate transformative adaptation</i></p> <p>The case study suggests that the journey towards transformative adaptation is neither linear nor predictable and that a range of initiatives and actors are needed in a number of spaces in order to facilitate and sustain transformative adaptation. Understanding the relative importance of various catalysts, facilitating factors and barriers at different points in either advancing or undermining transformative adaptation, is therefore an important part of navigating this landscape of change. The case study also highlights the importance of recognising the need for trade-offs in decision-making, in a context where resources are scarce and it is impossible to do everything.</p> <p><i>2. The importance of collaboration</i></p> <p>The case study placed emphasis on the need to facilitate collaborative work within and across disciplines in order to spark innovation and bring multiple perspectives together to solve complex problems.</p>	<p>In the context of bureaucratic and inflexible institutions, where cross-sectoral interaction, innovation and risk-taking are not actively facilitated, there is a need to find ways of working in the grey institutional spaces where there are greater opportunities to network, be creative and work in less restricted ways, in order to initiate and sustain transformation and transformative adaptation. However, there is still a parallel need for new ideas to be integrated into relevant institutional policies and strategies, since these ultimately provide the formal framework within which any “informal” work can be mainstreamed. Ensuring political support in a local government context is a critical part of this.</p> <p>An important “success factor” in driving transformation and transformative adaptation is likely to be the way in which different actors, skills, projects and policy interventions are brought together in different ways and at different levels, throughout the transformation journey, to drive change. This could, for example, be through building partnerships for implementation, expanding networks or actively facilitating transversal conversations across sectoral disciplines. Given the complexity of the challenges being faced, transformation and transformative adaptation are unlikely to happen without collaboration, to draw on different perspectives and form relevant partnerships that can drive new ideas and innovation, and that can</p>

Catalysing and sustaining transformation and transformative adaptation	Similarities of the eThekweni Municipality climate adaptation case study with the transformation and transformative adaptation literatures	Distinctions of the eThekweni Municipality climate adaptation case study from the transformation and transformative adaptation literatures	Potential implications of these similarities and differences for understanding transformative adaptation and transformation in environmental governance in a local government context.
			bridge across the disciplines that are needed to facilitate transformation and transformative adaptation.
The role of knowledge sharing and social learning in facilitating transformation and transformative adaptation	Knowledge sharing and social learning are important in creating opportunities for mind-sets to change and for innovation to emerge, that can facilitate transformative adaptation in the case study.	The way in which knowledge sharing and social learning takes place, is important. The case study placed more emphasis on the way in which knowledge sharing and social learning take place, highlighting the importance of external sources of information (such as international conferences, subject experts and professional peers) as important in validating information and lending credibility to new areas of work. The importance of this information being made relevant within a particular developmental or professional context was also seen to be critical in helping to build support and ownership of a transformative adaptation agenda.	Although knowledge sharing is a critical driver of transformation and transformative adaptation, the way in which knowledge is shared needs to be carefully considered, in order to maximise its potential to build capacity and support and to provide the foundations that are needed for lasting change.
Barriers to and transformative adaptation	There is far less emphasis on barriers to transformative adaptation in the literature, when compared with the literature on factors that catalyse and facilitate transformation and transformative adaptation.	<p><i>1. The bureaucratic nature of the institution</i> This limits the introduction of new ideas and innovation within the entrenched system. The systems themselves (e.g. procurement system, performance management system) are linear in their approach, and do not facilitate the cross-sectoral interactions and risk-taking that characterize exploratory work in new fields.</p> <p><i>2. The lack of understanding around climate change</i> Lack of understanding and potential mistrust of new agendas can undermine transformative adaptation.</p> <p><i>3. Multiple urgent developmental priorities</i> This results in less attention being given to longer-term challenges such as climate change, which can undermine the potential for transformative adaptation.</p>	These barriers raise questions regarding the ability of bureaucratic institutions to facilitate transformation and transformative adaptation, with the inherent design of these systems being contradictory to the flexibility, risk-taking and collaboration that is likely to characterise transformative work. In such contexts, important considerations therefore relate to how to: (1) use the previously mentioned catalysts and facilitating factors to create spaces for innovation within this bureaucracy and then find relevant ways to integrate new ideas into policies and systems; and (2) find relevant ways to question institutional systems that no longer seem to be relevant within a context where rapid change and transformation are required.

A critical question now is how to use this knowledge of what facilitates and undermines transformative adaptation, and an awareness of the potential need for trade-offs in decision-making, in order to assess the opportunities that currently exist in eThekweni Municipality to drive transformative adaptation. Chapter 8 will act as a more synthetic piece by consolidating the results from Chapters 6 and 7 in relation to specific phases of eThekweni Municipality's climate adaptation journey, in order to better understand the combination of factors that either facilitate or undermine the potential for transformative adaptation in this change landscape at various points. These observations will then be used as the basis for providing pointers as to possible "next steps" in the city's climate adaptation journey, before broadening the discussion in Chapter 9 away from eThekweni Municipality's climate adaptation work, to suggest insights that are gained regarding transformation processes in the broader space of environmental governance in a local government context.

CHAPTER 8: TOWARDS TRANSFORMATIVE ADAPTATION IN ETHEKWINI MUNICIPALITY - POSSIBLE NEXT STEPS FOR THE CITY'S CLIMATE ADAPTATION JOURNEY

Chapter 6 described the changes that have unfolded in eThekweni Municipality to integrate climate change adaptation into municipal planning and implementation, and assessed whether these changes constitute transformative adaptation. Given the progress that has been made in advancing the climate adaptation work in eThekweni Municipality over a short time in a difficult context, and the transformative characteristics of the way in which this has happened, the thesis argues that the case study might provide insights into the factors that are important in catalysing, facilitating or acting as barriers to transformative adaptation. The rationale for the thesis has been that these insights regarding transformative adaptation could also be useful in understanding transformation in the broader context of environmental governance, given that addressing climate change is a critical part of achieving sustainable development. Chapter 7 therefore presented the factors that catalyse, facilitate and act as barriers to transformative adaptation in the case study context. It concluded by summarising the ways in which these factors are similar to, or different from, those articulated in the transformation and transformative adaptation literatures, and provided commentary on the potential implications of these similarities and differences for understanding transformation and transformative adaptation more broadly in a local government context.

An important idea that emerges from these chapters is that transformative adaptation is neither linear nor predictable. Rather, in order to initiate and sustain transformative adaptation, it is necessary to build a “landscape of change”, with multiple actors, projects and policy initiatives being required at different levels and across different scales, in order to drive a transformative agenda. Understanding the roles that each of these plays at different points along the transformative adaptation journey, and the interactions between them, is critical in helping to navigate these complex spaces. The idea of a “landscape of change” emerges therefore as a critical framing concept within which to understand the elements that interact to either facilitate or undermine transformation and transformative adaptation. The purpose of the current chapter is to more clearly represent the “landscape of change” that is emerging in the eThekweni Municipality climate adaptation case study, by synthesising the main outcomes from Chapters 6 and 7 to demonstrate the elements of this landscape (e.g. the activities, actors and context factors) for eThekweni Municipality’s climate change adaptation journey. This more synthetic perspective is then used as the basis for considering how the elements of the landscape that emerged in Chapter 7 as being important in catalysing and facilitating transformative adaptation, could provide pointers as to possible “next steps” for the Municipality’s climate adaptation work, in order to advance transformative adaptation. The chapter draws predominantly from Chapters 6 and 7 for this synthesis and analysis, but also uses additional literature on eThekweni Municipality’s climate adaptation work to help locate components of the climate adaptation journey on a more detailed timescale.

In doing this, the chapter intends to contribute to the climate adaptation “practice” that is continuing to evolve in eThekweni Municipality. This applied focus is critical, given the embedded nature of the researcher as a practitioner within the eThekweni Municipality context, and her specific desire to contribute to the ongoing evolution of the city’s climate adaptation work, through translating the

theoretical ideas emerging in this thesis into practice. The researcher's own understanding of the work that is currently being undertaken in the EPCPD (where the Climate Protection Branch is located) is also used to project forward around future opportunities to advance transformative adaptation in the climate adaptation work of eThekweni Municipality. Chapter 9 steps back and up from the climate adaptation practice, and presents the theoretical contribution that this thesis makes towards understanding transformation in environmental governance more broadly.

8.1 Synthesising the elements of eThekweni Municipality's climate adaptation "landscape of change"

For the purposes of this synthesis and analysis, eThekweni Municipality's climate change adaptation work has been divided into four stages that reflect a particular combination or assemblage of elements that come together at particular moments in time in the climate adaptation "landscape of change". These stages are described briefly below:

Stage 1: 2004-2006 – Laying the foundations: Introducing climate adaptation to eThekweni Municipality

The climate adaptation work was initiated and driven by a single leader without a national or local precedent to guide this. The work was predominantly scientific and exploratory in nature.

Stage 2: 2007-2010 - Broadening support and experimenting with implementation

This phase was characterised by a broadening of actors and networks to help facilitate conceptual advances and implementation. Incremental changes helped to shift the system to incorporate climate change adaptation into municipal planning through the resourcing of a climate protection function and the incorporation of climate change into the Municipality's IDP. A broad, experimental and cross-sectoral approach across a range of implementation tools and projects was important in gaining experience, building working relationships and assessing where the focus for the work should be. Documentation of the work in eThekweni Municipality was an important focus from this point onwards. An emerging focus for eThekweni Municipality was on ecosystem-based adaptation, which built on existing experience of the lead department in the biodiversity field.

Stage 3: 2011-2013 - Building an international platform for adaptation and cementing eThekweni Municipality's primary focus on community ecosystem-based adaptation

A mega event provided a critical "window of opportunity" to facilitate important and more rapid shifts at the global and local level to advance the climate adaptation agenda. Local political leadership and partnerships were broadened and local implementation was focused on delivering co-benefits to ecosystems and people. Implementation initiatives were recognised as being long-term in nature and the climate change work was used as leverage for eThekweni Municipality to participate in broader (and potentially transformative) programmes, for example in the resilience field. Growing networks of actors provided access and insights into new funding sources and partnerships for implementation. However, some local partnership initiatives revealed an absence of stakeholder capacity to lead and guide the climate change work in Durban and the focus on driving the international adaptation agenda was seen by some to have compromised the focus on more dedicated local work.

Stage 4: 2014 – present (2016) - Consolidating the work and refocusing on regional and local knowledge sharing and implementation

By this point, shifts in the climate change adaptation space in eThekweni Municipality can be considered to be transitional in nature, rather than transformational, given the gaps in the local work and the need to create a more supportive and enabling leadership, political and implementation environment to secure the dedicated local support and champions to drive the more fundamental systemic changes that are required for the Municipality to respond effectively to climate change. However, a growing focus on learning and research builds on the partnerships and programmes that have been established (with many of these linkages having been made through the international work) and demonstrates transformational intention with regards to the climate adaptation work. The regional focus on capacity building and knowledge sharing is seen to be an important building block for regional adaptation and cooperation. A deliberate shift away from leading the international DAC, in favour of re-focusing on the local and regional climate adaptation work, has also been seen. Critical questions emerge at this stage regarding how best to advance transformative adaptation in eThekweni Municipality.

For each stage, the following elements of the “landscape of change” are described in Table 8.1 for eThekweni Municipality’s climate adaptation work:

- The global, national and local context
- The key actors and their roles
- The focus of the climate change adaptation work and its dominant discourses
- Implementation activities and practice
- Catalysts and facilitating factors for transformative adaptation
- Barriers to transformative adaptation
- The outcomes and potential influence to drive transformation and transformative adaptation

Table 8.1: Summarising the elements of eThekweni Municipality’s evolving climate adaptation “landscape of change”

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
The context for the climate adaptation work	<p><i>Global:</i> Little focus on climate change adaptation.</p> <p><i>National:</i> A National Climate Change Response Strategy existed but with no specific requirements or mandate for municipalities.</p> <p><i>Local:</i> A strong biodiversity function in the (then) EMD and some climate change mitigation initiatives, focused on renewable energy.</p> <p>The above context meant there was little precedent for climate adaptation work and limited global and national frameworks to help drive this work.</p>	<p><i>Local:</i> 2007 floods and the related coastal and infrastructure damage helped raise awareness of climate change and Durban’s vulnerability. The Energy Office was established to address the growing energy crisis. Durban’s hosting of the Fifa™ Soccer World Cup provided an opportunity to explore ecosystem-based adaptation through the event greening programme.</p>	<p><i>Global:</i> Increasing awareness of adaptation at the local government level. The adoption of the DAC by cities across the world was an important contributor to this.</p> <p><i>Local:</i> The Energy Office began to coordinate eThekweni Municipality’s climate mitigation function in 2011. A second mega event (COP 17) created a further “window of opportunity” to advance ecological restoration work through a focus on community ecosystem-based adaptation as part of the required “event greening” programme.</p>	<p><i>Global:</i> Greater acknowledgement of the importance of climate adaptation. The coming into force of the Paris Agreement in November 2016 helped to “lock in” adaptation as part of the global climate change commitments.</p> <p><i>National:</i> Work is underway to align with the mitigation and adaptation requirements of the Paris Agreement.</p> <p><i>Local:</i> Ongoing developmental challenges and a change in local government leadership (August 2016) continue to make the integration of longer-term agendas like climate change difficult.</p>
Critical actors and their roles	<p>The former Deputy Head of EPCPD was a critical leader (in her role of Deputy Head: EMD at that time) and introduced the idea of climate adaptation to eThekweni Municipality. She was later supported by members of the small Climate Protection Branch in the department, in translating</p>	<p>The climate adaptation function broadened beyond the original leader to include other officials in the (then) EMD function and champions in other municipal departments who helped to extend the circles of influence of the climate adaptation agenda and embed this in key sectors. Intellectual actors encouraged</p>	<p>As for the previous stages, but with a growing champion in eThekweni Municipality’s former mayor (Cllr James Nxumalo) who played a significant role in mobilising cities during COP17. He went on to take up global leadership positions in ICLEI to promote the issue of climate adaptation. The community ecosystem-based adaptation approach provided opportunities for implementation</p>	<p>Continued broadening of the actor base through expanding networks at the international and regional level. However, the role of the former mayor gradually reduced, given other political pressures and the change in local government leadership in 2016. To date this role has not been adopted</p>

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
	these ideas into locally relevant implementation.	the publication of eThekweni Municipality’s climate adaptation work in the peer reviewed literature. Former Mayor Cllr Obed Mlaba also played an important role in supporting the work that was being undertaken in the climate adaptation field in the Municipality.	partnerships with local NGO’s such as the Wildlands Conservation Trust. The Durban Climate Change Partnership was also an early attempt to build broader multi-stakeholder leadership in the climate change space.	by another political champion, although renewed interest has been expressed in the resurrection of the political “Climate Change Committee” under the new administration.
The focus of the climate change adaptation work in eThekweni Municipality: dominant discourses	Work focused on initiating the climate change adaptation work and building an understanding of the likely impacts of climate change for Durban. This was seen to be particularly important given the potential impacts of climate change on biodiversity and on an already vulnerable urban population (due to high levels of poverty and unemployment).	Work focused on: further exploration and experimentation with “no regrets” projects that could build learning and understanding; building a strong focus on ecosystem-based adaptation to align the biodiversity and adaptation workstreams of the EMD; institutionalisation of the climate adaptation agenda; and mainstreaming adaptation into municipal line functions. The Community Based Adaptation work also started during this time.	Work focused on: strengthening the global climate adaptation agenda and building political leadership to help drive this; broadening the climate adaptation work to explore the social-ecological and governance aspects of adaptation; embedding a community ecosystem-based adaptation approach at the local level; and broadening the partnership base for implementation.	Priorities have focused on: sustaining existing work; understanding the implementation gaps at the local level; strengthening knowledge partnerships to advance climate adaptation at the regional level (with less focus on managing the DAC at the global level); and consolidating the climate change work done to date in the Municipality.
Implementation activities and practice	1. Climatic Future for Durban Report (2004-2006) 2. The MCPP was first included in the IDP	1. Establishment and resourcing of the Climate Protection Branch (2007) in the EMD.	1. The establishment of the Durban Climate Change Partnership in 2011 to broaden engagement and leadership in the climate change arena	1. Establishment of a “network of networks” focused on regional hubs and local compacts anchored in cities

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
	<p>3. Headline Climate Change Adaptation Strategy (2006) to identify municipal departments who would be most affected by climate change</p> <p>The implementation approach was experimental given that there was little to no precedent to guide the work.</p>	<p>2. Implementation of a range of climate change projects and tools, including Community Based Adaptation.</p> <p>3. The implementation of a large scale ecological restoration programme (Buffelsdraai Landfill Site Community Reforestation Programme³⁰) for the Fifa™ Soccer World Cup greening programme.</p> <p>4. Development of MAPs for the water, health and disaster management functions (2008)</p> <p>5. Broadening the climate change message at a climate change conference, hosted in Durban (2009)</p>	<p>2. Hosting the Durban Local Government Convention as part of COP17 was a catalyst for drafting the DAC (2011), which helped mobilise global adaptation action in cities.</p> <p>3. The implementation of a second large scale ecological restoration programme (Paradise Valley community ecosystem-based adaptation project) to achieve both mitigation and adaptation objectives as part of the event greening programme for COP 17.</p> <p>4. Establishment of a new “Restoration Ecology Branch” in the EPCPD (2011) to oversee the implementation of the emerging large-scale ecological restoration programmes</p> <p>5. Establishment of the UKZN Joint Research partnership on global environmental change (2011)</p> <p>6. The beginning of the Umhlangane Catchment Climate Adaptation programme (2011), aimed at exploring governance elements associated with adaptation at a catchment scale (also with an ecosystem focus)</p> <p>7. The implementation of the UEIP (2013), also aimed at working at a catchment scale, with multiple partnerships to restore</p>	<p>that are climate change leaders (to build capacity and share knowledge and experience)</p> <p>2. Development of the Durban Climate Change Strategy (2014)</p> <p>3. Establishment of the reforestation research partnership (2014)</p>

³⁰ Note that planning for the Buffelsdraai Community Reforestation Programme began in 2008 and implementation began in 2009. However, the key impacts of this work, particularly in relation to the World Cup greening programme and the establishment of a dedicated branch to manage this work, was only felt later, in 2010 and 2011.

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
			<p>ecological infrastructure as a key adaptation response (focus on ecosystems, climate change and water).</p> <p>This phase was also characterised by the use of the climate adaptation work to leverage into other spaces such as “resilience” through Durban’s application to, and selection for, the international “100 Resilient Cities” Programme.</p>	
Catalysts and facilitating factors for transformative adaptation	<p>Strong leader and champion who understood the municipal institution and who was bold enough to experiment. This generated learnings and momentum to drive the work forward. The inclusion of the MCPP in the IDP provided an important institutional and policy level “bookmark” to highlight the importance of climate change.</p>	<p>The first dedicated municipal and other seed funding, along with external events (e.g. floods) were important catalysts. The creation of a dedicated Climate Protection Branch in the Municipality played an important role in formally institutionalising this function. The required event greening programme for the Fifa™ Soccer World Cup provided an important “window of opportunity” to invest in ecological restoration work for climate adaptation.</p>	<p>The mega events created important “windows of opportunity” to advance the adaptation agenda (particularly in relation to community ecosystem-based adaptation), raise awareness and build political support. The growing global adaptation agenda through the DAC helped to add momentum to local support for adaptation. Funding from USAID helped fund implementation workshops for the DAC. The creation of an official mitigation function in the Energy Office (focused largely on renewable energy), also helped create a more enabling environment for climate change work.</p>	<p>The DAC continued to be a key enabler of action and knowledge sharing at the international and regional level. Networking and collaboration at the regional level has also helped advance the work.</p>
Barriers to transformative adaptation	<p>The lack of precedent and the absence of national and international policy frameworks to guide the work, was a challenge.</p>	<p>The lack of a formal climate mitigation mandate was a challenge. The climate adaptation work far exceeded the available resources, meaning that a lot of</p>	<p>A key barrier was the realisation (through the Durban Climate Change Partnership) that there was insufficient leadership capacity in broader stakeholder groups. Another barrier lay in the difficulties</p>	<p>A key barrier in this phase has been the difficulty in building broader political and leadership support at the local level for climate adaptation</p>

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
	Limited adoption of the outcomes of the Headline Climate Change Adaptation Strategy by municipal sectors also meant that other integration approaches had to be considered.	work had to be done after hours. The lack of prioritisation of adaptation by other spheres of government was also constraining, as this meant that there was no community of practice with which to interact.	associated with broadening the municipal adaptation work beyond the three sectors that were originally part of the MAP work.	and the ongoing challenges of broadening implementation to additional key municipal sectors, despite the approval of the Durban Climate Change Strategy. The perception by some that the local agenda has been undermined because of the predominant global focus, has not helped this. Neither has the small size of the Climate Protection Branch that is responsible for implementation. An additional challenge has been that some of the early champions have moved on to focus on other areas of work, without sufficient broadening of the champion base.
Outcomes and influence of the climate adaptation work	This early work raised the flag around the issue of climate adaptation and provided a starting point for engagement and critique. Given the initial scientific nature of the climate adaptation work, this engagement and critique was predominantly from municipal functions such as the Engineering Unit. This	Incremental changes were seen in the integration of a climate protection branch in eThekweni Municipality, and growing awareness of the importance of the climate adaptation agenda amongst some groups of municipal officials, municipal champions and others. Publications in the peer reviewed literature helped to build	Growth in support for adaptation at the global level helped to drive adaptation into global policy discussions and cement eThekweni Municipality’s leadership role in the adaptation field. These significant shifts have been contrasted with ongoing local difficulties in integrating adaptation broadly across municipal departments, which has undermined the influence of the work. “Failures” in areas such as the Durban Climate Change Partnership had the	Consolidation of the work (through the Durban Climate Change Strategy) but also a realisation of the significant gaps (e.g. community based work; communication; lack of sectoral uptake; relative lack of political and administrative leadership) that exist in the local work. Climate adaptation work in eThekweni Municipality

	Stage 1: 2004-2006 – Laying the foundations	Stage 2: 2007-2010 – Broadening support and experimenting with implementation	Stage 3: 2011-2013 – Building an international platform for adaptation and cementing the Municipality’s focus on community ecosystem based adaptation	Stage 4: 2014- present (2016) – Consolidating the work and refocusing on regional and local knowledge sharing and implementation
	<p>helped to attract key individuals who would later become important champions in the climate work and ensured a sound scientific foundation for future work. However, this initial focus may also have reinforced a perception amongst broader stakeholder groups in eThekweni Municipality that climate change is a scientific issue, rather than a developmental one.</p>	<p>credibility and knowledge of eThekweni Municipality’s climate work. A growing focus on ecosystem-based adaptation helped build eThekweni Municipality’s profile as a city prioritising a key area of vulnerability (the natural environment) as a central part of the city’s climate adaptation response. However, this focus may also have reinforced the perception that climate change is an environmental issue.</p>	<p>potential to break trust with key stakeholders in Durban. However eThekweni Municipality’s growing focus on vulnerable communities and ecosystems as core to adaptation has helped to bring about institutional changes to embed the importance of restoration ecology as a key enabler of community ecosystem-based adaptation. Access to the “100 Resilient Cities Programme” opened up a new platform to advance broader transformative work in the Municipality.</p>	<p>itself has not broadened significantly beyond the original leaders and champions, although significant advances have been made at the regional and global levels through the success of the DAC. A critical question at this point in the work lies in how to build on the work done to date to advance transformative adaptation in eThekweni Municipality.</p>

Table 8.1 synthesises the elements of the “landscape of change” for eThekweni Municipality’s climate adaptation work and the extent to which these have collectively contributed towards outcomes at each stage that either advance or undermine transformative adaptation in the city. The thesis argues that this synthesis highlights the importance of a range of interacting elements (context, actors, dominant discourses, projects and practices, catalysts, facilitating factors and barriers) in contributing towards a continually evolving “landscape of change” that has the potential to drive transformation and transformative adaptation. The synthesis also raises important questions as to the specific levers for change within this landscape that might help to advance transformative adaptation in eThekweni Municipality.

8.2 Possible next steps in the “landscape of change” to advance eThekweni Municipality’s transformative adaptation journey

A critical question therefore lies in how to use this more synthetic understanding of the “landscape of change” that is emerging for eThekweni Municipality’s climate adaptation journey, to provide pointers as to possible next steps for the Municipality’s climate adaptation work, in order to advance transformative adaptation in the complex context of local government. Based on the outcomes from this research, the thesis argues that the following are possible levers for change that could help to catalyse and facilitate transformative adaptation in eThekweni Municipality.

8.2.1 Advancing the macro-system shifts that are needed for transformative adaptation

A significant challenge identified in Chapter 6, was the inability of the current climate adaptation work to effect significant system shifts, for example in the macro-economic policies of eThekweni Municipality. This is highly problematic, given the urgent need for systemic transformations that can shift the development discourse to one that prioritises issues of sustainable development, equity and justice (e.g. Swilling and Anneck, 2012; Leach et al., 2013). In 2012, the (then) City Manager for eThekweni Municipality proposed the creation of a “Sustainable City Initiatives Unit” in recognition of the need for improved coordination of efforts in the arena of sustainable development, and the elevation of these issues to a strategic position in the Office of the City Manager. This function has since evolved into the “Sustainable and Resilient City Initiatives (SRCI) Unit” and is currently in the process of being established in the Strategy Management Office (in the Office of the City Manager), with the purpose of coordinating strategic sustainability and resilience initiatives across the Municipality. An important function of this Unit will be to identify strategic sustainability and resilience gaps in the Municipality, and then to provide support to the relevant municipal departments in facilitating the changes that are needed. The Unit will also test and experiment with new approaches that can more effectively embed the principles of sustainable development into the operations of the Municipality. The creation of this function represents a significant opportunity to elevate strategic challenges such as climate change and to advance thinking around alternative and innovative policies (for example in relation to sectors such as economic development) that can fundamentally change the way in which the city responds to climate mitigation and adaptation. It will be critical for the Climate Protection Branch of EPCPD and the new SRCI Unit to work closely together to leverage greater possibilities for more rapid and transformative action in relation to climate change.

8.2.2 Enhancing the institutional and policy environment to facilitate innovative action in the climate change adaptation arena

This thesis has shown that an enabling policy and institutional environment is critical in facilitating innovative action across multiple levels of governance (e.g. Westley et al., 2011; O'Brien, 2011; Table 7.3) and in advancing transformative action. It has also argued that maximising the value of “windows of opportunity” in this regard, is critical (e.g. Olsson et al., 2006). The coming into force of the Paris Agreement in November 2016 represents a significant shift in the international and national policy arena in relation to climate change. The Paris Agreement has placed requirements on national governments to consolidate climate adaptation and mitigation strategies that quantify specific contributions towards achieving the global climate goals that have been set. South Africa is beginning to see this translate into the drafting of a National Adaptation Strategy (Department of Environmental Affairs, 2016), upon which its National Adaptation Plan will be based, and in both mitigation and adaptation commitments through the country’s NDCs. A national “Climate Change Act” is also being conceptualised, but has not yet been drafted. If promulgated, this will be the first legislative piece to guide climate change action in the country. This legislation, along with national mitigation and adaptation commitments, will require local governments to play a central role in meeting these targets. This strengthening of the policy and legislative context at both a national and international level, therefore provides an important “window of opportunity” to drive adaptation across a number of municipal sectors in eThekweni Municipality. This shifting context also provides a critical moment for local governments to play a proactive role in contributing to the debates regarding how policy and legislation is to be developed and framed. EThekweni Municipality already has strong regional networks that have been established, for example, through the work of the Climate Change Compacts. The Municipality could therefore play an important role in helping to mobilise other local government actors to contribute collectively to discussions around future policy and legislation, and the implications these may have for cities.

For eThekweni Municipality, an important part of responding to this shifting policy environment will also be to consider the institutional changes that might be needed to facilitate local government’s ability to help meet targets and legislative requirements. In this regard, opportunities exist to integrate the climate mitigation and climate adaptation agendas and discussions are currently underway regarding the most appropriate institutional location for the Energy Office (responsible for the climate change mitigation function in the Municipality) in relation to the Climate Protection Branch (responsible for the climate adaptation function). These discussions are critical in helping to better integrate and align these two components of the climate change agenda in a relevant way.

In addition, given that existing municipal systems were shown in this thesis to create a significant barrier to innovation, there is a need to engage directly with functions such as the Municipality’s Performance Management Unit in order to explore ways to facilitate, rather than constrain, innovative and exploratory work and to include issues such as climate change as cross-cutting performance areas in Individual Performance Plans. Such shifts would provide a critical institutional signal to demonstrate the intention of eThekweni Municipality to contribute meaningfully to the national and global climate change agenda, and to embed these requirements across all aspects of its work.

8.2.3 Building new champions for transformative adaptation

This thesis has argued that champions are critical in driving transformation and transformative adaptation (e.g. Leck and Roberts, 2015; Table 7.1) and that political support is also critical in this regard (Table 7.3). There is therefore an urgent need in eThekweni Municipality for strong political climate change champions and city leaders who can advance this agenda in the face of multiple complex and competing priorities. There is also a need to broaden the number of champions in the administration, who can raise the profile of climate change adaptation and ensure that this is appropriately embedded in the institution. A critical opportunity in this regard lies in the rejuvenation of the political “Climate Change Committee”, which was initially the brainchild of former Mayor Nxumalo and which has received support from the current Mayor Cllr Gumede. A Climate Change Technical Task Team comprising Heads of Departments (or their representatives) across all municipal functions has also been established to translate the Durban Climate Change Strategy into cross-sectoral action. Such platforms could provide a strategic opportunity to highlight the risks posed by climate change, emphasise the developmental nature of the agenda, and seek support to advance and upscale municipal-wide mitigation and adaptation initiatives. Opportunities to expand the champion base in the Municipality’s administration, might also emerge through the increasing national and international climate change policy “pressure” and the impact of this in incentivising and promoting more widespread local adaptation action. Emerging opportunities linked to large scale funding, for example through the Green Climate Fund, could also provide a focused platform to engage, plan and implement project and programme level climate adaptation initiatives at scale in eThekweni Municipality.

8.2.4 Facilitating multi-stakeholder collaboration and new partnerships towards transformative adaptation

Collaboration and the strengthening of partnerships emerged in this thesis as an important facilitator of transformative adaptation because of the way in which such patterns of working help to build capacity, strengthen opportunities for innovation, and bring a range of voices into the climate conversation (e.g. Bahadur and Tanner, 2014; Table 7.3). There is a need to continue advancing the collaborative climate adaptation work that has been started in eThekweni Municipality (e.g. through the UEIP and regional climate change partnerships) in order to maximise opportunities for multi-stakeholder involvement and the establishment of partnerships for climate adaptation implementation. Important opportunities exist to facilitate multi-stakeholder collaboration, for example through the Green Climate Fund, which represents a global commitment to providing climate finance, particularly in developing countries. Apart from assisting in scaling up the climate adaptation work and reducing some of the direct implementation costs for the Municipality, such funding catalysts can play a critical role in mobilising a range of municipal and non-municipal stakeholders around a collaborative vision for adaptation, and then in drawing them together for the purposes of implementation. As much as this can be complex to manage and coordinate, such opportunities also help to facilitate new forms of governance and encourage participation and the involvement of multiple perspectives around complex issues. A current opportunity exists to submit a collaborative proposal to the Green Climate Fund for innovative and transformative climate action.

Given that a current gap in the work of eThekweni Municipality relates to the participation of communities themselves in climate adaptation planning and decision-making, opportunities also exist to engage directly with communities around climate adaptation planning and implementation. As an example, one of the major pillars of the Municipality's first Resilience Strategy, a product of the city's involvement in the 100 Resilient Cities Programme (EThekweni Municipality, 2017b), will focus on "Collaborative Informal Settlement Action", with a specific intention to ensure that new work in this space is climate-smart, participatory and partnership-based. This could provide an important and practical space to involve communities in the process of planning for climate change and would build on existing work that is being undertaken in informal settlements as part of the UEIP. Such work is particularly important given the expansion of informal settlements in Durban and the high levels of vulnerability of these communities to climate change impacts.

8.2.5 Securing financial and human resources for the implementation of transformative adaptation action

Although the issue of resourcing did not emerge as a strong theme in this thesis, accessing finance and appropriate human resources for implementation is a critical element in advancing transformative adaptation. In many instances, new finance (i.e. not in existing budgets) is required and the skills that are needed to work in the complex and cross-sectoral climate change space are not easily available. In terms of financial resources, there is increasing access to global climate finance (for example the Green Climate Fund, mentioned previously) that could facilitate upscaling of transformative adaptation action, and these opportunities need to be explored by eThekweni Municipality. With regard to human resources, and given the breadth of skills required in the climate change arena, there is an urgent need to ensure proactive investment in appropriate climate change skills development. In this regard, the Municipality's current investment in research partnerships with local academic institutions should be strengthened and advanced. Opportunities also exist in the recent creation of an office at UKZN for the IPCC Working Group II co-chair, which could help to promote the urban climate change science agenda in this academic institution. Within the context of ongoing climate adaptation work, opportunities could also be sought to maximise the value of thought leaders and critical thinkers in helping to advance the work by strengthening technical expertise in areas where this may be needed, and introducing ideas that challenge and provoke new responses.

8.2.6 Understanding and monitoring the evolving "landscape of change" in eThekweni Municipality's climate adaptation field

The points that have been made in this section highlight elements of eThekweni Municipality's climate adaptation "landscape of change" that could be enhanced and leveraged to facilitate transformative adaptation. However, in the course of depicting this "landscape of change" more clearly in the current chapter, the thesis has also shown that these transformation and transformative adaptation landscapes are complex, with multiple changes happening continually at the level of context, and in terms of how actors, initiatives and policy frameworks interact at different points to produce particular outcomes. In this unpredictable and often "messy" context, constant observation and reflection is needed on work progress, what has changed, and which past lessons can be drawn on to think strategically about how to move forward. Ongoing monitoring of the evolving "landscape of

change” is therefore needed in order to better understand the shifts that are taking place and to inform the most appropriate response. This requires deliberate and regular reflection that is incorporated into project and programme management processes. This reflection needs to include deliberate consideration of the trade-offs that are being made when certain actions are prioritised over others, and how to manage these in the best way possible.

This chapter has sought to consolidate and articulate elements of the “landscape of change” that have emerged in this thesis as being important in facilitating transformative adaptation in the context of eThekweni Municipality’s climate change adaptation work, and to use this as the basis for identifying potential leverage points within the current landscape that could help to advance transformative adaptation. Importantly, these opportunities lie across a number of elements in the “landscape of change”, including the context, actors and climate adaptation practices. The next chapter builds on these ideas by elevating the discussion from the case study to consider critical components of a “landscape of change” that might be needed to facilitate broader transformation in environmental governance.

CHAPTER 9: TRANSFORMATION IN ENVIRONMENTAL GOVERNANCE IN THE LOCAL GOVERNMENT CONTEXT - WHAT CAN ETHEKWINI MUNICIPALITY'S CLIMATE ADAPTATION WORK TEACH US?

This thesis began by framing the current global challenge in achieving sustainable development and highlighted the urgent need for transformation in environmental governance, in order to steer development in a direction that is more sustainable, equitable and just. It also raised questions as to what the characteristics of transformation in environmental governance might be (i.e. what does transformation look like), how transformation might unfold in different contexts, and what factors could help to catalyse and facilitate transformation. This chapter responds to these questions by consolidating what has emerged in the analysis of the eThekwini Municipality climate adaptation case study, and proposing a conceptual framework that captures the ideas from this research. The chapter provides direction on critical elements to consider when initiating and sustaining transformation in environmental governance. The rationale of the thesis is that this transfer of learnings (from a transformative adaptation case study to transformation in environmental governance) is possible, given that addressing climate change is a critical part of achieving sustainable development in the context of environmental governance. The chapter begins by representing and then describing the elements of the proposed conceptual framework, before considering the potential implications of the messages that emerge from this for local governments that are trying to be agents of transformation in these environmental governance spaces.

9.1 Towards a conceptual framework for transformation in environmental governance

Three central ideas have emerged in this thesis as being critical in framing how local governments such as eThekwini Municipality conceptualise the process of initiating and sustaining transformation in environmental governance. Firstly, it is critical to understand what transformation might look like in a particular context, or at least the characteristics that allow one to assess whether the changes that are being initiated are in fact transformative. Secondly, it is important to recognise that transformation is likely to be a complex and unpredictable process, comprising a landscape of interacting elements such as context, actors, shifting discourses, implementation practices, catalysts, facilitating factors and barriers that interact in various ways at different moments in the transformation journey to produce a particular outcome at any point in time. In such a “landscape of change”, identifying the potential interventions that can help maximise opportunities for transformation is critical. Thirdly, monitoring the process of transformation is critical, not only to assess whether the change that is unfolding is in fact transformative, but also to inform how the landscape of change is continually navigated and adjusted to facilitate transformation in environmental governance. Figure 9.1 represents these ideas in a conceptual framework that links the idea of “transformation in environmental governance”, and the characteristics that distinguish this, with the “landscape of change” that this thesis argues is needed in order to advance transformation. The elements of the conceptual framework are then discussed in further detail.

Incremental and transformative change
 The emerging “landscape of change” contributes to incremental and more rapid change at different points along a transformation journey

CHARACTERISING TRANSFORMATION IN ENVIRONMENTAL GOVERNANCE IN A LOCAL GOVERNMENT CONTEXT

Critical characteristics:

- Transformation involves fundamental changes to existing systems in order to reduce risk and vulnerability
- The outcomes of transformation should promote greater social and economic quality, participation, rights and sustainable development

Transformation focus and intention
 An intentional focus on transformation needs to frame how sustainable development challenges are addressed

MONITORING TRANSFORMATION
 Proactive and critical reflection on the evolving “landscape of change” is critical in order to successfully navigate and sustain transformation in environmental governance. This includes considering trade-offs that are required.

UNDERSTANDING THE “LANDSCAPE OF CHANGE” FOR TRANSFORMATION IN ENVIRONMENTAL GOVERNANCE
 Transformation in environmental governance will require an ability to work across multiple scales, with multiple actors and across a variety of practices to establish a “landscape of change” that can advance transformation. This needs to happen in a context that is constantly changing, making the evolving “landscape of change” a messy and unpredictable space.

CONTEXT
 Historical, geographical, political and developmental context influences how transformation in environmental governance takes place

ACTORS
 Transformation In environmental governance will require a range of actors playing different roles at various points along the transformation journey

DISCOURSES
 Transformation processes need to produce, shape and remain responsive to existing and emerging discourses, both locally and internationally

PRACTICES
 Important practices include:

- Working in new, innovative and collaborative ways
- Proactively identifying and developing champions at different levels
- Sharing learning and building knowledge
- Building skills to facilitate transformation
- Working across multiple scales

CATALYSTS, FACILITATING FACTORS AND BARRIERS TO TRANSFORMATION IN ENVIRONMENTAL GOVERNANCE
 Additional catalysts (e.g. strong leaders, external events/crises, windows of opportunity), facilitating factors (e.g. resources, an enabling policy and institutional environment, appropriately framed communication) and barriers (e.g. challenging institutional contexts, lack of understanding around the need for transformation) need to be considered in order to understand the evolution of the “landscape of change” and potential leverage points to advance transformation in environmental governance.

Figure 9.1: A conceptual framework to understand transformation in environmental governance.

The proposed conceptual framework for transformation in environmental governance comprises three main elements: The characteristics of transformation in environmental governance in a local government context; understanding the “landscape of change” that is required to advance transformation; and monitoring transformation progress. The more detailed components that interact and contribute towards the “landscape of change” are also represented in the framework. Each of these elements is discussed in more detail in the following sections.

9.1.1 Transformation in environmental governance in a local government context: Critical characteristics

This thesis argues that understanding the characteristics of transformation, and being intentional in the desire to achieve transformation in environmental governance, is critical in guiding a complex and evolving “landscape of change” towards a particular outcome. Although transformation and what constitutes transformation is not necessarily uniform, the literature suggests that there are a number of characteristics that are inherent in transformational change. Transformation is characterised by a complete altering of an existing system (e.g. in the technical, social or political sphere) to reduce systemic risk and vulnerability (e.g. Pelling et al., 2015; Solecki et al., 2015). Such changes can happen at different levels in a system, for example at the personal, practical or political level (O’Brien and Sygna, 2013), and may unfold as incremental or more rapid change depending on the context (e.g. Frantzeskaki et al., 2012). Importantly, the outcomes from transformation in environmental governance should promote greater social and economic equality, participation, rights and sustainable development (e.g. Leach et al., 2013). This understanding of transformation (i.e. as involving fundamental system shifts) needs to fundamentally frame the way in which sustainable development challenges are addressed, so that progress can be intentionally evaluated against an appropriate reference point.

The importance of transformational intention and focus

Linked to the above points, and given the time that may be required to effect these deeper systemic changes, transformational intention becomes critical in providing conceptual direction to the transformation journey and ensuring that appropriate building blocks (e.g. policy “bookmarks”, securing resources and building cross-sectoral champions) are put in place to help facilitate the bigger shifts that are needed beyond the short-term.

9.1.2 Understanding the “landscape of change” for transformation in environmental governance

The results from this research suggest that transformation in environmental governance will require an ability to work across multiple scales, with multiple actors and across a variety of practices to establish a “landscape of change” that can advance transformation. This needs to happen in a context that is constantly changing, making the evolving “landscape of change” a messy and unpredictable space. The critical elements that need to be considered as part of such a “landscape of change” are described below:

Context

An important theme emerging in this thesis is that context (historical, geographical, political and developmental) plays a critical role in determining the way in which transformation is framed, the rate of change that is most relevant and the catalysts that will be most important in driving transformation forward. In eThekweni Municipality, for example, with its relatively resistant and bureaucratic context and its political focus on multiple priority challenges, framing the climate adaptation agenda as one that is developmental in nature and that has the potential to address human vulnerability and unemployment, was critical. Equally important has been the acknowledgement that, in a context that is generally resistant to change, slower and incremental change is necessary at points to gain traction and momentum. In such a context, where the broader system will take time to shift, the role of individual champions who can generate the necessary support and slowly create the institutional building blocks (e.g. dedicated functions and resources) for an enabling and supportive policy environment is critical. Political dynamics are a critical component of context that need to be considered when making decisions about the nature of implementation. In different contexts, transformation may therefore unfold differently.

Actors

Transformation in environmental governance will require the involvement of a range of actors playing different roles at various points along the transformation journey. An initial leader for example, may play a critical role in introducing new ideas, establishing the foundational structures that are needed and opening up opportunities for transformation. However, if transformation is to be influential, the actors involved need to broaden significantly to include others who can, for example: continue to champion these ideas within specific sectors; provide new and critical insights into alternative approaches; provide access to funding sources and networking opportunities; or help to reflect on and document processes. Transformation will require an ability to recognise the potential value of different actors at various points, both in formal and “shadow systems” of governance, and to create access points that allow them to contribute in appropriate ways throughout the transformation journey.

Discourses

Dominant discourses need to be considered as an important element in the “landscape of change”, as they shape transformation, may limit or enhance it and in turn are produced through transformation. These might be international discourses, for example in the case of the strengthening of the climate change discourse in the wake of the Paris Agreement, or the strategic prioritisation of cities in the New Urban Agenda as spaces in which to achieve the urban SDG. These discourses may also emerge in the spaces of academia and professional practice, as new knowledge emerges in relation to particular challenges. In the eThekweni Municipality case study for example, the shift in the climate change discourse to include issues of governance in a more explicit way, has resulted in significant investment in programmes that cross municipal boundaries and bring multiple actors together in new and innovative spaces. Remaining responsive to emerging discourses, or deliberately shifting the discourse to spark new thinking, is critical in the context of a transformation “landscape of change”.

Practices

Practices (or “ways of doing things”) that have emerged in this thesis as being important in the landscape of change include:

Working in new ways

Transformation in environmental governance requires an ability to work in new ways. In instances, for example, where there is resistance to new ideas, “shadow systems” of governance may be required to provide a space for testing and exploration, before these are elevated to challenge existing systems. In other instances, the cross-sectoral nature of the transformation agenda may require different perspectives to be brought together in trans-disciplinary arenas, so that new knowledge can produce more innovative and transformative outcomes. Increasingly, the complexity of the environmental governance challenges being faced in the sustainable development field also requires a number of new skills, and this will necessitate the formation of new partnerships for implementation. This will include acknowledging that most environmental challenges are not simply technical, scientific, problems waiting to be solved with technical solutions, but are more likely to involve a complex mix of technical, governance and political issues. In all these examples, collaboration will be key and will require a rethinking of “business as usual” processes in order to facilitate innovation and learning.

Proactively identifying and developing champions at different levels

The results in this thesis suggest that leadership through champions at a number of levels is central to transformation in environmental governance. Transformation requires strong and bold leaders, who can continue to drive transformation even in the face of significant obstacles. However, these initial leaders cannot be effective alone, and need to inspire and build relevant sectoral champions who can help to embed the transformation agenda in spaces that would otherwise be inaccessible. These champions usually share certain characteristics, such as the need to be brave, determined and willing to work beyond a traditional scope of work to advance new agendas. In the context of bureaucratic institutions, where changing the policy environment takes time, leaders and champions are needed at multiple levels, acting across different spaces in different ways, in order to drive transformation. In the context of local government for example, this would involve municipal officials, politicians and stakeholders external to the Municipality. The challenge lies in identifying champions and then in finding relevant ways to help ensure they remain engaged.

Sharing learning and building knowledge

Learning and knowledge production are critical in capturing lessons to help inform and advance current and future transformation. Although eThekweni Municipality has made significant progress in integrating the climate adaptation agenda into municipal planning and implementation, it has not yet fundamentally altered the structural foundations and developmental paradigms that perpetuate issues such as inequity, environmental degradation and vulnerability to climate change. This level of systemic transformation takes time and a long term commitment, often with little clear sense of what is required to achieve these outcomes. In this regard, learning and knowledge production are critical in capturing lessons that can help inform and advance current and future transformation in a context of uncertainty. Knowledge production is often the final part of the project “value chain” and too often is either left out or is inadequate. Yet, if transformation requires a more deliberate approach to

reflection and learning, then documentation of the process becomes critical in building an appropriate knowledge base. Equally, given the often experimental nature of new and transformative work, this knowledge base is critical in helping future work to advance through these early stages more rapidly. This form of “institutional memory” is particularly important given the long time-frames over which transformation will likely unfold.

Building appropriate skills to facilitate transformation in environmental governance

New skills sets and toolboxes will be required to deal with the increasing complexity of global and local sustainable development challenges and the transformation that is required to shift current development patterns. The results in this thesis suggest that addressing such challenges will require not only a focus on the substantive work and the experimentation and learning that will accompany this, but also an ability to observe the evolving “landscape of change” in a way that allows this to strategically inform the decisions that are made in the process. This requires technical knowledge, as well as an ability to interpret more nuanced issues relating to people, governance and party politics. It may also require new “process skills”, for example in the need to bring different groups together in collaborative ways to explore alternative development pathways, or to facilitate the bridging of different interest groups, whether this is between science and policy interests, or between different areas of specialist expertise. As Roberts (2016, p. 5) highlights, these “scientists-in-practice are the proponents of a new type of city/urban science, one that blurs boundaries and requires a mix of traditional natural and social science, grounded practice, savvy politicking and passionate activism”. Two critical questions emerge from this. Firstly, do the right people exist in organisations with this complex combination of skills that can provide the assistance that is needed to navigate transformation effectively? Secondly, if such skills are critical, are tertiary institutions providing training that gives young people the foundations from which to build their ability to think more broadly, to make decisions in non-linear ways and to work across disciplinary “silos” to find the pieces of knowledge and expertise that are needed to develop innovative responses to increasingly complex challenges? These are important considerations in a global and local environmental context that will be increasingly reliant on these abilities.

Working across multiple scales

This thesis suggests that transformation in environmental governance will require an ability to work across multiple geographic, implementation and time scales. For example, from a geographic perspective, transformation might require regional partnerships and collaboration to be facilitated; from an implementation perspective, working across the scales of policy and practice will be important in ensuring that facilitatory policy frameworks are in place, whilst at the same working in practical spaces to build an evidence base of implementation projects that can demonstrate success and build support from the bottom up; and from a temporal perspective, transformation will require an ability to conceptualise projects in a way that they can be sustained, especially given the medium to long-term time horizons over which transformation is likely to occur.

Catalysts, facilitating factors and barriers

In addition to the practices described above, which may themselves be important catalysts or facilitating factors, a range of additional catalysts, facilitating factors and barriers need to be considered in order to understand the evolution of the “landscape of change” and potential interventions that could leverage opportunities to advance transformation in environmental

governance. Potential additional catalysts include strong leaders, external events and crises that spark recognition of the need to change, and specific “windows of opportunity” that emerge at various points. Factors that can help to facilitate and sustain transformation include access to appropriate human and financial resources, an enabling institutional and policy environment, and the ability to frame and communicate the transformation agenda in a way that resonates with developmental priorities. Possible barriers to transformation in environmental governance include challenging institutional contexts, a lack of understanding around the need for transformation, and resource constraints in relation to implementation.

9.1.3 Monitoring transformation

Proactive and critical reflection on the evolving “landscape of change” is critical in order to successfully navigate and sustain transformation in environmental governance. This is because transformation does not necessarily follow a linear and predictable path but rather requires an ability to navigate an evolving “landscape of change” that comprises a range of interventions and actors that interact at different times and in different ways to either facilitate or undermine transformation. An important consideration is therefore how to create a landscape of change that will build sufficient momentum across enough arenas, to generate the transformation that is needed and how to be more proactive and deliberate in adjudicating the journey as it evolves. This requires an ability to: know what to watch for in the evolving landscape (e.g. changing local and national context; changing actors and interventions; emerging opportunities and barriers) and strategically identify intervention points that will leverage the greatest change; forecast more accurately (or at least more proactively) around where decision pathways might lead and the potential trade-offs involved; identify critical points in the process for strategic reflection; and involve individuals with the appropriate skills to help facilitate and guide this. This is particularly challenging, given that in most instances, the goal cannot be determined precisely in advance and therefore work must largely proceed “based on intuition, hypotheses and guesses” (Gray and Macanuso, 2010, p. 6).

Considering trade-offs

In a context where resources are scarce, it is impossible to do everything that is needed. This requires that trade-offs are made in terms of decisions and investment priorities. Where possible, these should be considered proactively and undertaken in a way that maximises the potential for transformation gains, and minimises the potential negative consequences of having prioritised a particular direction for action.

Incremental and transformative change

This research suggests that transformation may happen through both incremental and more rapid change at different points along a transformation journey. The thesis suggests that, although the objective of transformation in environmental governance is to effect fundamental systems change, in particular contexts (e.g. bureaucratic institutions) where it is difficult to effect change, incremental changes may initially be more effective in building support and momentum in the work. However, the thesis also suggests that given the urgency of the sustainable development challenges being faced, incremental change alone is unlikely to be sufficient to yield the scale of change and the deep systemic shifts that constitute transformation, within the required timeframes for action. The challenge lies in recognising when incremental change has reached its limit, and then understanding what might be

needed to take the big transformative steps that are so urgently required. Maximising the value of “windows of opportunity” in this regard, is critical.

9.1.4 Balancing inherent tensions in the transformation “landscape of change”

This thesis argues that the “landscape of change” that emerges as part of the process of transformation in environmental governance, is a complex and unpredictable space. In addition to this, it is a space where a number of tensions exist between what is required in terms of rapid and transformative action to address sustainable development, and the inherent characteristics of the particular context in which transformation unfolds. Although these tensions are unlikely to always be resolved, being aware of them can go some way in helping to balance conflicting needs. Some of the tensions identified in the eThekweni Municipality case study, and that are likely to be relevant in the context of transformation in environmental governance, are described briefly below:

Dealing simultaneously with immediate and long-term challenges

In the context of a local government such as eThekweni Municipality, there is a need to balance the demands of addressing immediate developmental priorities with the need to generate innovation and cross-sectoral engagement around longer-term challenges (such as climate change), which could ultimately undermine these same developmental gains. As Blackwell et al (2009, p. 18) emphasise, “there is a permanent tension between maintaining high levels of innovation and being dragged into short-term problem solving with its attendant risk of focusing on a few discipline-specific skill sets”.

Broadening the change landscape within a limited resource base

A broad landscape of change needs to be built across different actor groups, interventions and policy levels if transformation is to be effected. The challenge lies, however, in the fact that new work and functions are often under-resourced until they are able to develop sufficient support and momentum. Careful thought needs to be given to how to use limited resources in the most strategic ways to deliver maximum benefits.

Finding time for reflection in the growing urgency for change

In a context where rapid change is required, there is also an increasing recognition of the need to spend time ensuring that decision-making is strategic. A critical challenge therefore lies in finding a way to balance the need for reflection (in order to better navigate the change landscape) with the pressures of acting quickly given the urgency of addressing challenges like climate change.

Taking risks without undermining long-term process

Implementing new and innovative work will naturally require risk-taking. However, if interventions are unsuccessful they can cause damage, for example through loss of trust or a reduced willingness from key players to support additional interventions. There is a need to understand the potential implications of risks and to balance these with the potential opportunities that are linked to these.

Balancing structure and flexibility

Transformation requires sufficient flexibility in order to respond to a changing context, an evolving understanding around the issue, and the evolving change landscape. However, a degree of structure is required to help manage the process itself and to respond to performance monitoring requirements,

which are often restrictive. Finding a balance between “focus and serendipity” (Blackwell et al, 2009) in an increasingly rigid and controlled environment is central to facilitating effective transformation that is responsive to an increasingly complex world.

The skills mismatch between what we need and what we have

The skills and characteristics required of the individuals who need to navigate complex transformation processes, differ in many cases from the skills and characteristics of existing and new leaders, and also differ from the skills and characteristics that are being developed in the course of the education and training that is provided to young people. This is problematic.

Facilitating innovation in a time of conservatism

There is an inherent requirement in transformation that requires something other than “business as usual” and that has to be facilitated through the brokering of new conversations. However, in many cases, existing systems, political dynamics or general tendencies towards conservatism, do not facilitate such approaches. The challenge then lies in whether it is possible to still be innovative in such circumstances.

9.2 The implications of these emerging messages on transformation in environmental governance, for local government

As the world moves into a very different future, transformation in environmental governance will be required across many levels in different spaces in order to respond appropriately to secure a sustainable future. This thesis suggests that transformation is likely to be a complex and difficult process, requiring strong leadership and a combination of actors and interventions along the transformation journey in order to give effect to what is needed. A critical question then is what role local government needs to play in this space. As indicated earlier in this thesis, local governments by their nature are well positioned to adopt a longer-term and more strategic perspective than other sectors in society: they are service oriented and not driven by the need for immediate profit, they have access to levels of human and financial resources, they have the capacity to embed long-term agendas through relevant policy formulation, and their bureaucratic nature provides a degree of stability within this changing context. Many would argue on this basis, that local governments not only have the responsibility to be leaders in this transformation space but also that they are well positioned for this. However, local government institutions also come with significant weaknesses, given their systemic bureaucracy that can create systems that inhibit and slow down transformation, rather than facilitating it. As Davison et al (2016) point out, the structures that exist in local government do not facilitate integration and this limits the ability of such bureaucracies to address “wicked”³¹ problems. A clear challenge for local government therefore lies in how to position itself within this space and what will be required in terms of rethinking the way in which local governments operate. This thesis suggests that the following will be critical requirements for local governments that want to facilitate transformation in environmental governance.

³¹ The concept of a “wicked problem” was first coined by Rittel and Webber (1973) and is used to suggest problems that lack clear definitions, boundaries and solutions, and that contain complex interdependencies, making them extremely difficult to solve.

Ensuring sufficient allocation of resources to strategic coordination and “fore-sighting” functions

Although the majority of people employed in local government need to be able to focus on the “day to day” technical functions associated with running an institution of this nature, it is also critical to ensure that there are sufficient individuals who can bridge across functions and make strategic connections to ensure that the collective efforts across the Municipality contribute to socially equitable and environmentally sustainable outcomes. Such functions also need to be able to watch for emerging global trends and ensure alignment of local government activities with evolving science and knowledge. These coordination and fore-sighting functions will play an increasingly important role in helping to traverse new landscapes of change within the context of the ongoing and more immediate service delivery challenges that local governments are also required to address.

Incentivising and facilitating collaboration, dialogue and innovation

Transformation will require different ways of working, and an ability to test new ideas and bring knowledge together in new ways. This requires an ability to collaborate and to innovate. Cross-sectoral engagement, innovation and experimentation with new ideas should therefore be incentivised and facilitated in relevant ways.

Identifying and changing systems that hinder transformation

Linked to the above point, local governments need to look carefully and critically at existing institutional systems that have the potential to hamper transformation, and to actively engage in changing these in relevant ways. The Performance Management System was one example cited by respondents as a system that discourages innovation and collaboration, through its punitive nature and its focus on measurable targets. However, this also has the potential to provide incentives for work that will facilitate transformation, and therefore such opportunities need to be explored.

Understanding and building the skills required to facilitate transformation

As indicated previously, new skills are required to navigate complex transformation processes. This requires local government to recognise the skills required, find ways to recruit for these, and ensure that such skills are being developed in those entering the job market. This will require local governments to actively seek to employ officials in strategic positions who have the breadth of skills and experience to be able to play proactive “bridging” roles that can help facilitate the collaboration, critical thinking, innovation and knowledge sharing that will be needed in navigating towards a very different future. It will also require local government to partner with academic institutions to find innovative ways of building an appropriate skills base in emerging graduates.

Maximising the influence of local government

Local government has significant potential to influence national and global debates around sustainable development issues and related policy. The influence and leverage associated with this needs to be maximised.

Encouraging brave and bold leadership

None of the above is easy in a context that is increasingly tending towards conservatism, politicisation and silo-isation, rather than innovation. This will require leadership that is bold and brave enough to recognise the shifts that are needed and then to facilitate these in relevant ways.

The conceptual framework that has been proposed in this chapter consolidates the ideas emerging in this thesis and provides a way in which to more proactively consider what might be required for local governments and other entities to deliberately enter the space of initiating and sustaining transformation in environmental governance. As highlighted in Chapter 2, this is a critical endeavour if current development trends are to become more equitable, just and sustainable in a context where social and environmental thresholds are rapidly being exceeded. However, the framework that emerges is a complex one and suggests that embarking on a journey towards transformation in environmental governance in a deliberate way will require commitment, particular skills and a level of bravery. A critical question then, when one considers this conceptual framework, is whether local governments are suitably equipped for this challenge.

9.3 Transformation in environmental governance: A realistic agenda for local governments in African cities?

In considering the transformation messages emerging in this thesis and what these mean for local governments in cities like Durban, it is important to reflect on the local government context that was painted for eThekweni Municipality at the beginning of Chapter 6 and on the barriers to transformative adaptation that were framed in Chapter 7. Important characteristics of this local government context include the fact that the bureaucratic nature of the municipal institution and its systems are not conducive to change, that the local government institution is not well equipped to deal with multiple complex challenges (particularly in contexts where there are immediate and urgent development priorities that require attention) and that party politics has significant influence in determining the development path of the municipality. Importantly, this context is likely to reflect the context for most other African cities and the local governments that are responsible for their management.

The critical question then is whether the requirements for transformation in local government that were proposed in Section 9.2 are realistic and possible within such a context. This context is further exacerbated by the fact that the need for transformation now exists across multiple arenas as a result of emerging global and local pressures across the economic, social, environmental and governance spectrum. In cities like Durban for example, the pressure is mounting, not only to radically increase employment opportunities in order to reduce poverty and inequality to avoid social instability, but to simultaneously do this in a way that does not exacerbate ecological degradation and climate change impacts beyond critical thresholds. The likelihood of local governments being able to manoeuvre at the speed required to effect significant transformation across such scales and levels of complexity is doubtful, especially given the tendency towards conservatism under such conditions. As one respondent emphasised:

“I think we’ve become so pressurised...And I think survival instincts indicate that, you know, if you’re under a situation that’s dangerous to you and it’s threatening, you go

back to what you know, you become very conservative, and you know under those sets of circumstances to change becomes very risky...And that's the problem and society almost demands that we become more cautious at this point, it doesn't like high risk, you know and that's the problem is a lot of the stuff is high risk. ..It's high risk for individuals who are stepping into new places, high risk for the institution of government; it's high risk for the stakeholders we're asking to change their portfolios of action and do new things...we're now saying the way to respond to this high risk stuff is to come in and do transformative change and society's view is Oh no! ...I think we're caught in a very difficult position, there's not enough momentum around the transformative change and not enough courage to be able to drive that..." (Former Deputy Head: EPCPD, 25/05/2015).

These challenges are likely to be emphasised in African cities, where the scale of the additional socio-economic challenges is still so immediate and evident and where governance structures may not be sufficiently developed to respond well to new and more complex stresses. In such contexts, the requirements for local governments operating in the arena of transformation begin to feel overwhelming. However, it is often in these same complex urban spaces where significant opportunities still exist for innovation and transformation in environmental governance. Some important questions therefore follow: Firstly, can transformation in environmental governance be universally applied in response to the challenges of sustainable development, or are there some sustainable development challenges where the amplitude of change that is required in terms of scale and complexity, is too great for this to be a realistic objective for an institution like local government, in the timeframes required? And secondly, what contribution can local government and other actors make towards the complex transformations that are required? These are difficult questions to answer but some thoughts are provided as a starting point to further discussion in this regard.

9.3.1 Is transformation in environmental governance possible for local governments?

Climate change is a particularly complex sustainable development challenge to address, given the fact that it is cross-cutting, systemic in nature, challenging to existing development trajectories, and has impacts across multiple scales and time horizons, with exacerbated impacts for the most poor and vulnerable. In the context of a local government bureaucracy of the type seen in eThekweni Municipality, it is questionable whether transformation at the scale of the full climate change challenge is possible, given the time constraints within which these climate pressures require action. This raises questions as to whether transformation in other components of environmental governance is a realistic agenda for local governments. Transformation may be more readily achievable, for example, in instances where the amplitude and complexity of change is smaller than that of an issue such as climate change. In the case of eThekweni Municipality's Biodiversity work for example, the agenda is more focused, with a smaller and more recognisable range of options for implementation, and this may have contributed towards the ability of this work to become more mainstreamed in terms of the Municipality's planning and decision-making (Former Deputy Head, EPCPD, pers. comm., 19.04.2016). The timeframes over which this work has developed (which are longer than those of the climate adaptation work to date), may also have created more space and time for new champions to emerge to sustain the work in this field. However, in more complex and cross-cutting fields such as climate change, different approaches may be needed to facilitate transformation in environmental governance in a local government context.

9.3.2 What role can local government play in the arena of transformation in environmental governance?

If transformation in complex fields such as climate change is challenging for local governments, then what role *can* they play in the complex arena of transformation in environmental governance? One response might be to deconstruct the larger challenge into more manageable components, so that the transformation that is required is more clearly understood, that the “landscape of change” can be sufficiently contained in a more manageable space that allows a level of coordination and monitoring, and where the likelihood of making progress towards transformation is enhanced. The challenge however, is to still ensure that this work can ultimately contribute back to have broader systemic impacts in terms of transformation.

An approach of this kind is beginning to emerge in the Municipality’s resilience work as part of the city’s participation in the 100 Resilient Cities Programme, where the scale and complexity of the resilience challenge is perceived to be too great to address simultaneously across the full municipal area. In the course of working to develop a Resilience Strategy (EThekweni Municipality, 2017b) for the city, six “levers for change” emerged as being important in building urban resilience in Durban: Strengthen local communities and build social cohesion; Improve the effectiveness of education and skills development; Promote economic growth in line with 21st century trends and opportunities; Manage environmental assets more effectively; Create a more inclusive and integrated spatial plan; and Improve municipal effectiveness. Rather than focusing on addressing each of these levers individually at the scale of the full municipal area, Durban’s resilience team instead chose (with guidance from stakeholders) to identify specific issues facing the city where the challenges associated with each of these levers intersect simultaneously in those spaces. The Resilience Building Options identified for Durban’s draft Resilience Strategy, were “Collaborative informal settlement action” and “Integrated and innovative planning at the interface between municipal and traditional governance systems”. The approach was then to focus attention on addressing the six levers simultaneously in these spaces, with the intention that systemic action in these more defined areas of work could ultimately help to catalyse broader resilience and transformation in the city.

As an example, action in informal settlements has the potential to: enhance the effectiveness of skills development (e.g. through artisanal training and the involvement of communities in work areas such as data collection); manage environmental assets more effectively (through the improved location of settlements and the exploration of innovative approaches to enhance ecological infrastructure and address storm water and wastewater management issues); improve municipal effectiveness (e.g. through improved facilitation of partnerships, improved communication between eThekweni Municipality, communities and NGO’s involved in housing development, and improved coordination of upgrading interventions in Durban); build social cohesion; and explore new forms of economy within these spaces. Therefore, although collaborative informal settlement action does not address all of the resilience challenges facing Durban, it does provide a critical opportunity to test the ability of eThekweni Municipality and partners to use new approaches to address the “levers for change” simultaneously in a single resilience challenge in Durban. As work has progressed, the benefits of this approach are becoming clear. For example, the defined focus on informal settlements has allowed very specific challenges to be identified relating to municipal effectiveness, for example in the need to facilitate simpler and more flexible systems and regulations to govern where and how informal

settlements and their associated structures and facilities, develop. This is not to say that the work in these spaces is easy, but it is potentially less overwhelming than addressing issues of “municipal effectiveness” at the level of the entire Municipality, with a less defined scope of work. The ultimate success of this approach in catalysing broader municipal transformation still needs to be tested, but it may provide a pointer as to the way in which complex environmental governance issues need to be approached in areas where transformation is needed. Elements of this approach are also evident in the UEIP, where the breadth of the climate change challenge has been broken down to focus on a specific catchment area, and with a particular focus on coordinating action around investment in ecological infrastructure as a critical adaptation response. The success of this approach is also still being tested.

9.3.3 The role of other actors in facilitating transformation in environmental governance

The challenges associated with local government as a central actor in transformation, also raise questions regarding the role of other actors in becoming agents of transformation. NGOs, community-based organisations (CBOs), research organisations and the private sector are able to move far more quickly towards implementation than local government, and often have better developed and more direct links and networks with communities. The question then is whether the strengths of these entities can be more effectively harnessed through appropriate partnerships with local government, so that the strengths associated with being able to be flexible, responsive and connected with communities (generally characteristics of non-municipal entities) can be maximised alongside the strengths of local government, such as the ability to create enabling policy, facilitate access to local and international networks and provide resources to facilitate collaborative action towards transformation. Through appropriate partnerships and collaborative implementation, the magnitude of transformation that each institution or organisation needs to achieve, might then be reduced to something that is more realistically achieved.

In considering the respective roles of local government and other actors in transformation in environmental governance, it is also important to acknowledge that ultimately it is changes in individual and collective beliefs, assumptions and worldviews that will influence the systems and structures that require transformation (O’Brien, 2013b). This requires a level of responsibility and introspection on the part of every individual to contribute towards the changes that are needed in order to facilitate sustainable development.

9.4 Summary

This chapter has used the case study experience of eThekweni Municipality’s climate adaptation work to develop a conceptual framework for transformation in environmental governance. The conceptual framework suggests that, in order to facilitate transformation in environmental governance, it is critical to: understand the characteristics of transformation and be deliberate in acting towards this objective; understand the “landscape of change” that is required to advance transformation; and monitor transformation progress. The complexity of what is required in this regard raises important questions as to whether local government, as a challenging and slow-moving bureaucracy, is well positioned to lead transformative action in cities. However this thesis has also argued that cities are the places where the most significant transformations in environmental governance are likely to be

needed and that local government, because of its ability to plan for the longer-term, has a critical role to play in facilitating action. Although issues such as climate change may be too complex and cross-cutting to tackle comprehensively in a transformative way, an alternative approach for local government might be to deconstruct the larger challenge into components that allow focused and meaningful action, but that still have the potential to catalyse broader transformation in the city system. It is also clear that local government cannot address these challenges single-handedly, and therefore careful consideration needs to be given regarding how to facilitate partnerships for implementation that can maximise the strengths of local government and the strengths of individuals, NGOs, CBOs, research institutions and the private sector towards transformation in environmental governance.

CHAPTER 10: CONCLUSION

10.1 Introduction

In a global context where there is growing pressure for transformation in environmental governance towards more sustainable development pathways, the aim of this thesis was to explore the concept of transformation more closely in order to understand what it means to translate this into practice. In order to do this, the thesis has developed two parallel and sometimes overlapping narratives. The first has been the case study story of the climate adaptation work in eThekweni Municipality, which has been used to understand what transformative adaptation might look like in a local government context. Given that addressing climate change is a critical component of the broader sustainable development challenge, the second narrative in the thesis has involved the translation of the transformative adaptation case study experience into higher level messages regarding transformation in environmental governance more broadly, in a local government context. In drawing from both the transformation and transformative adaptation literatures, and in using these as a reference point against which to analyse and understand the changes that have taken place in the climate adaptation work of eThekweni Municipality, the thesis has attempted to respond to the specific research objectives that were identified at the outset:

- *Objective 1:* To identify emerging characteristics in the contemporary literature that can be used to assess the presence and effectiveness of transformation within environmental governance in eThekweni Municipality, with a specific focus on transformative adaptation in the climate change adaptation sector.
- *Objective 2:* To understand the changes that are taking place towards transformative adaptation in the local government climate adaptation case study within eThekweni Municipality by analysing the context, actors, practices and projects involved, the role of social learning and the nature of the change that results.
- *Objective 3:* To reflect critically on the extent to which the processes, practices, projects and the change that emerges within the context of the climate adaptation case study, reflect the emerging characteristics of transformation and transformative adaptation identified in the contemporary environmental governance and climate change literatures respectively.
- *Objective 4:* To reflect on the extent to which the observations and learning on transformative adaptation in the climate change adaptation case study, can provide insights into transformation in the broader environmental governance arena.

This concluding chapter therefore provides a summary of the main findings in relation to the research objectives, considers the implications of the findings for transformation in environmental governance for local governments, and raises questions that could be pursued as part of further research in the transformation field.

10.2 A summary of the main findings of the thesis

In responding to the research aim and objectives, the main components of the transformation and transformative adaptation literatures were summarised into a heuristic framework that provided a point of reference against which to analyse the changes that have emerged in the climate adaptation work of eThekweni Municipality. The case study analysis allowed conclusions to be drawn about the extent to which eThekweni Municipality's climate adaptation work can be considered to represent transformative adaptation, the processes that have either catalysed, facilitated or acted as barriers to transformative adaptation in this context, and the extent to which the case study experience reflects or differs from what is found in the transformation and transformative adaptation literatures. These findings are summarised below.

10.2.1 *The nature of change in eThekweni Municipality's climate adaptation work*

A number of significant changes have been seen in the climate adaptation work in eThekweni Municipality, for example in terms of the inclusion of climate change in municipal planning, the adoption of a climate change strategy for Durban, the resourcing of a climate adaptation function and the implementation of cross-sectoral projects and initiatives that have focused on preparing municipal departments, communities and ecosystems for the predicted impacts of climate change. Significant emphasis has also been on building the adaptation agenda at the international level and the last five years have seen Durban become a global leader in this space. However, there are still important gaps in the local work relating for example to the relatively limited take-up of the climate adaptation agenda across a broader range of municipal departments, the need for new political champions who can drive transformative adaptation more aggressively and the need to advance work that more directly engages with communities. The thesis concluded that, from a policy and project implementation perspective, eThekweni Municipality can be considered to be in a transitional stage of transformative adaptation, given the significant shifts that have taken place in the climate adaptation arena over a short period of time in a difficult context, but also acknowledging the remaining gaps in the local work.

However, the thesis also suggested that the intentional transformational approach adopted by the lead local government actors in the climate adaptation work (involving a strong focus on experimentation, research, learning and leveraging existing work to facilitate new opportunities), suggests that the *process* of integrating adaptation into municipal planning and implementation is strongly aligned with the characteristics of transformation and transformative adaptation. The thesis therefore argued that the foundations are being laid in eThekweni Municipality, through the climate change adaptation and other work, to bring about transformative and systemic change in the city. The commitment to longer-term project investment is also evidence of this transformative approach. A key challenge in advancing this agenda further lies in how to build greater local support at the level of municipal departments, politicians and city leadership to ensure that municipal planning and implementation drives climate change adaptation in a far more dedicated way than has been seen to date.

Importantly, the thesis also comments on the relationship between incremental and transformative change and suggests that, although the objective of transformation and transformative adaptation is

to ensure fundamental systems change, in bureaucratic contexts where change can be slow and difficult, incremental shifts in the early stages of transformation may be critical in laying the foundations and building support for actions that are more transformative in the longer-term. In this regard, understanding the context in which transformation is needed is important in determining how best to maximise the value of both incremental and transformative changes at relevant points.

10.2.2 Catalysing and sustaining transformative adaptation in eThekweni Municipality

Catalysts for transformative adaptation

In exploring the factors that catalyse, facilitate and act as barriers to transformative adaptation in eThekweni Municipality, it became clear that the case study demonstrates a number of the characteristics that appear in the transformation and transformative adaptation literatures. Specific similarities related to the role of leaders, external events and “windows of opportunity” in catalysing transformative adaptation. The importance of shadow systems of governance, effecting change across multiple levels and promoting knowledge sharing in order to facilitate and sustain transformative adaptation were also common to the case study and the literature. An important distinction however, related to the important role that individual champions have played in the case study. This suggests that in an institutional context such as eThekweni Municipality, where effecting wide scale transformative adaptation in a rigid bureaucratic context is difficult, the role of individual champions is critical in helping to introduce and integrate new ideas at a sectoral level and in building the support and momentum that is needed to effect broader transformation. Linked to this, the case study also highlighted the challenges related to strong leaders, suggesting that a more critical perspective is needed in the literature on the nature of the leadership that emerges, the characteristics of these leaders and their willingness to build champions and new leaders around them to ensure the sustainability of transformative adaptation.

Facilitating and sustaining transformative adaptation processes

An additional observation emerging specifically from the eThekweni Municipality case study is that transformative adaptation is not a linear process. Rather, it is effected through an evolving landscape of actors and interventions over different timeframes and with their own spheres of influence that interact in different ways at various points in the process to either advance or undermine transformative adaptation. The actors involved also change over time, with implications for sustaining institutional memory over the course of longer-term transformation. For those attempting to initiate and drive transformation, this is a complex and often unpredictable process and time needs to be invested in reflecting on and understanding this changing landscape in order to respond and adapt appropriately to it. In such complex spaces, building bridges to connect stakeholders, sectors and interest groups to share experience and knowledge in new and collaborative ways was seen in the eThekweni Municipality case study to play an important role in helping to find new responses to the complex challenges being faced.

Barriers to transformative adaptation

With regard to barriers to transformative adaptation, the eThekweni Municipality case study highlights a number of significant barriers in the specific municipal and developmental context of the climate adaptation case study that are not explicitly discussed in the transformation and transformative adaptation literatures. In this local government context, the bureaucracy of the institution itself and the range of other urgent developmental priorities make it difficult to advance new and transformative ideas that require alternative thinking. In such contexts, how one communicates the need for transformation in ways that link to these priorities and resonates with key actors is critical in building support.

10.3 The contribution of the thesis to the transformation and transformative adaptation literatures

In consolidating the outcomes from this thesis regarding the nature of transformation and transformative adaptation and the factors that catalyse, facilitate and act as barriers to these, the idea of a “landscape of change” emerges as a critical framing concept within which to understand the elements that interact and co-evolve to either facilitate or undermine transformation and transformative adaptation. These ideas were then elevated to propose a conceptual framework for broader transformation in environmental governance (see Figure 9.1). The conceptual framework emphasises the need to: be intentional in advancing a transformation agenda and clear about the characteristics that will be used to assess whether change is in fact transformative; recognise that transformation is likely to be a complex and unpredictable process, comprising a landscape of interacting elements (context, actors, discourses and practices) that interact to produce a particular outcome; and ensure that appropriate monitoring is undertaken in order to inform how the landscape of change is continually navigated towards transformation in environmental governance. In highlighting the idea of a “landscape of change” for transformation, making specific suggestions as to how this could be used to identify critical next steps for eThekweni Municipality’s climate adaptation work, and proposing a conceptual framework for broader transformation in environmental governance, the thesis therefore contributes towards advancing thinking in the climate adaptation practice of eThekweni Municipality and in the existing transformation and transformative adaptation literatures.

Importantly, the conceptual framework that is proposed reflects ideas found in other governance models, where interacting and co-evolving elements are seen to produce particular governance outcomes. For example, Braun (2014), drawing on Foucault’s concept, argues that a new urban “*dispositif*”³² (a grouping of discourses, institutions, regulatory decisions, scientific statements and moral and philanthropic propositions) might be needed in relation to climate governance. Similarly, Li (2007) uses the concept of an “assemblage” to describe the components of knowledge, technique and practice that come together to comprise different forms of governance, with varying outcomes. These ideas are also reflected in the work of Pelling et al (2015) when describing their “adaptation activity space framework”. In this model, decision-making in the context of climate adaptation is described as taking place in seven diverse and co-evolving components (individual, technology, livelihoods,

³² The concept of a ‘*dispositif*’ was first proposed by Foucault (1980).

discourse, behaviour, environment and institutions) within the broader climate adaptation activity space. However, although the conceptual framework for transformation that is proposed in this thesis reflects the structuring and some of the components of these models, the detail that has emerged in this research also provides a basis from which to critique these models. Given that the framework of Pelling et al (2015) is most relevant to the climate adaptation focus of this thesis, a short critique is provided below.

Pelling et al (2015) raise specific questions in relation to their “adaptation activity space framework” (summarised in Chapter 3). These questions relate to: the extent to which transformative adaptation requires there to be change in all activity spaces; the phasing and direction in terms of how these activity spaces interact at different points to produce an outcome; and the relative significance of individual activity components in specific cases of transformation. In response to these questions, the outcomes from this thesis point to three considerations. Firstly, change is needed across multiple activity spaces and with different actors to facilitate transformative adaptation. Importantly, the eThekweni Municipality case study also suggests that these activities need to happen across a range of scales, whether these are geographic (e.g. working across regions), governance (e.g. facilitating community participation at one level, and the development of appropriate policies in the international arena, at the other) or time scales. Secondly, the thesis argues that the phasing of activities might be context specific. In the case of eThekweni Municipality for example, the role of an initial champion was critical in helping to facilitate transformation in a rigid institutional environment, as was policy development and institutional restructuring and resourcing to “lock in” the climate adaptation function. In other contexts (i.e. other than that of local government), a different start point and phasing of activities may be more appropriate. Thirdly, given the strong emphasis that was given by interview respondents to the role of party politics in influencing transformative adaptation, the case study argues that explicit mention of the role of politics is needed in the adaptation activity space framework, in order to fully capture the complex nature of governance and decision-making. These observations provide a starting point for further debate regarding the research questions posed by Pelling et al (2015) and the various governance models that have been mentioned.

10.4 The implications of the findings for transformation in environmental governance in a local government context

The messages that emerge from this thesis highlight the complexity that is involved in translating theoretical ideas on transformation in environmental governance into practice, in the day-to-day reality of an African local government. Given the challenges facing local governments in this context, for example the bureaucratic systems that do not facilitate transformation and the need to address multiple urgent developmental priorities simultaneously in a resource-constrained environment, the thesis therefore raises critical questions as to whether transformation is a realistic goal for local governments in such contexts. The thesis suggests that, in order to achieve transformative outcomes in multi-faceted and complex fields of environmental governance (like climate change adaptation), where the amplitude and rate of change required can be overwhelming, a response that is more appropriate to the scale and complexity of local government might need to be considered. Such a response might involve a combination of: deconstructing large environmental governance challenges into more manageable components where local government can play a clear and meaningful role; and

more deliberately crafting a role for local government as a proactive facilitator of implementation amongst other actor groups that can move more efficiently and effectively to help catalyse transformation. In considering these dual roles however, it will be important to ensure that the actions taken are informed by transformational intention, in order to avoid defaulting into incremental changes that do not ultimately “add up” to the transformation in environmental governance that is needed. An additional challenge for local government, even in this space, will be to retain sufficient focus and long-term commitment to dedicated and ongoing action in the areas where it decides to act. These ideas require further discussion and investigation.

10.5 Questions for further research

The thesis also raises important questions for further research. Firstly, although a number of explicit “pointers” have been provided in the thesis relating to catalysing and sustaining transformation in environmental governance, it is not clear how much of this is likely to unfold in a deliberate manner, and how much happens through instinctive, rather than proactively considered, responses. This is important, as it speaks to the extent to which transformation can be deliberately managed. If proactive and deliberate action towards transformation is not entirely possible, then the role of regular reflection on the unfolding “landscape of change” becomes even more critical. Secondly, research is needed regarding how transformation can be more effectively facilitated in systems (like local government) that are inherently difficult to transform. Although some ideas have been proposed in this thesis, this requires more focused consideration. A potential contribution towards answering this question might lie in tracking the progress of the two areas of work mentioned in this thesis that have deconstructed the larger “resilience” and “climate adaptation” challenges into more manageable components by respectively identifying specific “resilience building options” (for Durban’s Resilience Strategy) and specific geographic locations (in the context of the UEIP) in which to focus transformation efforts. Thirdly, a comparison between the conceptual framework for transformation proposed in this thesis, and other governance models with similar structuring elements, could be important in advancing thinking around governance for transformation in different contexts. Finally, it is important to consider the extent to which the ideas contained in this thesis are relevant to other African cities, and further case study research in cities outside of Durban may be required in this regard.

10.6 Concluding comments

The sustainable development agenda is a well-established and dominant global discourse. More recently however, the urgency of finding new and innovative approaches to address sustainable development has been emphasised through research that highlights humanity’s proximity to exceeding critical earth system and social thresholds. The 2030 Agenda for Sustainable Development, the New Urban Agenda and the Paris Agreement on Climate Change have all added to this sense of urgency and have highlighted the importance of transformation in environmental governance in order to meet sustainable development objectives. As Everard (2017, p. 4) points out:

“This transformation will not be led “top-down” but rather by the engagement of all in society through recognition that socio-economic well-being and the nurturing of ecosystem capacities can and must become mutually supportive. This impels us to find

ways to safeguard or regenerate the ecosystems we depend on through innovations in the ways we learn, govern and direct resources...plan our settlements and infrastructure, educate and research, and build and act for the long-term security and benefit of all”.

It is critical that cities take on this challenge and begin to navigate the complex transformation landscape in a very intentional way. This thesis has contributed to this agenda by translating the complex, theoretical concept of transformation in environmental governance into the practical space of a local government that is working to secure a better socio-economic and ecological future for its citizens. It has then used this local experience to propose a conceptual framework for transformation in environmental governance that may be more universally applicable, beyond just the local government context of an African city. In doing this, it is hoped that the work that has been undertaken can provide initial direction and a point of departure for other cities that are also trying to facilitate such transformations.

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APPENDICES

APPENDIX 1: Interview questionnaire 1³³

Context and introductory questions

- What do you understand by the term ‘climate change’?
- What do you understand by the term ‘climate change adaptation’?
- To what extent have you been involved in the climate change adaptation work within the Municipality (e.g. directly/ indirectly/ not at all)?
 - If respondent has been involved in the climate change adaptation work in some way: What was/is your role in relation to this work?
 - If respondent hasn’t been involved in the climate change adaptation work: Are there any specific reasons why you/your sector have not been involved in the climate change adaptation work?

The nature and extent of change

(Note: Questions in italics are framed to gain responses at a sectoral, rather than a policy, level)

- Over the last ten years, how have you seen climate change adaptation emerging in the work of the Municipality, and what specific changes have you noticed over this time?
- Do you see these changes as being significant within the municipal context or not? Please explain your answer.
- *To what extent have you seen climate change adaptation emerging in the work of your sector/department? What specific changes have you noticed? (Give the three that have the greatest potential for impact)*
- Do you see these changes as being significant within the context of your department or not? Please explain your answer.
- Which of the Municipality’s climate adaptation projects/programmes that you have been involved in (or that you have observed), stand out for you as having the greatest potential for impact in eThekweni Municipality? What is it about these projects/programmes that makes you say this?
- Is there anything about this project/programme initiative that stands out for you as being different from what is done as part of ‘normal practice’ in the Municipality?
- What kind of change do you think will result from these projects/programmes?

Catalysts, facilitating factors and barriers

- What factors (if any) do you think have been important in getting the climate change adaptation work started in the Municipality? And what factors have been important in keeping it going? Why have these factors been important?

³³ It should be noted that this questionnaire was predominantly used for respondents in interview categories 1 to 3.

- *What factors in your sector/department have helped to get the adaptation work started and to keep it going?*
- Who have been the key 'actors' (e.g. individuals, departments, organisations) in this process, and what role have they played in the Municipality's climate change adaptation work? Why are these actors important and what do you feel about the role they have played?
- What role (if any) has the sharing of knowledge and experience ('social learning') played in mainstreaming climate change adaptation in the Municipality? How has this happened? In what ways have you seen knowledge sharing advancing the climate adaptation work in the Municipality? Or can you give examples of where you have not seen this happening?
- What factors (if any) have been a constraint to getting the climate change adaptation work started in the Municipality and then in keeping it going?
- *What factors have been a constraint within your sector/department?*

Outcomes of change

- Who/what do you think will gain the most from the climate change adaptation work that is happening in Durban?
- Are any of these benefits being seen yet? (If yes, what benefits are being seen and who is benefiting?)
- Is there anything in Durban's climate adaptation work that has had negative outcomes and implications?
- What would you say are the current major gaps/missed opportunities in terms of mainstreaming climate change adaptation into the work and decision-making of the Municipality?

Understanding the municipal governance context in relation to change processes

- How would you describe the Municipality in terms of its ability to change when it needs to?
- What factors in the Municipality do you think make it easy/difficult to change?
- Who or what is generally the 'driver' of change in the Municipality?

Closing question

- In what ways have your own ideas and perceptions around climate change adaptation changed or stayed the same, over the last 10 years? And what do you think the 'influencing factors' were?
- What role (if any) do you think your training (e.g. your university studies and previous experience) has played in shaping your perceptions around climate change adaptation?

APPENDIX 2: Interview questionnaire 2³⁴

Context and introductory questions

- What do you understand by the term ‘climate change’?
- What do you understand by the term ‘climate change adaptation’?
- To what extent have you been involved in the climate change adaptation work within the Municipality (e.g. directly/ indirectly/ not at all)?
 - If respondent has been involved in the climate change adaptation work in some way: What was/is your role in relation to this work?
 - If respondent hasn’t been involved in the climate change adaptation work: Are there any specific reasons why you/your sector have not been involved in the climate change adaptation work?

Characteristics of change

- In what way/s have you seen climate change adaptation emerging in the work of the Municipality?
- Do you see these changes as significant in the municipal context, or not?
- What factors do you think have helped to advance this work?
- Is there anything you think that may have hampered the progress in this area?
- Who have been the key ‘actors’ (e.g. individuals, departments, organisations) in this process, and what role have they played in the Municipality’s climate change adaptation work? Why are these actors key and what do you feel about the role they have played?
- How important do you think the sharing of knowledge and experience is, in progressing new areas of work e.g. the climate change adaptation work?
- In your opinion, how is the climate change adaptation work perceived by various stakeholders in the Municipality?

Outcomes of change

- Is there anything in Durban’s climate adaptation work that has had positive outcomes and implications?
- Is there anything in Durban’s climate adaptation work that has had negative outcomes and implications?
- What do you think the Municipality should be considering in order to progress/mainstream this work further?

Understanding the municipal governance context in relation to change processes

- How would you describe the Municipality in terms of its ability to respond to change, both positive and negative?
- What factors in the Municipality do you think make it easy/difficult to respond to change?
- Who or what is generally the ‘driver’ of change in the Municipality?

³⁴ Questionnaire 2 was predominantly used for interview categories 4 and 5 although, in instances where the respondent’s understanding was more detailed, they were asked similar questions to those in Questionnaire 1.