A nodal governance approach to understanding the barriers and opportunities for disaster governance:

A case study on flood governance in an informal settlement in Cape Town, South Africa

---

JOY WADDELL

A THESIS PRESENTED FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF ENVIRONMENTAL AND GEOGRAPHICAL SCIENCE
FACULTY OF SCIENCE
UNIVERSITY OF CAPE TOWN

SUPERVISOR: DR. GINA ZIERVOGEL

JANUARY 2016

DECLARATION

I, **JOY WADDELL**, hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Candidate's signature: **Date:**

Signed by candidate 31.01.2016

ACKNOWLEDGEMENTS

This research would not have been possible without the financial support from the Flooding in Cape Town under Climate Risk (FliCCR) project, which was funded by IDRC and DFID under the Climate Change Adaptation in Africa programme.

This research would not have been possible without input from the City of Cape Town officials who agreed to be interviewed and enter into dialogue on the complexities of flood risk management across Cape Town and its informal settlements. My gratitude also goes out to the residents from Sweet Home who allowed me to explore their community, enter their homes, and document their experiences.

I thank my supervisor, Dr. Gina Ziervogel, for her guidance and input throughout this research process.

I also thank Isabelle Desportes for her support, insights, and friendship during (and beyond) the fieldwork in Cape Town.

Lastly, thanks to my husband John; he listened to my many frustrations and encouraged me to keep going. He stood by me throughout this process and I would not have made it this far without him.

ABSTRACT

The premise of this thesis is that complex socio-environmental problems, such as those associated with urban disaster risk and climate change, cannot be managed by individual organisations or hierarchical forms of organisation, but require integrated, inclusive, and multi-actor forms of governance. By adopting the concept of 'disaster governance' and by drawing on governance discourse, this thesis argues that multiple actors with various capacities and understanding of the problem should be involved in disaster management processes. This thesis demonstrates that in practice, however, a collaborative, decentralised, and inclusive disaster governance approach, which often involves actors outside of taken-for-granted networks, is harder to design, implement, and maintain in cities of the global South.

In this thesis, an embedded qualitative case study approach is adopted to explore how the local municipality in Cape Town manages flood risk in one of their high-risk informal settlements called Sweet Home, which is located in Philippi on the Cape Flats. Qualitative data is collected from in-depth, semi-structured interviews and multi-actor workshops with local government officials in Cape Town, residents from Sweet Home informal settlement, and non-governmental organisations involved in flood management activities. This research uses a nodal governance approach to describe and analyse the unique mentalities, resources, technologies, and institutions that shape actors' actions and decisions with regard to flood governance. Added to this is an in-depth look at what barriers might be present as a product of these characteristics, and how these barriers impact on the ability of these actors to collaboratively address disaster risk. This thesis demonstrates that by unpacking these characteristics and the potential barriers, the conditions needed to strengthen disaster governance can then be identified.

The empirical research in this thesis suggests that unclear roles and responsibilities, a lack of monitoring and accountability mechanisms, unclear definitions of flooding, and a lack of human resources are significant barriers to collaborative flood governance in Cape Town. Addressing these barriers, through multi-actor platforms and inclusive partnership, is seen as one approach to creating a more inclusive environment for local disaster risk reduction in Cape Town's informal settlements. It is concluded in this thesis that in order to strengthen collaborative disaster governance in the context of cities of the global South, inclusive partnerships and multi-actor platforms need to be complemented by strengthened institutional structures and more deliberate, systematic approaches to fostering collaboration between multiple actors.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ANC	African National Congress
CBD	Central Business District
CBO(s)	Community-Based Organisation(s)
CCA	Climate change adaptation
CCT	City of Cape Town (municipality)
CSO(s)	Civil Society Organisation(s)
DA	Democratic Alliance
DFID	(British) Department of International Development
DMAF	Disaster Management Advisory Forum
DRA(s)	Disaster risk assessment(s)
DRM	Disaster risk management
DRMC	Disaster Risk Management Centre
DRR	Disaster risk reduction
EPWP	Expanded Public Works Programme
FBO(s)	Faith-Based Organisation(s)
FliCCR	Flooding in Cape Town under Climate Risk
GDP	Gross Domestic Product
GIS	Geographic Information System
IDRC	International Development Research Centre
IFRC	International Federation of Red Cross/Crescent Society
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resource Management
MAYCO	(City of Cape Town's) Mayoral Committee
NGO(s)	Non-Governmental Organisation(s)
PRA(s)	Participatory risk assessment(s)
RDP	Reconstruction and Development Programme
SA	South Africa
SANZAF	South African National Zakah Fund
SUDS	Sustainable Urban Drainage Systems
TOC	Technical Operations Centre
TRA(s)	Temporary relocation area(s)
UBU	Ubuhle Bakha Ubuhle (Beauty Builds Beauty)
UK	United Kingdom
UN-HABITAT	United Nations Human Settlements Programme
UNISDR	United Nations International Strategy for Disaster Reduction
US$	United States dollar
USA	United States of America
VD(s)	Voting District(s)
ZAR	South African rands

PART ONE:

CONCEPTUALISING THE DISASTER GOVERNANCE DEBATE

CHAPTER ONE:

INTRODUCTION

1. INTRODUCTION

Greater attention is being paid to disasters worldwide because they are happening more frequently, costing countries more, and taking more human lives (IFRC, 2010, UNISDR, 2011, Djalante, 2012). UNISDR's (2015) *Global Assessment Report on Disaster Risk Reduction* emphasises the increasing economic impact that disasters have had on many developing and developed countries around the world (see Figure 1 on page 3). Disasters are also increasing in complexity, especially in urban environments where a number of socio-economic and political compounding factors underpin disaster risk and the impacts that they have on society and the environment (UNISDR, 2011, Djalante, 2012, Tierney, 2014, Twigg, 2015, UNISDR, 2015).

Disaster risk management (DRM) discourse recognises that urban environments, where the majority of the world resides, is highly dynamic, complex, and uncertain; these environments are embedded in and shaped by social, economic, and political realities (Pelling and Wisner, 2009, UNISDR, 2011, UNISDR, 2013, Tierney, 2014, UNISDR, 2015). The underlying social, spatial, and political factors, as initially explored by theorists from the behavioural paradigm, are still seen today as the root causes that make the urban poor in cities of the global South the most vulnerable to urban risk (Fay *et al.*, 2003, Pelling, 2003b, Douglas *et al.*, 2008, IFRC, 2010). Addressing these underlying factors means altering deeply-ingrained power structures within society (Wisner *et al.*, 2004, Mercer *et al.*, 2008); a process that Mercer *et al.* (2008) argue governments are reluctant to do. Critics of state-led DRM approaches argue that governments are not always ideally placed to alter these underlying, politically-sensitive issues. Mercer *et al.* (2008) support this view, arguing that governments often prioritise technical, short-term approaches because it is politically more viable and easier than addressing the underlying entrenched and deeply-ingrained political and socio-economic imbalances.

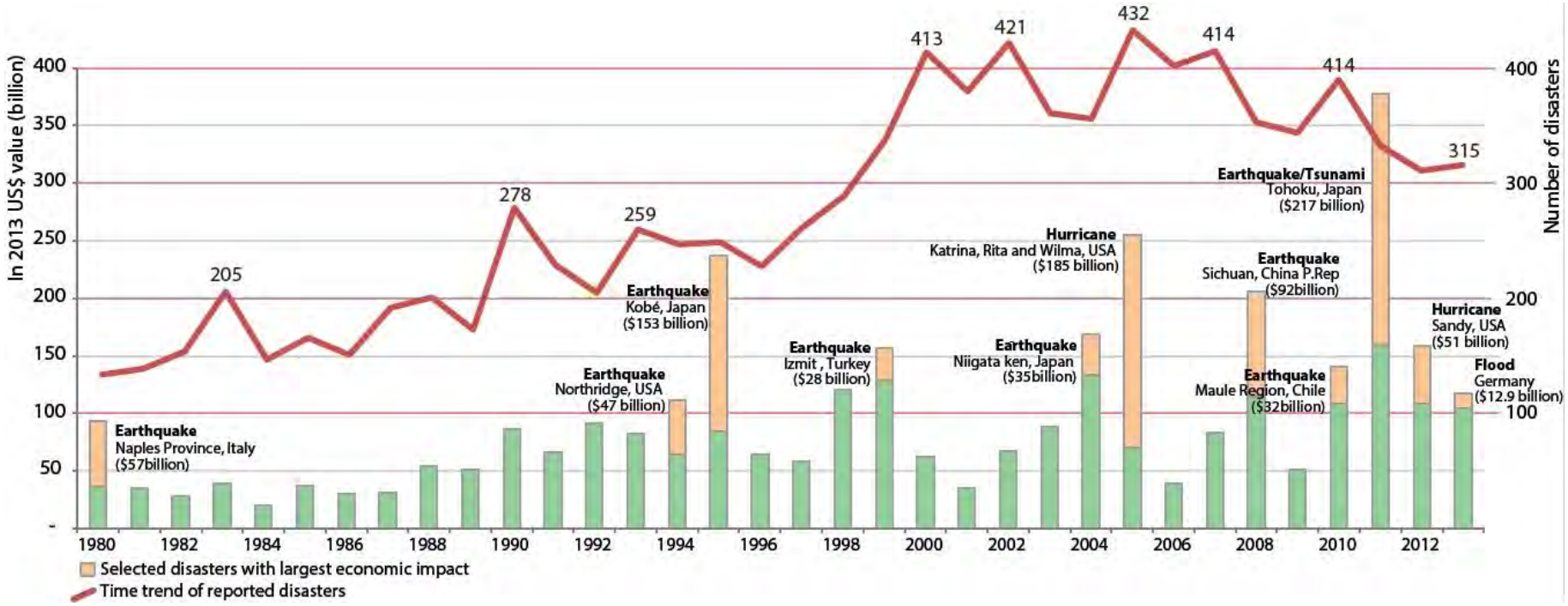


Figure 1: Annual reported economic damages (in US$ billion) and time trend from disasters worldwide: 1980-2013
(Source: EM-DAT, 2014)

Over the years, there has been increasing recognition that disaster risk is embedded within global environmental issues such as climate change and environmental degradation, and developmental concerns such as poverty, food insecurity, and informality (Douglas *et al.*, 2008, O'Brien *et al.*, 2008, Pelling and Wisner, 2009, UNISDR, 2009b, Cannon and Müller-Mahn, 2010). Tierney (2014) dedicates her new book to discussing how all types of contemporary disasters (*e.g.*, technological, natural, and economic) are the result of human actions (and inaction) and are thus rooted in social, political, historical, and economic decisions that individuals, governments, organisations, and communities have made. To reflect this, theoretical approaches to understanding disasters have shifted to focus on the complicated interactions between nature and society (Kasperson *et al.*, 2005), the multiple factors amplifying disaster risk at multiple scales (Blaikie *et al.*, 1994, Wisner *et al.*, 2004), and how disasters are increasingly characterised by complexity and uncertainty (Morss *et al.*, 2005, Berkes, 2007, Aerts *et al.*, 2008, Renn, 2008a).

Major disaster events, such as the 2004 Asian tsunami, the 2010 Haiti earthquake, the 2010 Pakistan floods, and the 2011 Fukushima earthquake, have impacted on the way contemporary disaster risk is managed and analysed in developed and developing countries (Thomalla and Larsen, 2010, Walker *et al.*, 2010, Ikeda and Nagasaka, 2011, UNISDR, 2011). The 2011 Fukushima earthquake, for example, highlighted how the technologies that modern society has become dependent on have led to new, complex, and compounded risks and vulnerabilities (UNISDR, 2011). This earthquake also revealed that Japan, which has implemented multiple earthquake preparedness and mitigation actions (Norio *et al.*, 2011) and is often seen as the example of best practice for DRM (Foster, 2011), is still vulnerable from mega (large-scale) disasters that can overwhelm local coping capacities (Norio *et al.*, 2011, Tierney, 2012). The 2010 volcanic eruption in Iceland and the 2011 flooding in Thailand highlight how disasters do not always respect political borders (Wachtendorf, 2000, Boin and Rhinard, 2008), and can have far-reaching impacts on global industries and their supply chains[1] (Tierney, 2012).

Disaster events worldwide have highlighted changing patterns of socio-economic vulnerability and hazards and demonstrated how limited current attempts at reducing and mitigating complex contemporary disaster risk really are. From climate change science, there is increasing recognition that disasters are also increasing in complexity and uncertainty. The IPCC's (2012) recent SREX report argues that there is and will continue to be increases in extreme events, such as extreme high/low temperatures, extreme droughts, extremes of intense precipitation, and extremes associated with sea level rise. Tierney (2012) highlights how hurricane Sandy in 2012

[1] For example, the volcanic eruption in Iceland in 2010 affected air travel throughout Europe, while the 2011 flooding in Thailand disrupted the global supply of electronics to countries around the world.

was a wake-up call for many climate change sceptics and those who did not think that the effects of climate change would be felt now. These extreme events will have far-reaching impacts on the economies and development of cities across the world and the livelihoods and activities of its citizens (IPCC, 2012). Several authors agree that these impacts will be felt most acutely in cities of the global South, which are already facing many development-related and governance challenges and have large proportions of urban poor who are already socio-economically and politically marginalised (Schipper and Pelling, 2006, Huq *et al.*, 2007, Satterthwaite *et al.*, 2007, Tanner *et al.*, 2009, Ziervogel and Smit, 2009, CDKN, 2012). Although total economic losses (including insured losses) as a result of disasters are higher in developed countries, fatality rates and economic losses expressed as a proportion of the gross domestic product (GDP) are reportedly much higher in developing countries (IPCC, 2012). Important to note is that losses in low and middle-income countries are not always the result of large-scale and extreme disaster events (which receive a lot of media attention), but more often the result of small, recurring, everyday disaster events that impact people's livelihoods, housing, and critical public infrastructure (UNISDR, 2015).

The uncertainty of climate change, the predicted increases in frequency and magnitude of extreme events, the impact of disasters on global, interconnected economies, the increased complexity and compounded nature of contemporary disaster risk, and the shortcomings of DRM in developing and developed countries all underscore the need for conversations on how to strengthen DRM. The IPCC's (2012) SREX report emphasises the need for a multi-faceted approach to understand and address current and future disaster risk, and increase the resilience of cities and communities exposed to extreme events. The IPCC's (2012) multi-pronged approach to addressing current and future disaster risk is exemplified in the SREX report in the way that it draws on knowledge and information from multiple actors, including experts in physical climate systems, experts in the impacts of climate change and disaster risk, and experts who are specialists in managing and reducing disasters.

The conversation about the need for a multi-disciplinary approach to reduce society's exposure and vulnerability to disaster risk and increase their resilience in the face of this exposure is not new. Van Aalst (2006) and Mercer (2010) have argued for disaster practitioners to integrate climate change adaptation (CCA) strategies into existing disaster risk reduction (DRR) policies and strategies. O'Brien *et al.* (2006) and Schipper (2007) argue similarly for CCA work that does not simply address the impacts of climate change, but also addresses the underlying factors causing vulnerability, within the context of development. O'Brien *et al.* (2008) and Schipper (2009) argue for DRM and CCA communities to develop coordinated efforts to jointly tackle the pressing, complex challenges posed by climate change and disasters. The take-home message

from these authors and others is that contemporary disasters have become too complex and diverse for traditionally centralised, technocratic, and narrow DRM approaches (Burris *et al.*, 2008, Walker *et al.*, 2010, Holley *et al.*, 2011).

Recognising this shortcoming in DRM approaches, disaster communities are calling for more innovative, interdisciplinary, and integrated DRR approaches that address disaster risk holistically and systematically (Fung, 2006, Ikeda *et al.*, 2008, Renn, 2008a, Fuchs *et al.*, 2011, Ikeda and Nagasaka, 2011). These authors emphasise the benefits of drawing on a broader range of actors' expertise, diversifying DRR measures, improving the assessment of causal factors, improving the communication of risks to civil society, and increasing the participation of civil society in disaster planning and activities (Fung, 2006, Özerdem and Jacoby, 2006, Ikeda *et al.*, 2008, Renn, 2008a, Fuchs *et al.*, 2011, Ikeda and Nagasaka, 2011).

In this thesis, I draw heavily on the emerging concept in DRM and environmental management of 'disaster governance'; a concept that emphasises the increasingly polycentric nature of DRM, the decentralisation of DRM activities, and how these activities are now dispersed amongst multiple and diverse sets of actors beyond the traditional 'state' actors (Holley *et al.*, 2011, Tierney, 2012). In this thesis, I view the inclusion of a plurality of actors as encompassing the need to include people who are, or are likely to be, affected by disaster risk, as well as those with technical expertise, financial resources, and the authority for making decisions and developing policies. I argue further that multi-actor platforms and multi-level and cross-scalar partnerships are a necessary tool for shifting from traditional top-down, hierarchical DRM to more inclusive, multi-actor, and collaborative 'disaster governance'.

2. SCOPE AND OBJECTIVES

In the face of environmental change, increased extreme events, and the increased complexity of disaster risk, the concept of 'resilience' has taken centre stage in climate change and DRR debates (Mayunga, 2007, Bahadur *et al.*, 2010, Cannon and Müller-Mahn, 2010, Djalante, 2012). Resilience thinking in DRR discourse has resulted in a shift from focusing on identifying and reducing vulnerabilities and risks (Van Niekerk, 2013), to considering what is needed to make society and affected communities more resilient and adaptive to shocks and stresses (Twigg, 2007, Bahadur *et al.*, 2010, IFRC, 2010). In my thesis, I do not contribute towards literature on resilience arguments, but rather draw on the concept of resilience as a frame for exploring what 'disaster

governance' can contribute towards DRM thinking, if the outcomes of disaster governance are argued to be the resilience of society and communities to disaster risk. Van Niekerk (2013:2) argues that resilience is an important concept in DRM discourse because it "involves accommodation of and adaptation to changing conditions over the long-term". This implies that a 'resilient' society is able to learn to adapt to constantly changing risks and vulnerabilities. Therefore, I argue in this thesis that multi-actor collaboration and information-sharing is critical for building resilience to contemporary and future disaster risk.

In order to conceptualise the 'how' of 'how to strengthen DRM' within a resilience framing, I argue that bringing together different groups of actors and forms of knowledge, through multi-actor and cross-scale platforms, as well as within networked governance systems, is able to stimulate learning, the co-production of knowledge, and innovation in DRR approaches (Berkes, 2007, Bahadur *et al.*, 2010). Linked to this is the understanding from disaster discourse that bringing multiple actors together is one way to encourage the exchange of knowledge and practice between multiple actors (De Bruijin *et al.*, 2007, Ikeda *et al.*, 2008, IFRC, 2010, Djalante, 2012) and in turn strengthen DRM practice. The disaster community supports this view, arguing that creating resilient cities requires the implementation of integrated approaches that rely on the action of a range of actors (IFRC, 2010, Newell *et al.*, 2012).

Although the need to include a broader range of actors in DRM processes has been recognised, most of the literature within disaster scholarship is still largely theoretical and normative. There have been few empirical attempts to identify and analyse the factors that might inhibit multiple actors from governing disaster risk collectively. Examples of methodologies developed to measure a community's ability to collectively manage disaster risk include Cutter *et al.*'s (2008) Disaster Resilience of Place model, and their Disaster Resilience Index. These models extend Cutter *et al.*'s earlier work on measuring social vulnerability[2], by proposing a set of composite indicators for measuring the baseline characteristics of communities that foster social resilience. Using this Disaster Resilience Index, Cutter *et al.* (2010) are able to identify the most and least resilient counties in the USA, according to five categories: social, economic, institutional, infrastructure, and community capital. Bevc (2010), Lassa (2010), and Kapucu (2011) have all used a mixed-method approach, which relies on qualitative and quantitative data, as well as social network analysis, to analyse and map disaster governance and disaster governance arrangements for their respective case studies. Tierney (2012) argues that although these types of network

[2] Cutter *et al.*'s (2003) Social Vulnerability Index assesses social vulnerability by taking into account available hazard data and socio-economic data, while Cutter's (1996) earlier 'hazards of place' model was useful for examining vulnerability as the intersection and interaction of socio-economic factors, geographic context, biophysical context, hazards, and technological factors.

analysis approaches are well suited to studying and analysing governance arrangements, the use of these types of approaches to study disaster governance has been very limited in the literature.

Thus, the research outlined in this thesis attempts to contribute towards the emerging scholarship around the concept of disaster governance: what it means in theory and practice, what the challenges and barriers are to adopting a disaster governance approach in cities of the global South, and how to strengthen disaster governance in these cities. I contribute towards this scholarship by providing a theoretically-informed research approach to analyse the capacities of a case study city in terms of its ability to manage a particular disaster risk. I argue that a deeper understanding of the capacities of a city to manage and respond to disaster risk is an important step towards understanding the conditions necessary for strengthening collaborative DRM approaches, and thus how to strengthen their ability to address disaster risk. Although there have been many case studies and much empirical research on DRR at the government, municipal, or local level, missing from this body of research are case studies of cities that have tried to integrate actors across levels, including the state, local communities, and other actors (*e.g.*, NGOs and the private sector) (*i.e.*, a multi-actor governance approach), and the barriers that these cities face in doing so. This research aims to fill this empirical gap using a case study of flood risk management in Cape Town, South Africa (Figure 2), and how the City of Cape Town (CCT) municipality has attempted to integrate a diversity of actors, not always successfully, into existing DRM activities.

Figure 2: Location of the case study city of Cape Town in South Africa
(Source: Google Earth and Joy Waddell)

One of the contentions in this thesis is that although disaster discourse and rhetoric highlight the need for bringing multiple actors together to collaboratively address disaster risk, simply bringing these actors together to govern risk will not automatically lead to them working collaboratively. Bringing multiple actors together (from state actors and engineers, to non-governmental organisation (NGO) representatives and local communities) also means that multiple ideologies, capacities, and institutional frameworks are brought into the mix. Although this is arguably the strength of and rationale for bringing multiple actors together to address complex issues, these multiple ideologies and capacities can be contradictory and can complicate the process of collaboratively addressing disaster risk.

With current rhetoric and theory arguing that disaster governance needs to move beyond the confines of local government to including local communities and non-state actors, my research aims to question what this means in practice, in cities of the global South, which are often characterised by development backlogs, lack of critical services and infrastructure, weak governance, and marginalised (politically and physically) poor and informal communities (Satterthwaite *et al.*, 2007, Satterthwaite and Dodman, 2013, UN-HABITAT, 2014). Cities of the global South are currently stifled by top-down, hierarchical, and technocratic approaches to DRM, with solutions sought internally and not in participation with local communities who often have a better understanding of localised hazards and local politics (Pelling and Wisner, 2009, Satterthwaite, 2011, Van Niekerk, 2011, Van Niekerk and Coetzee, 2012). In theory, bringing multiple actors together onto platforms with the collective goal of reducing and addressing disaster risk can strengthen the resilience of communities and cities to disasters, but in practice, there are many socio-political and logistical barriers.

Informed by nodal governance theory, I argue in this thesis that certain characteristics dictate the actions of different actors (called 'nodes'). For example, different actors bring with them multiple rationalities, which dictate their mandates, priorities, and actions (Burris *et al.*, 2005, Tefre, 2010). The multiple rationalities of multiple nodes can often lead to conflict and misunderstandings, but if understood properly, can provide opportunities for facilitating shared understanding, improving the use and channelling of resources, and enabling more effective decision-making and collaboration. Coming from the climate change literature, Ekstrom *et al.*'s (2011) barriers to adaptation framework recognises that certain factors exist within any decision-making and planning processes, which might inhibit and limit the outcomes of those processes. The barriers to adaptation framework provides a road map to help actors diagnose the nature and source of different existing and potential barriers, in order to strategically plan how to overcome or lower those barriers. With a combined understanding of the characteristics guiding nodes' actions, and the factors ('barriers') that might inhibit nodes from carrying out a certain role, I argue that we can develop a better understanding of the conditions under which collaborative disaster governance can take place, and from there, how collaboration can be strengthened to more effectively govern disaster risk.

South Africa, where the case study in this thesis is based, was one of the first African countries to legislate DRM (Van Niekerk, 2011). More importantly, South Africa's DRM legislature is described as progressive and significant by Holloway (2003) and Van Niekerk (2011) because it strives to promote proactive DRM as opposed to traditionally reactive thinking, as well as emphasising the need to decentralise DRM activities across local, provincial, and national government, and within

government departments. The decentralisation of DRM activities is a way to shift the DRM structure from a traditionally centralised, autocratic approach, to one that includes a plurality of actors. In Van Niekerk's (2011) analysis of the Disaster Management Act no. 57 of 2002, and the National Disaster Management Policy Framework in 2005, he highlights a mismatch between what is outlined in this legislation and what takes place in practice. Although this DRM legislation explicitly outlines the various institutional arrangements needed, at national, provincial and municipal levels, there is a lack of the necessary institutional structures needed at these levels (Van Niekerk, 2011); although as Van Niekerk (2011) adds, more of these structures seem to exist at the municipal level. Holloway (2003) critiques South Africa's DRM legislation, arguing that although it promotes proactive DRM, current DRM practice is often reactionary with a focus on narrow technical solutions and on the provision of disaster relief.

In South Africa, polarised priorities and contestation with regards to service delivery, unemployment, inequality, and poverty, have resulted in challenges in implementation and planning (Isandla Institute, 2011). This polarisation of priorities and interests is attributed not only to the contentious nature of these socio-economic factors, but the current, often divided and fractured politics at all levels, as well as the inherent differences in interests and priorities within government structures and local communities (Isandla Institute, 2011). Fatti and Patel's (2013) research on flood management highlights similarly how differences in perceptions that municipal officials and communities have, shape the responses these different groups of actors prioritise. GNDR's (2011) global research project, which aims to assess country-specific progress to implementing DRR in local governments, found that effective local governance was when local governments strive to not only link different line ministries and sectors, but work together with civil society, the private sector, and at-risk communities. Collaborative governance theory promotes the bringing together of diverse sets of actors onto decision-making platforms, yet in practice, as shown by the Isandla Institute (2011) and Fatti and Patel (2013), these different actors often do not see eye-to-eye on the same issues. In South Africa's current context, despite DRM legislation that facilitates and endorses inclusive, participatory DRM, these different priorities and perceptions present one of the key challenges to effective collaborative disaster governance. By shifting focus from the activities and outcomes of DRM processes, to the governance of disaster risk, this research seeks to understand the actions of the diverse sets of actors currently governing disaster risk in a particular South African context, questioning whose actions have a bearing on DRM outcomes, and how.

In light of the above arguments, the overall aim of this research is to explore how a nodal governance approach can be used to identify and understand the potential barriers and

opportunities to collaborative disaster governance. Through a qualitative case study of flood governance in Cape Town, the following specific objectives will be addressed:

1. to understand the actors integral to, and the nature of, the disaster governance system investigated;
2. to draw on a nodal governance approach to help identify the unique mentalities, resources, technologies, and institutions that shape the perceptions and actions of the multiple actors governing disaster risk;
3. to analyse these four nodal governance characteristics and how they interact, in order to determine the barriers and opportunities for collaborative disaster governance;
4. to identify the conditions required to inform a more inclusive and collaborative approach to disaster governance; and
5. to contribute towards the emergent discourse on disaster governance by fundamentally enhancing the debate to include issues of nodal governance and barriers to governance.

3. THESIS FORMAT

This thesis comprises ten chapters, which are divided across five larger 'parts'.

PART ONE comprises the introductory chapter.

In **Chapter One,** I present the background, scope, aim, and objectives of this thesis.

In **PART TWO**, I set out the theoretical framework and approach within which this thesis is framed.

In **Chapter Two**, I discuss why there is a need to re-imagine current DRM thinking because of (a) a broader decentralisation trend in DRM, and (b) a recognition of the increasing complexity and transboundary nature of current disaster risk (and events), which requires that a diversity of actors be involved in decision-making and planning. Building on this, I use the concept of disaster governance, as introduced by Tierney (2012), to frame the analysis. In order to develop this concept, I draw on

broader understandings of governance and collaborative governance as a means for exploring the role that multiple actors, beyond the confines of the state, play in collectively managing complex and uncertain disaster risk.

In **Chapter Three**, I review briefly some of the key literature on urban flood risk in cities of the global South and flood risk management more broadly because the case study for this thesis is based on how local government in Cape Town, South Africa, manages flood risk in their informal settlements. I reinforce the idea that although multiple actors need to be brought together to collaboratively manage flood risk, as conceptualised by disaster governance discourse, doing so is challenging in practice.

In **PART THREE**, I present the conceptual framework that guided the analysis of the case study, as well as the research approach and methodology.

In **Chapter Four**, I present the conceptual framework that guided the empirical research and theoretical development. By drawing on insights from both nodal governance theory and barriers to adaptation literature, this conceptual framework allows me to unpack the characteristics of the key actors governing disaster risk and the unique characteristics shaping these actors' decision-making and activities; allowing me to analyse the potential barriers impeding actors' abilities to govern risk and collaborate with other actors.

In **Chapter Five**, I outline the methodology adopted for this study. I begin with a brief discussion on the single-case embedded case study approach, which was used to guide the research and inform the choice of qualitative methods used to gather the data. I then present the specific qualitative methods employed in this study. One of the key methods used was semi-structured, in-depth interviews, which helped me to gain in-depth insight into and analysis of 'who' manages disaster risk in a particular context, as well as the conditions that enable or impede collaboration between multiple actors. I also present and discuss the data analysis process, and the ethical considerations and limitations of the study.

In **PART FOUR,** I present the case study and an analysis of flood governance in Cape Town, South Africa, framed by the conceptual framework and in relation to broader literature.

In **Chapter Six**, I provide an in-depth overview and broad analysis of flood governance in Cape Town, with a particular focus on the challenges related to informal settlements. I identify and describe the main actors (called 'nodes') governing flood risk in Cape Town, with a particular focus on the nodes engaged with during the fieldwork: City of Cape Town (CCT) municipal departments represented on the Flood Task Team, NGOs active in flood relief provision and flood awareness, local politicians (ward councillors), and residents living in an informal settlement. I focus on the actions of Cape Town's Flood Task Team and the experiences of flood risk in the informal settlement called *Sweet Home.*

In **Chapter Seven**, I explore how the different actors governing flood risk in Cape Town have multiple and often contested perceptions of the nature of the problem and its solutions (*i.e.*, their mentalities). I explore how these different mentalities impact on the types of decisions that are made and which activities are selected. I conclude that bringing multiple actors together to reach consensus and carry out collaborative disaster governance is a complex and messy process because multiple actors bring multiple capacities, technologies, and ideologies with them. I argue that this makes it challenging, in practice, to adopt a collaborative disaster governance approach.

In **Chapter Eight**, I explore the different types of resources and institutional structures that are available or lacking to actors governing flood risk in Cape Town. I explore the disagreement that exists in the literature, as well as between actors governing floods in Cape Town, on whether local government or local communities are best equipped to drive the planning and implementation of DRR activities. I highlight that in order to strengthen disaster governance, we need to identify what the constraints are in terms of nodes' resources and capacities, and the institutional structures available (or lacking) for accessing particular resources. I also present the formal and informal institutional structures that actors in Cape Town have to work within to access and channel resources, and the impact that these structures have on the ability of actors to mobilise resources and coordinate activities. I relate this empirical evidence to broader discussions on community resilience and how multiple actors are needed to govern disaster risk because they bring with them a diversity of key resources and capacities.

PART FIVE comprises the synthesis and conclusions of this thesis.

In **Chapter Nine**, I identify some of the barriers to collaborative disaster governance that emerged from the case study in Cape Town. I then discuss the role of multi-actor platforms and inclusive partnerships as one way to strengthen collaboration between multiple actors. I discuss the need for partnerships with external actors, who bring with them, critical resources, such as social capital. I also highlight the critical role that external actors can play as intermediaries and bridging organisations between local government and communities.

In **Chapter Ten**, I conclude the thesis. In particular, I highlight the key contributions of this research in terms of broadening current disaster governance thinking. I also highlight the importance of engagement between multiple actors, across various institutional and social boundaries, with inclusive partnerships and multi-actor platforms recognised as one way to overcome barriers to collaborative governance, as long as they are complemented by strengthened institutional structures.

PART TWO:

DELIBERATING THE DISASTER GOVERNANCE QUESTION

CHAPTER TWO:

RE-IMAGINING DISASTER RISK MANAGEMENT: THEORETICAL CONTEXT AND APPROACH

1. INTRODUCTION

Three themes drawn from three sets of literature have contributed towards the theoretical framing of this thesis. Firstly, the underpinning tenet of this thesis is that there needs to be a re-imagining of contemporary DRM, as emphasised in and borrowed from risk governance literature. The nature of risks and the way society responds to these risks is changing, which requires a shift in our thinking of how risks are managed (Walker *et al.*, 2010). This understanding is linked to the reality that contemporary disasters have become increasingly global, both in scope and consequences (Kapucu, 2011), and that disaster risks and modern society have become too complex and diverse for traditionally centralised, technocratic, and non-inclusive DRM approaches (Tierney, 2012).

Secondly, I recognise in this thesis that there has been a decentralisation and democratisation of activities that were managed traditionally by governments and experts (Shearing, 2005). Tierney (2012), reflecting on contemporary disaster and environmental management activities, explains how these activities are no longer carried out by state entities, but are now dispersed amongst a diverse set of actors who include private and civil society entities, as well as governmental institutions. New governance and collaborative governance literature embraces this decentralisation of activities and recognises the strength that it can provide to environmental outcomes (Bulkeley and Betsill, 2003, Holley *et al.*, 2011). In light of the above arguments, this thesis concurs with the arguments in various governance literature that call for more approaches that bring together multiple actors and consider the plurality of actors acting across various scales and engaging in DRM decision-making (Ansell and Gash, 2007, Holley *et al.*, 2011).

Thirdly, this thesis draws on the concept of resilience, as it is reflected in DRM and CCA literature (Mayunga, 2007, Bahadur *et al.*, 2010, Djalante *et al.*, 2011, Berkes and Ross, 2013, Satterthwaite and Dodman, 2013, Tierney, 2014). The drive in DRM practice is to strengthen the resilience of cities and communities to disaster risk and climate change (Bahadur *et al.*, 2010, IFRC, 2010). In this thesis, it is understood that building the resilience of cities and communities emphasises the importance that diverse types of collaboration and partnerships play in building and sharing knowledge, bridging gaps in understanding, and creating innovative approaches to tackling current and future risks (Berkes, 2007, Bahadur *et al.*, 2010, Djalante *et al.*, 2011, Tierney, 2012).

These three themes come from three different sets of literature: risk governance, collaborative/new governance, and resilience thinking in DRM and CCA literature. The theoretical framing of this thesis is created by linking these three themes from these three sets of literature, building on some preliminary links that have already been established, especially between risk governance and collaborative/new governance. When re-imagining DRM, in light of the above themes, this research draws from and builds on the concept of disaster governance. Disaster governance is itself an emerging concept in DRM and environmental management scholarship, and therefore there is very limited literature that explicitly uses this concept, and so is not presented as one of the sets of literature. Tierney (2012), as one of the very few but most prominent authors that uses this concept within a DRM context, highlights how this concept emerged from the recognition that activities once carried out by state entities are now dispersed amongst multiple and diverse sets of actors who include actors outside of the government (Tierney, 2012). Recognising that there is a decentralisation of activities, I explore in this chapter what disaster governance means for DRM, the extent to which there has been a decentralisation of responsibilities related to DRM activities, how it reflects broader global trends, and the extent of decentralisation in South Africa and other countries.

In order to expand on and unpack the concept of disaster governance, this thesis draws on governance literature, in particular from 'risk governance', 'new environmental governance' (also referred to simply as 'new governance'), and 'adaptive governance' literature. In this chapter, I explore the literature that has contributed towards understandings of disaster governance, highlighting how disaster governance fits into current DRM theory and debates, and the role it plays in providing an alternative theoretical approach to managing complex social and environmental problems, such as those associated with disasters and climate change. I go on to unpack the concept of 'building resilience' in urban DRM and how it can support and is supported by disaster governance processes. Although the concept of disaster governance has

its foundation in broader governance literature, it has not been linked to the concept of resilience, which has become a key concept in DRM practice and scholarship. This is a gap that I identify and then address by exploring some of the key linkages that can be made between the concept of disaster governance and resilience. Finally, I reflect on collaborative governance theory and practice to explore the concept of how different priorities and capacities of the actors, who are central to governance processes, can have an impact on the outcomes of these processes.

2. DECENTRALISATION AND THE AGE OF DIVERSITY: IMPLICATIONS FOR DISASTER RISK MANAGEMENT

More recently in disaster scholarship and practice, there has been increasing recognition of the critical role that collective action can play in the reduction of disaster risk, especially in cases of extreme events (UNISDR, 2004, GNDR, 2011, UNISDR, 2011, GNDR, 2013, Van Niekerk, 2014). Van Niekerk (2014:862) argues that the 'tenor' of the Hyogo Framework for Action (UNISDR, 2005), as well as research by UNISDR's *Global Assessment Reports* (UNISDR, 2011, UNISDR, 2013), is that "communities should benefit from the decisions taken at a strategic level and that an incremental process of decentralising DRR may be the best way forward". Tierney (2012) describes how large-scale disasters increasingly require cross-institutional and cross-border collaboration, as well as complex governance arrangements made up of multiple actors and entities, in order to manage and address the related impacts. This decentralisation of DRR activities and the reliance of collective action between a wider range of actors have also been documented in the international relief arena. For example, Kapucu (2011), describes how international disaster relief is increasingly made up of independent actors responding to disasters individually, with their own individual capacities, but ultimately collaborating with each other in order to coordinate their activities and more effectively mobilise disaster relief.

Tierney (2012) argues that the shift towards collaboration and coordinated action between a diversity of actors is a reflection of broader globalisation trends. Tierney (2012) is referring to examples of complex socio-environmental issues (*i.e.*, large-scale disasters and climate change) when she explains how these disasters, which can often have transnational impacts, require transnational governance processes and institutions to address them. With governments not existing at global scales, transnational governance processes and institutions with the ability to coordinate a diversity of agencies and actors are increasingly needed (Tierney, 2012). Tierney

(2012) also scales her discussion to the national level, arguing that the shift towards collaborative decision-making and multi-actor networks is also a response to the rise of contracting and outsourcing, new forms of collaboration (*e.g.*, public-private partnerships and joint ventures), and the replacement of hierarchical, bureaucratic systems of control with more decentralised networked forms of organisation.

Speaking from a USA-based public administration context, Lynn *et al.* (2001) discuss similar shifts, attributing the decentralisation of operations in the USA towards pressures in the 1970s on resources for all levels of government, growing voter's mistrust of government and resistance to taxation, and budgetary constraints that pushed governments towards contracting third parties (*e.g.*, non-profit and non-governmental organisations, contractors, and the private sector). Lynn *et al.* (2001) describe how the administration of public policies and programmes in the USA shifted away from the traditional 1960-70s 'bureau model' whereby government agencies provided all the services. These alternative forms of public administration and service delivery have since shifted to include collaborations, partnerships, and networks between and with third parties (*i.e.*, actors outside of the 'government') (Lynn *et al.*, 2001). Gupta *et al.* (2015a) attribute the rise of non-state actors in decision-making processes to the push towards increased public participation in these processes in the 1960s, and a growing emphasis on the decentralisation of government tasks in the 1970s-1980s. This resulted in increased subsidiarity, with local authorities increasingly making decisions instead of national government (Gupta *et al.*, 2015a).

South Africa has not been immune to the decentralisation and diversification of services, as experienced at global scales and in the global North. For example, in the case of South Africa's policing services, Shearing (2005) describes what he sees as the emergence of a new paradigm of policing, where there is a diversification of the actors governing security; he refers to this new paradigm as 'the age of diversity'. Marks *et al.* (2009) see the diversification of policing activities as a result of the demands for policing exceeding the capacities of the government and police, as well as a recognition that a more networked approach to policing provides a broader, more effective reach in service delivery. In South Africa, the decentralisation of DRM is evident to a much smaller extent. Many earlier critiques of South Africa's disaster legislation (*i.e.*, the Disaster Management Act No. 57 of 2002 and the National Disaster Management Policy Framework of 2005) highlight the progressiveness of this legislation because:

1. it promulgates proactive DRR thinking instead of traditionally reactive disaster response thinking;

2. it integrates DRR into the government's hierarchical structure by decentralising responsibilities across the three tiers of South African government (*i.e.*, national, provincial, and municipal); and
3. it emphasises the need to engage with communities, external actors, and across sectors (Holloway, 2003, Pelling and Holloway, 2006, Van Niekerk, 2006).

More recent critiques, however, highlight how there has been a failure to translate this legislation into practice; many local municipalities have failed to establish functioning DRM centres and they often lack the capacity and authority to implement DRR-related activities (Van Riet, 2009a,b, Van Riet and Diedricks, 2010, Van Niekerk, 2011, Wisner *et al.*, 2011, IFRC, 2012, Van Niekerk, 2014). Bulkeley *et al.* (2011:149) draw on various case studies from around the world to explore the role of institutions in climate policy and action; these authors argue that the capacity and authority of local governments determines their ability to act:

> "Municipalities that have a broader range of competencies have been able to intervene across the different modes of governing climate change, whereas those with more restricted authority have had less scope to become directly involved."

These competencies are arguably related to the amount of resources at their disposal. For example, Bulkeley *et al.* (2011) describe how Seoul had sufficient access to funds, which enabled the city to implement numerous significant initiatives. Similarly in Indonesia, Djalante and Thomalla (2012) highlight how national government has decentralised their DRR programmes and given more autonomy to provincial and local government authorities. This move, which is a reflection of the decentralisation of governance in Indonesia, has many advantages, such as providing better allocation of revenues and resources and more effective and targeted development results (Djalante and Thomalla, 2012). The reality, however, is that a lack of capacity in terms of human and financial resources at provincial and district/municipal levels has resulted in different levels of progress between local government entities, with very few provinces and districts (only 144 of the 497) actually developing their DRR agencies and plans (Djalante and Thomalla, 2012).

In the context of DRM in Africa, there is a dearth of research that critiques the extent to which DRR activities have been decentralised and diversified. Most of this research is limited to critiquing African countries' very top-down approach to managing disasters and how there is often very low cooperation, coordination, and communication with non-state actors: in Ghana (Oteng-Ababio, 2013); the Cameroon (Bang, 2013, Gaston *et al.*, 2013, Bang, 2014); the Greater

Horn of Africa (Baudoin and Wolde-Georgis, 2015); and Zimbabwe (Bongo *et al.*, 2013). In other studies, authors have considered the effectiveness of African governments in establishing multi-actor DRR platforms at the national level. For example, Van Niekerk and Coetzee (2012) and Baudoin and Wolde-Georgis (2015) argue that African governments have made lots of progress in establishing national-level multi-actor platforms, but have failed to translate these national efforts to the local level. GNDR's (2013) *Views from the Frontline* report highlights how many countries have national platforms for DRM, but that these platforms only have the capacity to exchange information and lack the authority for decision-making and for formally coordinating DRR activities. Baudoin and Wolde-Georgis (2015) attribute the failure of national DRM platforms in Africa to communication gaps that exist between policymakers, climate information producers (*i.e.*, experts and scientists), and end-users (*i.e.*, communities). This is in contrast to the Philippines, where DRR and DRM councils exist from national to local government level; these councils have representatives from government and civil society, act as an important communication channel between communities and local government, and have the capacity to coordinate DRR activities and allocate funding to DRR (GNDR, 2013).

As highlighted so far in the literature review, there is lots of research that explores issues of decentralisation and diversification of DRM responsibilities and activities from a very theoretical approach; *e.g.*, from a governance approach, which will be presented in the next sections of this literature review. As highlighted so far in this chapter, there is also lots of research that examines how DRR legislation, which allows for and promulgates the decentralisation of DRR responsibilities across spheres of government, has failed to do so in practice, particularly at the local level. What is missing from this body of research, however, are case studies of cities that have tried to integrate actors beyond just the state (*i.e.*, a multi-actor governance approach), and the barriers that these cities face in doing so. This research aims to fill this empirical gap using a case study of flood risk management in Cape Town and how the CCT municipality has attempted to integrate a diversity of actors, not always successfully, into existing DRM activities.

Acknowledging these different actors and the important role that they can and do play in DRM is necessary in order to avoid 'crises' where there are many different actors competing for resources and political power. This can have detrimental effects on the outcomes of governance processes if not addressed properly. Kapucu (2011) emphasises the importance, in the international disaster relief arena, of better understanding how the international coordinated system of multiple actors is structured. By structure, Kapucu (2011) refers to how actors within the particular network are situated with other actors, socio-politically and economically; in

other words, what these actors' relationships with each other are, what the power dynamics are, what their perceptions of each other are, and what influence their position in the network has on their capacities, functions and outcomes, and on other actors. Kapucu (2011) argues that understanding the network properly can help managers to better identify key organisations and their specific activities and resources in times of a crisis, and in turn decrease the response time during a disaster emergency.

The emphasis that Kapucu (2011) places on understanding the 'network' of actors echoes the emphasis that is placed on the interactions between multiple actors in 'interactive governance' discourse (Kooiman *et al.*, 2008, Torfing *et al.*, 2012). Torfing *et al.* (2012:2-3) define interactive governance as "the complex process through which a plurality of social and political actors with diverging interests interact in order to formulate, promote, and achieve common objectives by means of mobilising, exchanging, and deploying a range of ideas, rules, and resources". From an interactive governance approach, decisions are understood to be made from either bottom-up or interactive processes; although these can be orchestrated or initiated by government agencies, multiple actors are involved in the interactions (Torfing *et al.*, 2012). There is a range of literature that focuses on the 'networks' between actors, such as in networked governance, which was made popular by Castells (2000, 2011) and is captured nicely in Powell (1990). Considering the 'interactions' between actors, which is a much more recent concept in the literature, is an approach that draws on the notion of 'networked governance'. In the context of this research, I argue that the process of identifying the multiple actors who can and should form part of a particular network, and understanding the DRM network (and interactions between actors) in a particular context, can help address any gaps or overlaps in disaster risk reduction and response activities.

3. THEORISING THE AGE OF DIVERSITY FROM A GOVERNANCE APPROACH

In the previous section, I discussed the global trend of decentralised decision-making processes, the resultant diversification of actors beyond the state, and the extent to which it is evident in countries such as South Africa, as well as in DRM. This global trend led to the rise in theories on 'governance', which essentially captures what Shearing's (2005) 'age of diversity' means from a theoretical perspective. In order to find a broader, more inclusive term to help conceptualise

this diversification of actors providing and managing public goods, common-pool resources, and key services, I turn to the literature on governance.

Speaking to broader governance theory, Burris *et al.* (2008:4) see the contemporary world as polycentric; comprising "multiple agencies and sites of governance that govern through a variety of forms of power". This concept of polycentric governance is presented most notably in Ostrom's (2010) paper, which explores the emergence of diverse institutional arrangements, beyond the 'market' and the 'state', for governing common-pool resources and public goods at multiple scales. Ostrom (2010) argues for polycentric governance as an alternative to previous assumptions of seeing the world through simple models of organisation. These former models identified the 'market' as the institution best suited for governing private goods, and the 'government' as best suited for imposing the rules and regulations necessary for governing non-private goods and "forc[ing] self-interested individuals to contribute necessary resources and refrain from self-seeking activities" (Ostrom, 2010:2). Ostrom (2010:2) explores in her article how this 'dichotomous view of the world' fails to "adequately deal with the wide diversity of institutional arrangements that humans craft to govern, provide, and manage public goods and common-pool resources".

In the literature, the term 'governance' has been applied in a variety of disciplines, with very similar overlapping theoretical understandings of what 'governance' is; although the theories underpinning 'governance' are the same, the context, factors, and exact terminology considered are specific to the discipline. Torfing *et al.* (2012:2) see this "spate of concern about governance" in the social sciences as a reflection of the interest in trying to "understand changing institutional and social patterns in society", as well as a desire to focus on institutions and organisations (*i.e.*, political science) instead of individual behaviour and rational choice theories, which have traditionally dominated social and political science. Examples of the term 'governance' being applied to other disciplines include:

- 'interactive governance' in fisheries and coastal management literature (Kooiman and Jentoft, 2009, Jentoft *et al.*, 2010);
- 'risk governance' in risk and hazards management literature (Renn, 2008b, Van Asselt and Renn, 2011);
- 'urban governance' in urban management literature (Pierre, 2005, Tanner *et al.*, 2009, Gupta *et al.*, 2015b); and
- 'global environmental governance', 'climate governance', or even 'adaptive governance' in climate and environmental change literature, depending on the

specific context or themes discussed (Bulkeley and Betsill, 2003, Djalante *et al.*, 2011, Berkhout, 2012, Djalante, 2012, Fatti and Patel, 2013).

Authors making similar observations in the disaster arena have adopted the terms 'risk governance' (Renn, 2008a, Van Asselt and Renn, 2011), 'disaster risk governance' (Ikeda and Nagasaka, 2011, Kelman, 2015), or more recently, 'disaster governance' (Tierney, 2012). For the purposes of this thesis, theoretical understandings of 'governance' are drawn from authors who discuss governance within the context of collaborative, adaptive, new environmental, risk, and disaster governance.

At the simplest level, governance is defined as the intentional shaping or 'management' of the flow of events in a particular social-ecological system (Burris *et al.*, 2005, Ansell and Gash, 2007, Wood and Shearing, 2007, Djalante, 2012). From a new environmental governance perspective, governance is seen as capturing the shift from state-centred, autocratic, hierarchical regulation to more decentralised, collaborative approaches of governing complex environmental systems (Holley *et al.*, 2011). Definitions of governance therefore need to capture the collaboration between a diversity of private, public, and non-state actors acting together towards a commonly agreed (or mutually negotiated) goal; reaching agreement collectively rather than as individuals. From a global environmental governance perspective, Bulkeley and Betsill (2003) argue that a governance approach to understanding systems needs to recognise the roles played by the state and non-state actors, as well as the complex interactions and relationships between them. An interactive governance approach similarly emphasises how problems can be solved and opportunities created through the complex interactions that exist between a plurality of actors: private, public, and civil (Kooiman *et al.*, 2008, Torfing *et al.*, 2012).

Governance takes on its full meaning when contrasted to the concept of 'government'. 'Governance' and 'government' are not synonymous; there can be governance without the presence of the government (Rosenau and Czempiel, 1992, Rhodes, 1996, Kelman, 2015). There are many examples of this type of governance without government. For example, Millstein *et al.*'s (2003) research on South African grassroots organisations and Boonyabancha *et al.*'s (2012) research in poor communities in Thailand, both help to illustrate the ability for non-state actors to access and manage resources outside of government structures. Rosenau and Czempiel (1992:4) differentiate between 'government' and 'governance', arguing that the key differences do not necessarily lie in the outcomes of the processes, but in who manages and controls those processes:

> "Both refer to purposive behaviour, to goal-oriented activities, to systems of rule; but government suggests activities are backed by formal authority… whereas governance refers to activities backed by shared goals that may or may not derive from legal and formally prescribed responsibilities."

Drawing on political theory and administrative theory, Freeman (1997) links 'government' to urban bureaucracy, political authority, and state control, with Kjaer (2009) characterising 'government' by its inherent hierarchies and clear separation between state and society. Conceptualisations of 'governance' in governance discourse, however, blur the lines between public-private spaces and shift the focus from state-oriented hierarchies to the networks and actors outside of the state sphere who are involved in the attainment of public goals and the management of public resources and services (Pierre, 2005, Meijerink and Dicke, 2008, Somerville and Haines, 2008). In other words, while 'government' infers a top-down, hierarchical approach to the management of public goods, 'governance' infers a networked approach that includes actors beyond just the state. Powell (1990:303) articulates this difference well, when he differentiates hierarchies from networks: hierarchies have "clear departmental boundaries, clear lines of authority, detailed reporting mechanisms, and formal procedures", while networks are "lighter on their feet" and allocate resources not through discrete exchanges, but through "networks of individuals engaged in reciprocal, preferential, mutually supportive actions".

The shift in thinking from 'government' to 'governance' is important for understanding *who* participates in governance processes. Bulkeley and Betsill (2003) see the government as playing a role in governance processes, but not as the only or most important actor. Renn (2008a) expands on the 'who' of governance, arguing that governance takes into consideration civil society and organisations external to the state and how they should also be included in decision-making processes, through public-private partnerships. Burris *et al.* (2005) have a much broader understanding of governance, highlighting not only the actors involved, but the institutions, social norms, and practices through which social goods are managed and shared, at all scales; including the smaller, local community, and the broader, global community. This understanding of governance is particularly useful when applied to global, national, and transnational environmental issues (*i.e.*, disasters and climate change) because it takes into consideration the plurality of processes, institutions, and actors operating at multiple scales (Bulkeley and Betsill, 2003).

Important to note here is the use of the term 'actor(s)' throughout this thesis, as opposed to 'stakeholder(s)', which is more widespread and accepted in DRM discourse. 'Actor(s)' is the concept widely used in 'governance' discourse, and therefore the term that I use throughout this thesis. I prefer the term 'actor(s)' because it implies that the individual or group of people are 'actively' engaging with the process and making decisions, as opposed to just being brought into the process because they have a 'stake' in it.

In the section that follows, I take a closer look at the emergence of the 'disaster governance' concept. I argue that 'disaster governance' as a concept is necessary for the re-imagining of DRM; no longer seeing DRM as the traditionally state-centric, top-down management approach, but as a networked approach that brings together multiple actors, including state and non-state actors.

4. DISASTER GOVERNANCE: RE-IMAGINING DISASTER RISK MANAGEMENT

Disaster governance is not a commonly used term in disaster literature, and only a few authors have started exploring what this term means within a disaster and hazard context (see: Lassa, 2010, Ikeda and Nagasaka, 2011, Kapucu, 2011, Tierney, 2012, Kelman, 2015). Tierney (2012) conceptualises what disaster governance is and addresses some of the theoretical implications of this concept, while Kapucu (2011) presents a methodology for mapping multiple actors governing risk and relief activities at the international scale. Other authors have applied the concept of disaster governance to particular case studies: Kelman (2015) examines the extent to which there is collaborative disaster governance in Pacific island communities; Ikeda and Nagasaka (2011) apply their understanding of disaster governance to local DRR in Japan; and Lassa (2010) presents a thorough assessment of disaster governance at micro-, meso-, and macro-scales in Indonesia. There is a lot of literature and several empirical studies that focus on DRM activities at various scales (Bosher *et al.*, 2007, CBDRR, 2007, Pelling and Wisner, 2009) and DRR legislation and policies (ADPC, 2006, Faling, 2012, IFRC, 2012). There is, however, very little DRM literature that focuses explicitly on governance processes and its implications for how disasters are managed or should be managed. There is also no methodology other than social network analysis that is suggested for mapping and analysing the actors who do and/or should govern disasters at the local scale (for example, see Kapucu, 2011).

This thesis addresses this gap in theory and methodology by presenting a framework for mapping and analysing multi-actor governance at the local scale; this framework is presented in Chapter Four. The emphasis in this framework is placed on the actors (and their capacities) managing DRR activities, rather than examining the DRM activities themselves. This approach is in contrast to common approaches in disaster scholarship, which often focus on the government's activities, legislation, regulation, and government planning, and not governance itself (Tierney, 2012). Tierney (2012) highlights the importance of analysing disasters through a disaster governance lens because it is a more inclusive concept that recognises how DRM and DRR activities take place within the context of broader societal and political contexts, and that these contexts either enable or constrain DRM and DRR activities. Disaster governance not only takes these contexts into consideration, but focuses on a much wider array of actors and the diverse mechanisms that do or do not encourage collaborative actions within the context of DRM (Tierney, 2012).

By adopting the concept of 'disaster governance', this research highlights key shortcomings in traditional DRM approaches. Despite the theoretical paradigm shifts in disaster thinking, there tends to still be a 'paternalistic' view of what's best, operationally, in DRR. The term 'paternalistic' is one that Weichselgartner and Obersteiner (2002) use when they refer to DRM approaches that ignore local needs and knowledge, and venerate expert- and state-driven initiatives. In their chapter on African experiences of community-based DRM, Van Niekerk and Coetzee (2012) argue that communities in African countries and cities are often excluded from DRR planning because of the prevalence of top-down approaches to DRR by African governments. This prioritisation of top-down approaches and communities remaining as passive recipients of DRR interventions is attributed to African governments still seeing themselves as "the only entity that poses the necessary skills, technologies, and expertise to address the impact of disasters" (Van Niekerk and Coetzee, 2012:338). Gaston *et al.* (2013) also see examples of this top-down management approach in the Cameroon's legal and institutional framework for DRR, which places the state as the central, leading actor.

In disaster scholarship, it is widely recognised that there are limitations to top-down DRM approaches (Weichselgartner and Obersteiner, 2002, Mercer *et al.*, 2008, Tanner *et al.*, 2009, Manyena *et al.*, 2013). These limitations include the meaningful participation of at-risk people in DRR planning, getting buy-in from people in DRR activities, empowering people to mitigate risks, and ensuring local knowledge is included in assessments. Weichselgartner and Obersteiner (2002) argue that as a result of these limitations, DRR strategies that integrate hazard assessments, socio-economic factors, and participatory decision-making processes are

rare. Participatory DRR strategies also require significant time, commitment, and resources, which often discourages policy-makers and government officials from adopting them; politicians instead want immediate returns because their terms of office are short, and they want sector-based strategies instead of multi-disciplinary, cross-sector approaches (Weichselgartner and Obersteiner, 2002, Mercer *et al.*, 2008, Van Riet, 2009a, Djalante, 2012, Waddell and Ziervogel, 2014). Tierney (2012:6) argues that although the knowledge already exists for how to reduce disaster risk, "applying that knowledge is difficult because of institutional inertia and especially because of the benefits those in power obtain through activities that increase risk".

There is a wide range of DRM and CCA literature that emphasises the importance of including communities (*i.e.*, civil society) in decision-making and planning, in order to strengthen their resilience to disasters and climate change (Pearce, 2003, IFRC, 2004, Cannon, 2008, Cutter *et al.*, 2008, Thomalla and Larsen, 2010, Gaillard and Mercer, 2012, Fois and Forino, 2014). Participatory techniques have been used as a way to try and address this failure to involve at-risk people in top-down decision-making processes (Mercer *et al.*, 2008). Participatory techniques, which aim to ensure that at-risk people play a central role in developing research and DRR agendas, are a response to what some authors see as limitations of top-down approaches in DRR (Mercer *et al.*, 2008). Although there is extensive literature and research on community-based DRR and CCA, which are rooted in participatory DRR approaches, I strongly agree with Gaillard and Mercer (2012) when they argue that a top-down or bottom-up approach (*i.e.*, either/or approach) to DRR will not be able to reduce disaster risk in the long run. As Gaillard and Mercer (2012:98) argue, "reinforcing the ability of people to face natural hazards necessitates reducing their vulnerability, which requires intervention from the top, and strengthening their capacities, which draws upon actions from the bottom up".

Important to note here is that despite a strong emphasis in DRR literature on the need to include communities in decision-making, and integrate local knowledge and community-based DRR into existing DRM practice (IFRC, 2004, Wisner *et al.*, 2004, UNISDR, 2005, Shaw, 2006, Shaw, 2012), there is also much evidence from the global South that there is still a lag in this regard (Weichselgartner and Obersteiner, 2002, Mercer *et al.*, 2008, Manyena *et al.*, 2013, Oteng-Ababio and Sarpong, 2015). In practice, this more recent thinking in disaster scholarship is often not institutionalised in policies and budgets (Meijerink and Dicke, 2008, Manyena *et al.*, 2013). Even in countries where the inclusion of communities is emphasised in their DRR legislation, recent research highlights how governments of developing countries have failed to translate this into practice (Bang, 2014, Van Niekerk, 2014). O'Brien *et al.* (2006) argues that in

developing countries there is often a lag between planning and implementation, and the institutionalisation of these plans; this impacts greatly on the outcomes of the plans and the translation of these plans at the local or municipal level, where they are needed most.

The extent to which this is evident in South Africa is an issue raised by Van Niekerk (2011, 2014). South Africa's Disaster Management Act No. 57 of 2002 (South Africa, 2002) outlines the need for multiple actors, both state and non-state actors, to be included in the various advisory forums and intergovernmental structures at the national, provincial, and municipal level. Van Niekerk (2014) identifies these non-state actors as at-risk communities, the private sector, government parastatals (*i.e.*, utilities companies), academic institutions, traditional leaders, and non-governmental organisations (including faith-based, and community-based, and relief organisations). South Africa's (2002) Disaster Management Act also stipulates the need for participatory DRM programmes and disaster risk assessments (DRAs) at the municipal level, which actively involve communities in assessing and reducing disaster risk. Despite this progressive legislation, South Africa's local municipalities are failing to implement those objectives in practice (Van Riet, 2009a,b, Van Niekerk, 2011, 2014, Van Niekerk, 2014).

Although there have been shifts in DRM towards more inclusive, participatory DRR, I argue that this is insufficient and that there needs to be a further 're-imagining' of current DRM approaches. Coming from risk governance discourse, Walker *et al.* (2010) argue that broader changes in how society is organised, as well as changes in the types of hazards and risks societies currently face, impact on and demand different ways of managing these hazards and risks in society (Figure 3). In other words, not only do global trends, such as decentralisation, outsourcing, and globalisation impact on the way that disaster risk is addressed (*i.e.*, by non-state actors), but increasingly complex, multi-faceted hazards and vulnerabilities demand a change in the way that disaster risk is addressed.

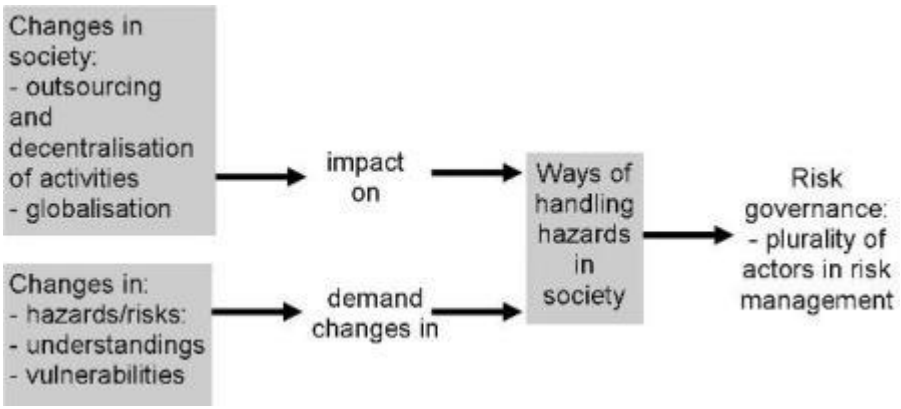


Figure 3: Two rationales for changing current risk management approaches
(Adapted from: Walker *et al.*, 2010:8)

Authors writing from new environmental governance discourse and adaptive governance discourse propose a similar argument, emphasising how complex and dynamic social-environmental systems have become too complex and diverse for centralised, top-down, state-centred management approaches (Burris *et al.*, 2008, Holley *et al.*, 2011). Based on this argument, Holley *et al.* (2011) argue that management approaches need to shift from traditionally fragmented command and control mechanisms, to more decentralised, integrated, and localised approaches that involve multiple sets of actors acting across large scales. Adaptive governance calls similarly for governance systems that are less rigid, prescriptive, and hierarchical, and more innovative and effective in managing complex socio-environmental problems such as disasters (Holley, 2010, Djalante, 2012).

When conceptualising 'disaster governance', important ideas can be drawn from risk governance discourse. Risk governance is seen as a tool for describing how decisions are made, with the ultimate aim of improving decision-making structures and processes in the face of complex and uncertain risks (Van Asselt and Renn, 2011). Risk governance is also understood to be a multi-disciplinary activity that:

> "looks at the complex web of actors, rules, conventions, processes and mechanisms concerned with how relevant risk information is collected, analysed and communicated, and how management decisions are taken" (Renn, 2008a:9).

Risk governance therefore argues that decisions about risks are taken within complex webs of actors, rules, processes, and institutional arrangements (Walker *et al.*, 2010, Van Asselt and Renn, 2011). Risk governance provides a framework for recognising the need to bring multiple actors together to manage complex risk in a decentralised manner; furthermore, it provides a framework for understanding how decision-making processes should accommodate diverse or conflicting interests. Within risk governance discourse, attention is also shifted from the *product(s)* of disasters and risk management, to the *process* of risk management (Van Asselt and Renn, 2011). In my conceptualisation of disaster governance, I therefore emphasise the *process* of managing and intentionally shaping events. Tied in to this is the *process* of identifying the multiple actors who are and should be involved in decision-making and understanding how these actors interact and impact on the process as a whole. By analysing the governance process itself and those actors shaping this process, I argue that the disaster governance process itself can be strengthened, thus increasing the capacity of the system to cope with and reduce risk.

5. BUILDING RESILIENT SYSTEMS: LINKING THE CONCEPTS OF RESILIENCE AND DISASTER GOVERNANCE

With the onset of environmental change and the increased complexity of social-ecological systems (what Cutter *et al.* (2008) refer to as 'human-environment interactions'), the concept of 'resilience' and 'building resilient cities' has taken centre stage in CCA and DRR debates (Twigg, 2007, Bahadur *et al.*, 2010, IFRC, 2010). There are multiple definitions and understandings of the concept of resilience (Bahadur *et al.*, 2010), and there exists a rich body of scholarship on resilience, which elucidates its potential and shortcomings with regard to its application in DRM and CCA discourse (Manyena, 2006, Davoudi, 2012, Alexander, 2013).

From a human-centric, sociology perspective, Tierney (2014:6) defines resilience as "the ability of social entities to absorb the impacts of external and internal system shocks without losing the ability to function, and failing that, to cope, adapt, and recover from those shocks". Cutter *et al.* (2008:599) define resilience as "the ability of a social system to respond and recover from disasters and includes those inherent conditions that allow the system to absorb impacts and cope with an event, as well as post-event, adaptive processes that facilitate the ability of the social system to re-organise, change, and learn in response to a threat". Tierney (2014) adds that resilience arises from social order and is rooted in social, economic, and cultural conditions.

Roberts and O'Donoghue (2013) reflect on how definitions of resilience either implicitly or explicitly refer to the ability of socio-ecological systems to 'bounce back' to a previous state, and how this view of resilience is not useful for South African cities. Roberts and O'Donoghue (2013) use the city of Durban as an example, explaining how in its current form, current factors such as high unemployment, high inequality and poverty levels, and lack of services and infrastructure are not sustainable and should not be preserved. In thinking about resilience in South African cities, and arguably in many cities of the global South, Roberts and O'Donoghue (2013) prefer the terms 'bouncing forward' and 'transformation'. Transformation is defined in the IPCC's (2012:5) SREX report as the "altering of fundamental attributes of a system (including value systems; regulatory, legislative, or bureaucratic regimes; financial institutions; and technological or biological systems". This idea of bouncing forward relates to how Folke (2006) sees disturbances (such as disasters and climate change) not as something to resist, but as an opportunity to change. Resilience is therefore seen by Folke (2006) as providing an opportunity for systems to develop new trajectories.

In defining resilience, I draw on UNISDR's (2004) definition, which is framed within DRM discourse. Resilience is defined by UNISDR (2004:6) as:

> "the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organising itself to increase this capacity for learning from past disasters for better future protection and to improve risk reduction measures."

UNISDR's (2009a:24) more recent definition adds a disaster response/relief angle to resilience, highlighting the need for the impacted "system, community or society… to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions".

UNISDR's (2004) definition highlights the ability of the system to adapt by resisting or changing in order to reach acceptable levels of functioning. Here, 'resisting' can be applied to cities of the global North, where their current form and functions are sustainable; for cities of the global South, on the other hand, 'to change' by either 'bouncing forward' or through 'transformation', is needed in their context of high levels of inequality, poverty, and weak governance. UNISDR's (2004) definition of 'resilience' highlights the concept of 'adaptive capacity', which has strong linkages to the concept of 'vulnerability' (Smit and Wandel, 2006, Engle, 2011). Adaptive capacity is defined by the IPCC (Smit and Pilifosova, 2001:894) as "the potential, capability, or ability of a system to adapt to climate change stimuli or their effects or impacts". In one of IPCC's reports (Smit and Pilifosova, 2001), the features that are argued to determine a community or region's adaptive capacity include economic resources, technology, information and skills, infrastructure, institutions, and equity.

Berman *et al.* (2012) differentiate between 'coping capacities' and 'adaptive capacities', arguing that CCA processes need to transform 'coping' capacities into 'adaptive' ones. Berman *et al.* (2012) define coping capacities as "the ability of actors to draw on available skills, resources, and experiences as an *immediate response* to manage adverse stress or shocks", whereas adaptive capacities are the ability to "*prepare in advance* […] and to adjust, respond, and adapt to" potential stresses and shocks. Coping capacities here are just a different term for 'coping strategies' that other authors refer to in DRM literature (Few, 2003, Paul and Routray, 2009). Important to note here is that 'coping' with potential stresses and shocks is seen as undesirable

and not sustainable, whereas being able to 'adapt' to stresses and shocks implies a level of resilience. To frame this differently, as O'Brien *et al.* (2006:71) explain, by adopting the concepts of adaptive capacity and resilience, the focus shifts from a more negative "what is missing in a crisis (*i.e.*, needs and vulnerabilities)" to a more positive "what is already in place (*i.e.*, resources and adaptive capacities)". Further, identifying the elements already in place can help decision-makers to explore 'what' can be done with existing capacities and resources. I argue that the focus on adaptive capacities and resilience is important for understanding disaster governance processes because it highlights the importance of assessing and identifying what actors, resources, capacities, and institutions are already in place; by identifying these elements, we can then move to a place of exploring how to use and share these elements in a way that strengthens the resilience of cities and communities.

UNISDR's (2009a) definition of resilience shifts the focus from households and individuals, which previous theories about vulnerability focused on (Cannon *et al.*, 2003, Wisner *et al.*, 2004), to broader systems (*i.e.*, socio-ecological or socio-technical), communities, or society. In the case study presented in this thesis, this system can refer to the whole city, including at-risk communities, relevant infrastructure (*i.e.*, drainage in a flooding context), communication systems, local government, and so on. As I will argue in Chapter Eight, the 'system' cannot only focus on at-risk communities because an important component of building a community's resilience to risk is their access to resources and networks outside of their socio-political and geographically-demarcated boundaries; therefore the focus needs to shift to consider the linkages between government, communities, and other external actors.

Resilience denotes the ability of a social-ecological system to cope with risk, in the sense that it is able to deal with a change in the system and continue functioning without being completely overthrown (Lopez-Marrero and Tschakert, 2001, IFRC, 2010). Because of environmental change and the impacts it is having and will continue to have on the frequency, magnitude, uncertainty, and complexity of disasters, I argue that it is impossible to comprehensively prepare for a range of scenarios. While traditional DRM approaches aimed to resist risk and stop disasters, resilience thinking recognises the need for management approaches to be more flexible and proactive, with a longer-term view, in order to better deal with uncertainty and complexity (Bahadur *et al.*, 2010). Tierney (2014) argues similarly that because risk cannot be eliminated completely, strengthening someone's resilience can help them to contain the risk, reduce the likelihood of disaster events happening, and cope better when disasters do happen. Tierney (2014:7) argues that risks and related losses can be reduced or contained if people "undertake actions that make them less 'brittle' and failure-prone, and more robust, flexible, and

adaptable". Recognising the complexity of social-environmental problems such as disasters, Tierney (2012) argues that these problems need to be addressed beyond the confines of individual organisations and institutions. Instead, socio-environmental problems need to be managed "through networks of collaborating and diverse entities… because networks are flexible, adaptable, and capable of mobilising diverse resources" (Tierney, 2012:343).

Explicit in UNISDR's (2004) definitions of resilience is the need for systems to be able to 'organise itself', 'increase its capacity to learn from past disasters', 'protect itself from future disasters', and 'improve its risk reduction measures'. Berkes (2007) outlines four characteristics of a resilient system, which links to the idea of resilience as a way to 'bounce forward', 'transform', and 'improve adaptive capacities':

1. A resilient system is able to learn to live with change and uncertainty by building social (*e.g.*, rules of conduct in an event) and ecological memory (*e.g.*, which vegetation survives particular events) from experiences of past events.
2. A resilient system nurtures diversity ecologically, economically, and in partnerships. Diversification is able to reduce risks by spreading them out, and increase available options before, during, and after a particular event. Diversity in partnerships, for example, recognises how bringing multiple actors into decision- and policy-making increases the potential for knowledge-sharing and new knowledge.
3. A resilient system combines different forms of knowledge, such as scientific, traditional/indigenous, and local knowledge, from a range of actors. Bringing together different forms of knowledge through multi-actor and cross-scale platforms is able to stimulate learning and innovation, and bridge gaps in cross-scale and cross-sector understanding.
4. A resilient system creates opportunities for self-organisation and re-organisation. This can be achieved by strengthening the capacity of communities to socially and politically organise themselves when facing disasters, as well as building linkages across scales of governance through multi-level partnerships (*e.g.*, from the community level, to regional and national levels).

In thinking about disaster governance as an approach to building resilient communities and cities, two key points emerge from Berkes' (2007) view of what makes a system resilient. Firstly, there is the notion of building knowledge and diversifying knowledge. Different forms of

knowledge, including skills and information, are recognised as critical for helping cities (as systems) learn from past disasters, understand present risks, predict future risks, and improve on current risk reduction measures. The second point, which informs the 'how' of building and diversifying knowledge, is to bring multiple actors into governance networks and to diversify partnerships. I argue that it is the latter that helps to bring different forms of knowledge together in a way that can stimulate learning and knowledge, create social and ecological memory, and bridge gaps in understanding. Bringing multiple actors together and diversifying partnerships within a disaster governance framework will in turn enable actors to build, diversify, and share knowledge in a way that will strengthen the capacity of communities and cities to self-organise and re-organise in the face of disasters; essentially strengthening their resilience to disasters and climate change. Armitage *et al.* (2011) argue similarly that networks and interactions between multiple actors allow actors to contribute and combine a plurality of knowledge sources and types. This type of collaborative, knowledge co-production enables learning, which can strengthen an individual or group's adaptive capacity to cope with variability and uncertainty inherent in complex environmental problems (Armitage *et al.*, 2011). In DRM practice, this would require that a broader range of actors, from multiple disciplines and levels in society with different types of knowledge sources, be encouraged to participate in DRAs, decision-making, and planning.

Implicit in these definitions of resilience is that resilience is a process, not a static concept. As Smucker and Wisner (2008) argue, resilience is a social process whereby communities or cities continually respond and adapt to environmental and/or socio-economic and political change. Referring to resilience as a process avoids creating an artificial snapshot in time and space, and recognises instead the process of 'building' and 'strengthening' the necessary elements that create resilience. This mindset also recognises that resilience fluctuates over time in relation to internal and external socio-economic, political, and environmental factors.

Also implicit in the above arguments is that in order for a system to be considered resilient, there needs to be a combination of different forms of knowledge, from *a range of actors*. Although previous definitions of 'governance' emphasised how decision-making processes have (and should) become decentralised and now (and should) include actors beyond the state, missing from this is an explicit appreciation for the role that actors other than the state and civil society can and should play. Here I am referring to actors who include scientists and other experts, as well as NGOs and 'intermediaries'. Bulkeley and Betsill (2003) draw attention to the role of scientists in governance systems; scientific communities, they argue, can provide information that helps to influence decision-makers. Baudoin and Wolde-Georgis (2015) reflect

on current DRR efforts in the Greater Horn of Africa, arguing that one reason why there is a failure to translate DRR efforts into positive outcomes at the community level is because there are communication gaps between local communities, scientists (*i.e.*, especially in the case of climate change and climate information), and decision-makers. These authors emphasise the need for linkages to be built between these groups of actors, in order to strengthen current DRR practice in this region of the world. In particular, Innocenti and Albrito (2011) argue that in order to address disaster risks and climate change, there needs to be participatory dialogue between the scientific community and policy makers, while Shannon *et al.* (2014) emphasise the importance of collaboration between local communities and scientists for ensuring the co-production of DRR expertise and to improve knowledge exchange. Gaillard and Mercer (2012) also recognise the additional role that local knowledge plays in DRR; they argue that local knowledge *and* scientific knowledge need to be included, thus an array of actors need to contribute to DRR.

It is also important to recognise the contributions that internal 'expert' actors and local communities can provide to risk assessments and decision-making. Weichselgartner and Obersteiner (2002) draw attention to the situation found in developing countries where often 'external' experts (*e.g.*, scientists and researchers who do not live in a particular community) overlook the immediate priorities of people living in hazard-prone areas. For example, communities might prioritise solutions that address immediate issues such as a lack of health and education services, or a lack of political representation, whereas 'external' experts might miss this nuance while focusing on more disaster-related factors. Therefore, I argue that it is critical to also include local communities in DRAs and DRR planning.

In addition, this raises the importance of including NGOs and community-based organisations (CBOs) in DRR planning and decision-making. As stressed by Benson *et al.* (2001), more attention needs to be paid to NGOs and CBOs in DRM processes because they are well-placed to support DRR activities at the local level; they are based 'on the ground', have connections and social capital with communities, and are already involved in DRR-related activities, even if they are not explicitly labelled as such. The critical role that NGOs and CBOs can play as intermediaries is explored in Chapter Nine.

Mayunga's (2007) understanding of resilience, which draws on DFID's (1999) sustainable livelihoods approach and capitals-based discourse, provides further insight into the idea of social capital playing an important role in strengthening decision-making between multiple actors. Mayunga (2007) sees social capital, which represents trust, norm, and networks, as

necessary for ensuring high levels of coordination and cooperation within a particular system. Bahadur *et al.* (2010) add to this, arguing that for there to be social capital between actors, there needs to be trust and accountability. Drawing on these arguments, I argue that social capital, in the form of trust and accountability, is critical for there to be collaboration between actors and effective flood governance processes. Not only is social capital critical for there *to be* collaboration, but Cowan and Arsenault (2008) argue that social capital is also a key outcome and benefit *of* collaboration. According to Cowan and Arsenault (2008:23), collaboration between multiple actors helps to build social capital of, and between, actors, by "breed[ing] social trust, foster[ing] norms of reciprocity, and creat[ing] stores of goodwill that can prove invaluable during times of crisis", and that even cross socio-political divides.

In summary, I have drawn linkages between the key characteristics of resilience and disaster governance, in order to inform how cities and communities can better govern disasters. The types of linkages that I have identified in this section are very similar to the interlinkages that Djalante *et al.* (2011) identify between building resilience in the context of DRR and the key characteristics of adaptive governance. Djalante *et al.* (2011) present a diagram (Figure 4) that shows these linkages, which also captures the arguments that I have presented so far. Important to note here is that in order to build and strengthen adaptive capacities and resilience through a disaster governance approach, there needs to be a diversity of actors at multiple levels, a decentralisation of responsibilities, participation and collaboration between these actors, social capital and trust to enable collaboration, a diversity and co-production of knowledge, and bridging organisations that can support and enable dialogue and collaboration.

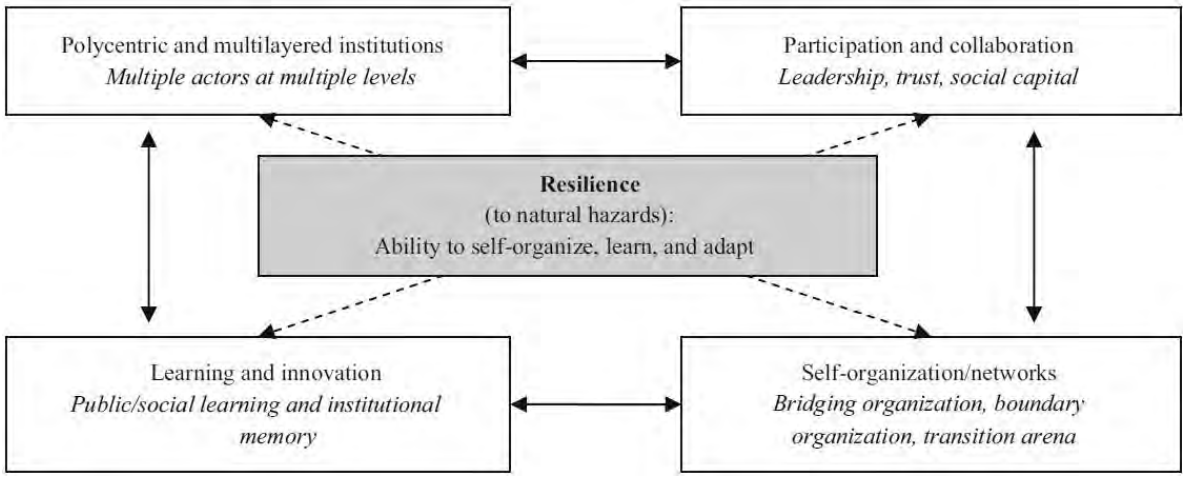


Figure 4: Interlinkages between the key characteristics of adaptive governance in relation to building resilience

(Source: Djalante *et al.*, 2011:4)

6. DISASTER GOVERNANCE IN PRACTICE: STRENGTHENING COLLABORATIVE GOVERNANCE PROCESSES

I argue in this thesis that collaborative processes, as understood within collaborative governance discourse, are key to strengthening the resilience of cities and communities. Collaborative governance is defined by Ansell and Gash (2007:543) as a process that brings "multiple stakeholders together in common forums with public agencies to engage in consensus-oriented decision-making". Collaborative governance has become a popular catchphrase in management and policy-based discussions and documents. The concept essentially emerged from various sources within governance scholarship, often as a response to failed governance attempts, the high politicisation of regulation, and the accountability failures within broader management approaches (Ansell and Gash, 2007). Normatively, collaborative governance has connotations of working together and cooperating with multiple actors. Theoretically, collaborative governance draws on broader governance theory. Ansell and Gash (2007) argue that collaborative governance captures the way in which multiple actors can actively engage with one another through formal, deliberative processes that aim to build consensus, reach a common goal, and implement and manage public policy, programmes, and assets.

In developing their model of what collaborative governance is, Ansell and Gash (2007) identify key components or principals of what collaborative governance should be. They argue that collaboration implies the agency for all actors to communicate and influence decision-making in a deliberative, multilateral process, as opposed to mere consultation (Ansell and Gash, 2007). Implicit in this is the idea that all actors have a responsibility for policy outcomes, and therefore all actors (particularly non-state actors who are often sidelined in these processes) should be engaged directly in all stages of decision-making processes (Freeman, 1997, Ansell and Gash, 2007).

It is recognised in the literature that although collaborative governance calls for all actors to be directly involved, distinctive leadership roles and the ultimate authority on decisions often remain with public agencies (Leach *et al.*, 2002, Ansell and Gash, 2007). I argue that this should not, however, prevent non-state actors from participating in decision-making processes. Ansell and Gash (2007) see collaborative governance as being a formal process, in order to distinguish it from conventional forms of agency-interest group interactions, implying an explicit, public strategy with shared activities, structures, and resources. Central to collaborative governance is

therefore the "institutionalisation of a collective decision-making process" (Ansell and Gash, 2007:548). In order to distinguish collaborative governance from others forms of partnerships, mediation, and consensus decision-making, Ansell and Gash (2007) highlight the need for collaborative governance to focus on public policies, issues, and affairs.

Referring to water conflict issues, Tarlock (1999) highlights some of the conditions that he sees as necessary for ensuring that multiple actors are successful in consensus-building processes. I argue that the conditions highlighted from his research are transferrable to a discussion on the conditions necessary for disaster governance:

1. The state must play a major role in creating incentives for actors to manage risk;
2. Institutional players with the capacity to bear risks should play a major role in the process because individuals at the local level cannot be expected to assume substantial new risk and management obligations;
3. Incentives for negotiation should be created through actual shifts in political or legal power; and
4. There must be scientific basis for proposed management strategies and solutions.

Tarlock (1999) argues further that this type of collaborative governance should not be seen as devolution of power, but rather as ensuring that there is shared responsibility for the management of water resources. Devolution here is defined as the process whereby authorities (*e.g.*, the state) delegate their authority and responsibility, and transfer their decision-making power to another entity (*e.g.*, communities, external actors) outside of their own immediate jurisdiction; by doing so, they surrender their control (Armitage, 2005). Devolution of rights and responsibilities by the state to communities and external actors is most notably seen in community-based natural resource management literature (St. Martin, 2001, Armitage, 2005). Whether this process is good or bad is beyond the scope of this thesis, but the idea of devolution within the context of collaborative governance is applicable to disaster governance processes. Disaster governance should not be seen as a way for the state to relinquish ('devolve') their responsibility and pass it on to non-state actors, but instead to ensure that all actors, at all levels, actively participate in consensus-oriented decision-making and ultimately assume equal responsibility for reducing flood risk.

In cities of the global South, disaster governance and adaptation to climate change activities are faced with different challenges than the North. Satterthwaite (2011) considers the implications

for cities of the global South trying to adapt to climate change, with ineffective or unrepresentative local governments. Talking from a resilience perspective, Folke (2006) argues that transforming a system from its current state to a more desirable state is not an easy process. This idea relates well to building resilient cities and how transforming cities from their current state is easier said than done. Faced with a wide array of challenges, cities of the global South are finding it extremely difficult to transform to a more desirable state.

The World Bank's (2013) '*World Development Report 2014*' argues that in order to effectively manage risk, whether systemic[3] or idiosyncratic[4], the state, civil society, the private sector, and the international community need to work together to manage risk. The World Bank's (2013) report defends this position by highlighting how governments, although they are expected to provide public goods and services and manage risk, can and have often failed to provide these goods and services and manage risk on behalf of civil society and the private sector. The World Bank's (2013) report supports these views, arguing that the state needs to play an overarching role by supporting and enabling processes of risk management at different scales, including household, community, enterprise sector, financial system, macro-economy, and international community. Satterthwaite (2011) and Van Niekerk and Coetzee (2012) expand on this, explaining how African governments and cities of the global South often lack financial and physical resources, skills, and technical capacities, which impacts on their ability to effectively address development and disaster risk issues. By bringing multiple actors together to 'collaboratively' govern disaster risk, this research argues that governments can draw on multiple sources of resources, knowledge, skills, and technical capacities, to more effectively, and holistically address disaster risk and build more resilient cities.

Collaborative governance recognises the diversity of actors working collectively towards a common goal, as well as the reality that a diversity of actors brings a wide range of ideologies and resources. This is particularly pertinent for managing urban risk with its multiple underlying risk factors, particularly in developing countries with high levels of inequality and informality. Despite this theoretical understanding, collaborative governance is difficult to achieve in practice. In practice, collaborative, decentralised governance approaches, which involve a wide range of actors often outside of taken-for-granted networks, are harder to design, implement, and maintain. Stoker (2004) argues that although collaborative governance can help solve conflicts about the distribution of resources, it cannot resolve the often deeply-entrenched

[3] A systemic risk is a large-scale risk that affects the majority within a particular system (*e.g.*, country or region); examples include economic or financial crises, increased food and commodity prices, large-scale natural disasters, pandemics, conflict, and war (World Bank, 2013).
[4] An idiosyncratic risk only affects the minority within a smaller system (*e.g.*, community, household, or city); examples include injuries, loss of income, loss of a job, and illness (World Bank, 2013).

ideological differences between actors, which often lead to conflicts and barriers in collaborative processes. Collaboration literature recognises the challenges of collaboration and the conditions which might hinder effective collaboration. Cowan and Arsenault (2008:24) explain how collaboration might fail "because a stakeholder feels disenfranchised, conflict derails the process, and/or parties either disagree or change their minds about the project goals". Although public participation and multi-actor collaboration are recognised in the literature as essential for strengthening resilience of at-risk communities, there are a number of barriers inhibiting society's ability to govern risk. In this thesis, I consider what some of these barriers are in the context of the Cape Town case study and in relation to disaster governance processes more broadly. The conceptual framework presented in Chapter Four helps to identify some of these barriers; these barriers are then presented and discussed in Chapters Seven to Nine.

The diversification of actors, which is a foundation for and a by-product of disaster governance, has broader theoretical and practical implications for understandings and outcomes of DRM processes. Shearing (2005:58) reflects on how a diversification of actors providing services also results in a multiplication of "mentalities, institutions, and technologies", which these multiple actors use to produce a diverse set of styles and practices. One of the potential implications of diversification is the potential for conflict and a lack of collaboration between actors, as a result of these differences in priorities and ideologies. Ballard *et al.* (2005), reflecting on the multiple civil society actors in South Africa who managed to establish themselves in various forms and organisations in post-Apartheid South Africa, explain how there was very little uniformity between these groups. This resulted in a diversity of social movements and groups, with multiple priorities and concerns, and different ideologies informing their actions (Ballard *et al.*, 2005). These differences meant that engagement between social movements and the state "[fell] on a continuum between in-system collaborative interactions on the one extreme, and out-of-system adversarial relations on the other" (Ballard *et al.*, 2005:625).

Inclusive governance theorists argue for transparent measures that unpack the vested interests of diverse actors governing, in order to reconcile them and ensure these actors trust each other and have confidence in the management process (Renn, 2008a). Institutional and individual mandates, rationales, perceptions, and vested interests are seen as contributing factors in these cultural differences and diverse framing of the issues (Renn, 2008a). Inclusive governance fails, however, to propose a framework for unpacking the differing rationales and individual characteristics of the actors involved. I argue in this thesis that these different rationales and individual characteristics can often lead to conflict, but if understood properly, can provide

conditions for more effective decision-making and opportunities for collaboration. This thesis addresses this gap by providing a theoretically-informed framework that helps identify and analyse the multiple actors within a particular networked governance system, in order to better understand "their internal constitutions, their cultures, their resources, and the strategies they use to amass and project power" (Burris *et al.*, 2008:127). A more in-depth discussion on this framework and how it draws on nodal governance theory and Ekstrom *et al.*'s (2011) barriers to adaptation framework is provided in Chapter Four.

7. SUMMARY

The nature of risks and the way society responds to these risks is changing, requiring a shift in our thinking of how they are managed. These systemic risks, embedded in social, economic, and political realities, have become too complex and diverse for traditional centralised and technocratic management approaches. With environmental change exacerbating existing patterns of global disaster risk, DRM approaches need to be able to function in highly dynamic and complex social-ecological systems. This is especially the case in cities of the global South, where majority of the urban poor live in marginalised communities and face ongoing shocks and stresses. In response to higher levels of uncertainty and complexity, the disaster community needs to adopt more innovative, integrated and flexible risk management approaches that are able to holistically and systematically address urban disaster risk. Resilience thinking contributes towards this gap in disaster discourse, advocating for systems to not simply resist change, but increase their capacity to learn, re-organise, and diversify. DRM literature calls for a shift towards bottom-up, participatory approaches where the public are involved in DRR decision-making and planning. New governance literature calls for decentralised, yet more holistic and integrated approaches that consider the interests of a plurality of actors acting across various scales. Similarly, collaborative governance recognises the need to engage with a plurality of actors and bring them together onto common platforms where they can engage in consensus-oriented decision-making.

Effective DRM needs the cooperation of multiple actors working towards a common goal. This is particularly applicable in urban areas facing flood risk, where these risks are complex and often compounded, and solutions therefore need to be approached holistically. This requires not only a range of approaches and strategies to holistically reduce risk, but recognition that multiple actors with multiple skill-sets, tools, and understanding of the problem should be involved in

governance processes. Particularly for cities of the global South, where natural hazards interact with exogenous factors such as weak governance, lack of adequate basic services, densification, and socio-economic instability, the complexity of contemporary disaster risk demands a multi-actor approach to governing risk. Governance theory recognises the development of more complex networks that include public and private actors working collectively, yet using their own distinctive ways and particular processes to contribute towards the common goal.

CHAPTER THREE:

URBAN FLOOD RISK MANAGEMENT: THEORY AND PRACTICE

1. INTRODUCTION

In Chapter Two, I focused on the theoretical concepts that have assisted my conceptualisation and understanding of disaster governance as an approach to strengthen cities' resilience to disaster risk. Since the case study for this thesis is based on Cape Town and how its local government manages flood risk in its informal settlements, I present a brief literature review on urban flood risk management in this chapter. The literature review provides insight into some of the theory related to flood risk management and how it fits within my understanding of disaster governance. In this chapter, I discuss briefly the effects of urban flooding on the urban poor living in cities of the global South. I also highlight current theory on 'sustainable' and 'integrated' flood risk management, arguing that sustainable flood governance lies at the interface of socio-political and technical considerations (*i.e.*, non-structural and structural measures respectively) of flood risk management. This chapter therefore presents a slightly more focused discussion on current thinking and practice in flood risk management discourse, with a focus on cities of the global South and experiences in informal settlement contexts. Many of the discussions presented in this chapter, in particular the socio-political and economic challenges to flood risk management faced by many cities of the global South, will be picked up in later chapters of this thesis when I present the findings from the Cape Town case study.

2. THE IMPACT OF URBAN FLOOD RISK ON CITIES AND THE URBAN POOR

Recognised in the literature on floods and flood management is that urban flood risk is increasing globally because of an increase in populations living in cities that are located next to

large bodies of water (*e.g.*, riverine and coastal) (Butler and Davies, 2004, Ashley *et al.*, 2007, Zevenbergen *et al.*, 2008, Swiss Re, 2013). The African continent continues to have the highest urbanisation rate in the world, with its rapidly expanding cities pushing many of its new immigrants into marginal, unsafe areas that remain largely un-planned, un-serviced, and un-governable hotspots of disaster risk (Pelling and Wisner, 2009, Ziervogel and Smit, 2009). Urbanisation also results in an increase of impervious areas such as roads, buildings, and paved areas, which reduces infiltration and increases the amount of surface runoff; when combined with inadequate or unmaintained stormwater drainage infrastructure, localised flooding takes place (Parkinson and Mark, 2005). Vulnerability to flooding is a growing concern in many cities of the global South because these cities tend to have higher population densities, and majority of their urban poor are forced to settle in informal, unregulated housing in flood-prone areas (Schipper and Pelling, 2006, Satterthwaite *et al.*, 2007, Douglas *et al.*, 2008, Tanner *et al.*, 2009).

Douglas *et al.* (2008:187) argue that "floods are natural phenomena, but damage and losses from floods are consequences of human action". Lack of adequate services and infrastructure (*e.g.*,. sanitation, stormwater, water, and health services), as well as poor housing quality, increase the risk of people living in informal settlements to hazards such as flooding and a changing climate (Armitage and Rooseboom, 2000, Pelling, 2003a, Huq *et al.*, 2007, Satterthwaite *et al.*, 2007, Douglas *et al.*, 2008, Ziervogel and Smit, 2009, Graham, 2010). Weather-related disaster events, which include flooding, storms, cyclones and hurricanes, and storm surges, will be exacerbated in cities of the global South by ongoing urbanisation, population and economic growth, and high rates of floodplain occupancy (Mitchell, 2003, Dicke and Meijerink, 2008, Hegger *et al.*, 2013). Compounding these existing challenges are the predicted impacts of climate change: increased frequency, duration, magnitude, and severity of hydro-meteorological hazards such as flooding, landslides, storms, drought, and temperature extremes, as well as vector-borne and water-related diseases (Huq *et al.*, 2007, Pelling and Wisner, 2009, Tanner *et al.*, 2009, Ziervogel and Smit, 2009).

Although overall flood mortality[5] in the world is decreasing, mortality to all weather-related hazards is increasing in countries with weak governance and low GDPs (UNISDR, 2011). Economic loss from flood events and tropical cyclones continues to rise across the world, seriously threatening the economies of countries with low GDPs (UNISDR, 2011). Table 1 illustrates how the numbers of people per year exposed to floods have doubled globally in the last 40 years, particularly in East Asia and the Pacific, South Asia, and Sub-Saharan Africa

[5] Flood-related deaths per capita.

(UNISDR, 2011). Table 2 illustrates further the economic implications of flood exposure, highlighting the average annual global GDP exposed to floods.

Table 1: Flood exposure by World Bank Region (million people per year)

Region	1970	1980	1990	2000	2010
East Asia and the Pacific (EAP)	9.4	11.4	13.9	16.2	18.0
Europe and Central Asia (ECA)	1.0	1.1	1.2	1.2	1.2
Latin America and the Caribbean (LAC)	0.6	0.8	1.0	1.2	1.3
Middle East and North Africa (MENA)	0.2	0.3	0.4	0.5	0.5
OECD countries (OECD)	1.4	1.5	1.6	1.8	1.9
South Asia (SAS)	19.3	24.8	31.4	38.2	44.7
Sub-Saharan Africa (SSA)	0.5	0.7	1.0	1.4	1.8
World	**32.4**	**40.6**	**50.5**	**60.5**	**69.4**

(Source: UNISDR, 2011:26)

Table 2: Average annual global GDP exposed to floods (in billion 2000 US$)

Region	1970–1979	1980–1989	1990–1999	2000–2009
East Asia and the Pacific (EAP)	2.8	5.1	10.2	21.5
Europe and Central Asia (ECA)	2.2	2.7	2.7	3.1
Latin America and the Caribbean (LAC)	2.5	3.1	3.9	5.4
Middle East and North Africa (MENA)	0.3	0.4	0.6	0.9
OECD countries	24.1	32.8	43.5	52.9
South Asia (SAS)	3.9	5.4	8.7	15.4
Sub-Saharan Africa (SSA)	0.4	0.5	0.6	0.9
World	**36.2**	**50.0**	**70.2**	**100.1**

(Source: UNISDR, 2011:32)

Notable in these two tables is that OECD countries, which comprise the global North and so-called 'developed' countries, have relatively low numbers of people who are exposed to floods each year, yet their GDP exposed to floods is significantly higher than other regions of the world. Although economic losses due to floods are increasing faster in OECD countries, the impact of economic losses relative to GDPs of countries of the global South is much higher and thus threatens their economies more (UNISDR, 2011).

The urban poor, who often live in marginalised urban communities, are situated in risk-prone environments without property ownership titles, often outside of formal jurisdiction, and excluded and discriminated from formal decision-making processes and DRR activities (Ahammad, 2011, Bulkeley *et al.*, 2011). In many cities of the global South, there is a lack of

institutionalised mechanisms that enable the urban poor to participate in DRM and CCA planning and decision-making (Action Aid, 2006, Haque *et al.*, 2014). Where these types of participatory mechanisms do exist, they still frequently exclude residents living in informal settlements from participating (Haque *et al.*, 2014); this is particularly true for cities where informal settlements and slums are considered illegal and are therefore not formally recognised by government (Pieterse, 2008, Michelutti and Smith, 2014).

Although government is often seen as best placed to manage flood risk, governments of cities of the global South are argued to lack the capacities (*e.g.*, finances, resources, authority, and technologies) to respond to and address disaster risk and the needs of the urban poor (Action Aid, 2006, Huq *et al.*, 2007, Tanner *et al.*, 2009, Poapongsakorn and Meethom, 2012, Vedeld *et al.*, 2012, Hardoy *et al.*, 2014, Vedeld *et al.*, 2015). In developing countries, DRM and CCA programmes have to compete for scarce resources and against socio-political issues and development agendas that are seen as more pressing, such as infrastructure and service delivery backlogs, poor housing quality, poverty, and so on (Chan, 2012, Hardoy *et al.*, 2014). These issues, which also apply to Cape Town, are considered in more detail in Chapters Seven and Eight of this thesis.

Parkinson and Mark (2005) attribute many of the flood and pollution-related problems that are associated with urban runoff in developing countries to institutional challenges:

1. Investments to improve and prioritise drainage infrastructure in public spending is only realised once there is a major problem (*i.e.*, large-scale floods);
2. Deficiencies in the administration systems for urban planning and control often result in insufficient controls over new developments;
3. Planning authorities lack resources to develop and implement effective solutions to control runoff and mitigate floods;
4. DRM departments, urban stormwater departments, and sanitation and water departments are often separate and there is a lack of coordination between these departments, which leads to contradictions, confusions, and overlapping functions and gaps in responsibility;
5. The boundaries of the stormwater catchment (hydrological boundaries) and administrative boundaries (*e.g.*, the city boundary) do not overlap, and this makes it challenging to develop and implement holistic drainage systems;
6. The pace of cities' growth in developing countries often outpaces the availability of funds to extend, rehabilitate, and maintain existing drainage systems.

Some of these above challenges are also highlighted in the case study of flood governance in Cape Town's informal settlements, in Chapters Six to Eight.

3. SHIFT IN PRACTICE FROM FLOOD DEFENCE TO FLOOD GOVERNANCE

Flood risk management is understood in this research as the "combination of all activities [*i.e.*, structural and non-structural] that aim at maintaining and improving the ability of a region to cope with peak discharges or extreme rainfall events" (De Bruijin *et al.*, 2007:63). In the face of environmental change and urbanisation, De Bruijin *et al.* (2007:63) argue that flood risk management needs to "move away from the traditional focus of *defending against floods* to a focus on *managing flood risks"*. Traditional approaches in flood management centred on managing the physical phenomena of flooding through technocratic, engineered 'flood defences', such as building dams, embankments, and dikes (Plate, 2002, De Bruijin *et al.*, 2007). Plate (2002) describes how this engineering-focused approach was driven by professionals possessing the engineering-driven, technical knowledge of how to reduce the risk of floods impacting on communities or social-ecological systems.

Ashley *et al.* (2007) highlight how there is widespread recognition that it is impossible to provide universal flood protection for people, their livelihoods, and their activities, as a result of the rate of environmental change (*e.g.*, climate change) and because of the high costs involved. In light of this, Ashley *et al.* (2007) argue that the benefits of engaging with multiple actors (including communities) need to be recognised. Zevenbergen and Gersonius (2007) support this view, arguing that engagement with and between multiple actors means that more people are better prepared for flooding and they can take an active role in decision-making about where, when, and how investments are made and which measures should be taken. Added to this is the recognition that contemporary flood risk is dynamic and complex, with climate change and global changes providing new challenges and uncertainties (De Bruijin *et al.*, 2007, Pahl-Wostl *et al.*, 2008). Therefore, a more integrated approach to flood management needs to be taken, which addresses all aspects of flood management, including policy, regulation, decision-making, engagement, and technical approaches (Ashley *et al.*, 2007, Pahl-Wostl *et al.*, 2008). An integrated approach to flood management integrates structural and non-structural aspects of flood management into a more holistic approach that aims to build the resilience of systems to flooding (Ashley *et al.*, 2007, Zevenbergen and Gersonius, 2007). This approach places

importance on softer, non-structural measures, such as policy, insurance, risk awareness, risk assessments, and communication, while still recognising the need for technical, structural solutions that are supported by non-structural measures (Zevenbergen and Gersonius, 2007, Pahl-Wostl *et al.*, 2008).

De Bruijin *et al.* (2007) argue that flood risk management approaches need to be considered within the context of sustainable water management and development, as captured by the concept of 'Integrated Water Resource Management' (IWRM). IWRM not only aims to systematically manage all aspects of water and its use, but also aims to manage catchments as a whole (*i.e.*, both the water and the land) (De Bruijin *et al.*, 2007). Current flood risk management discourse, which reflects broader DRM thinking, attempts to be more holistic and emphasise the need for a diversity of structural and non-structural measures, a plurality of actors contributing to decision-making, and a broader understanding of flood risk, which includes looking at the catchment as a whole (De Bruijin *et al.*, 2007, Hegger *et al.*, 2013). When talking about a diversity of structural and non-structural measures, current flood risk management discourse recognises the need to rely on both structural engineered measures that reduce flood risk (*e.g.*, embankments and drainage infrastructure) and non-structural flood defences that complement structural measures (*e.g.*, wetlands and parks, early warning systems, by-laws, and policy) (Plate, 2002, Werritty, 2006, Zhai *et al.*, 2006, Kelman, 2007). This requires that engineers and government actors continue to play a key role in flood management activities and decision-making because they bring the relevant expertise, technical knowledge, and resources that other actors (*e.g.*, NGOs and residents) might lack. Despite comprehensive flood management plans in some developing countries that outline the need for both structural and non-structural approaches to managing flood risk, the reality is that structural, engineered projects are often favoured and prioritised financially because they are more visible and quicker to implement (Chan, 2012, Poapongsakorn and Meethom, 2012, Desportes, 2014, Ziervogel *et al.*, 2014b, Desportes *et al.*, 2015).

Flood risks need to be managed in the short-term and the long-term (De Bruijin *et al.*, 2007). Managing the short-term means strengthening the capacity of systems to cope with extreme peak discharges and extreme rainfall events as a result of everyday weather and climate variability (De Bruijin *et al.*, 2007). Managing the long-term means strengthening the capacity of systems to deal with the uncertainty related to predicted climate change and its impact on flood probabilities (De Bruijin *et al.*, 2007). This uncertainty is often used as an excuse for delaying the implementation of proactive DRR and CCA measures (Adger *et al.*, 2009, Hallegatte, 2009, Measham *et al.*, 2011). For this reason, strengthening the capacity of systems to deal with this

uncertainty needs to form a crucial part of any flood risk management strategy. The latter can be achieved, as advocated in resilience thinking, by increasing the system's flexibility, redundancy, and capacity to learn and re-organise (Berkes, 2007, Folke *et al.*, 2010, Djalante *et al.*, 2013). Resilience in the face of uncertainty can therefore be achieved by strengthening the system's capacity to learn from past events and predict future events, and diversifying its options for managing current and future risks. The diversification of options here refers to not only the strategic implementation of both structural *and* non-structural measures, but also the inclusion of a broader range of actors who can provide both local and expert knowledge in decision-making processes.

In South Africa and many other developing countries, centralised management of flood risk is still prevalent, with governments driving responses (Van Niekerk, 2011, Chan, 2012, Jha *et al.*, 2012, Poapongsakorn and Meethom, 2012, Trung, 2012, Van Niekerk, 2014). Parkinson and Mark (2005) argue that this type of centralised, top-down flood management and decision-making approach is unresponsive to the needs and concerns of local actors and fails to recognise the wide range of actors who need to be part of the solutions and planning. South Africa is impacted by floods annually (DRMC, 2009) and current flood management approaches reflect not only the hierarchical nature of management approaches, but the prioritisation of engineered, structural measures that rely on input from experts rather than the communities most at-risk (Desportes, 2014, Ziervogel *et al.*, 2014b, Desportes *et al.*, 2015). Despite increased efforts by the CCT to manage annual flooding and strengthen the resilience of the urban poor who are impacted most, the reported reliance on large-scale relief and response activities highlights the CCT's failure to proactively manage flood risk across the city and in particular, its informal settlements (Ziervogel and Smit, 2009, Desportes, 2014, Ziervogel *et al.*, 2014b, Desportes *et al.*, 2015).

I argue that in order for flood risk management to be more resilient and responsive to the priorities and needs of civil society, actors at various scales and from various backgrounds (*e.g.*, scientific, policy-making, and local communities) need to be included in decision-making. According to De Bruijin *et al.* (2007) and Innocenti and Albrito (2011), resilient flood management systems are only possible when there are multiple actors, with multiple knowledge and resources, included in decision-making and governance processes. Parkinson and Mark (2005:xii-xiv) argue similarly that urban drainage systems require multiple actors, with different sets of resources, capacities, and forms of knowledge:

> "…to achieve the benefits of IWRM in practice requires much more than simply adopting new concepts and the development of new management tools. It requires interdisciplinary teams involving engineers, urban planners, economists, environmental scientists and social scientists who need to actively engage with communities through local politicians, community development workers, social activists, and representatives from non-governmental organisations and community-based groups".

Parkinson and Mark (2005) argue further that engineers and state actors need to work with communities at the grassroots level, in order to better understand and appreciate the local context these communities live in, so that better, more appropriate, and context-specific drainage systems can be designed. It is therefore important to consider residents' perceptions of, and responses to, flooding, when designing appropriate forms of drainage intervention or developing flood mitigation measures.

Writing from a UK perspective on flood risk management, Cashman (2008) highlights how UK flooding policy is also moving from more top-down, technocratic and structural approach towards non-structural, people-centred mitigation actions. Cashman (2008) argues that there is an emergence of local government arrangements in the UK which try to resolve the limitations of the state and its responsibilities, as well as limits of agencies within the state. In the cities of Bradford and Glasgow in the UK, flooding has been represented as a community and economic issue, which Cashman (2008) argues has created the space for non-state actors to be brought into the institutional field of flood management. In these cities, emphasis was placed on engagement with communities. Cashman (2008) also reflects on the role of political elites and 'policy entrepreneurs', who he argues are critical actors for ensuring ('promoting') a shared vision in terms of flood management, and ensuring stronger, more effective networks of relationships between actors, both vertically and horizontally.

Pahl-Wostl *et al.* (2008) see social learning as an important component of the new paradigm of management. Social learning, on the one hand, is a combination of individuals learning from their observations of others and social interactions within a group; this is seen as an iterative feedback process between individuals and their environment, with individuals changing the environment and these changes affecting the individual (Pahl-Wostl *et al.*, 2008). Social learning is also understood as a collective process, whereby actors come together into 'communities of practice' that are made up of individuals that share the same collective goals and objectives. By participating in these collective communities, which often develop an identity of its own that is

different to the individuals, people continually redefine themselves and that community, through the decisions they make, their understandings of issues, and the solutions that are created and/or chosen (Pahl-Wostl *et al.*, 2008). I argue that this collective social learning enhances the flexibility and capacity of systems to respond to change, because it not only results in improved, collective decisions and solutions to problems, but it also increases the capacity of individuals and groups of people (within their communities of practice) to solve issues and collaboratively reach a decision.

Although the theory on flood risk management recognises this need to include multiple actors, and cities of the global North have adopted these principles in current approaches (Godschalk *et al.*, 2003, DEFRA, 2005, Gill, 2008, Hegger *et al.*, 2013, Warner *et al.*, 2013), there is still a lag in thinking and practice in cities of the global South (Diagne and Ndiaye, 2009, Lebel *et al.*, 2011, Bang, 2013, Gaston *et al.*, 2013, Hiwasaki *et al.*, 2014, Ziervogel *et al.*, 2014b). Current stormwater management plans and floodplain management plans in South Africa, for example, still focus exclusively on the roles and responsibilities of engineers and experts, referring to civil society only in discussions on how to communicate decisions to them and educate communities on how to use the services provided (for example, see CCT, 2002b, CCT, 2009).

The CCT's flood management plans (DRMC, 2009) recognise the importance of drawing on multiple knowledge from multiple experts, yet their plans still only prioritise municipal departments and officials, with references to 'external stakeholders' meaning provincial and national government departments, or NGOs funded by the municipality to carry out very specific activities on their behalf. Any references to civil society in these flood plans are along the same lines as the stormwater management plans; how to communicate decisions to communities and educate them on how to protect themselves from and during floods. In cities of the global South and in South Africa in particular, flood governance discourse needs to realise that flood management is and should no longer be the exclusive mandate of the state, but new public and private actors need to enter the scene. I argue in this thesis that this increasing decentralisation in disaster management, as well as flood management, means that management and decision-making processes are no longer found within the confines of a top-down, autocratic systems, but are made up of multiple actors governing flood risk. In addition, I argue that shifting focus from technocratic, reactive solutions to managing flood risk to developing and implementing proactive, participatory risk reduction strategies requires that a different set of actors take part in decision-making and planning.

4. SUMMARY

This chapter discussed how flood risk is increasing globally because of an increase in populations living in cities, which are often built next to bodies of water. In cities of the global South, the urban poor are particularly at risk from flooding and hydro-meteorological risk because of a lack of adequate services and infrastructure, poor housing quality, and being forced to settle on marginal, flood-prone land. This chapter highlighted how flood management in developing countries and particularly in South Africa is still technocratic and centralised, despite legislation that calls for more inclusive, participatory approaches. This management approach is in contrast to the global paradigm shift within flood risk management discourse from expert-driven, technocratic approaches that 'defend' against floods, to more integrated, decentralised approaches that address all aspects of flood management, including policy, regulation, decision-making, engagement, and technical approaches. These decentralised approaches also focus on bringing multiple actors together (including the state, technical experts, and local communities) to inform and make flood management-related decisions. This chapter reiterated the discussion in Chapter Two, which highlighted the importance of including a diversity of actors in disaster governance processes, in order to strengthen their resilience to flood risk.

PART THREE:

RESEARCH DESIGN AND METHODOLOGY

CHAPTER FOUR:

CAPTURING THE COMPLEXITY OF DISASTER GOVERNANCE: THE CONCEPTUAL FRAMEWORK

1. INTRODUCTION

In order to conceptualise disaster governance, I have drawn on understandings of the concept of 'governance' in its broadest sense. 'Governance' is therefore considered to be the plurality of actors 'intentionally shaping' or managing the flow of events within a social system (Burris *et al.*, 2005, Ansell and Gash, 2007, Wood and Shearing, 2007). By focusing on the 'governance' of events within a social system, attention is drawn to the 'plurality of mechanisms' through which social goods and services are managed and shared, and through which decisions are made, at multiple scales (Rosenau and Czempiel, 1992, Burris *et al.*, 2005, Van Asselt and Renn, 2011). Implicit in this recognition of the 'plurality of mechanisms', is the understanding that there are, and needs to be, multiple actors, beyond the confines of the state, who actively participate in and contribute to decision-making processes.

In order to bridge the gap from a theoretical understanding of disaster governance to analysing what disaster governance looks like in practice in a particular case study, this research draws on two theoretical frameworks: nodal governance (Burris *et al.*, 2005) and barriers to adaptation (Ekstrom *et al.*, 2011). These two theoretical frameworks are combined in a novel way to form the conceptual framework that is used in this thesis to guide the data collection and analysis processes, and to help unpack the complexity of disaster governance in the case study on flood management in Cape Town. In this chapter, I begin by conceptualising nodal governance and unpacking the key characteristics used to define the actors (called 'nodes'). My discussion then focuses on the barriers to disaster governance, drawing on insights from the barriers to adaptation framework. This chapter ends with a diagrammatic representation of the conceptual framework.

2. NODAL GOVERNANCE: THEORETICAL UNDERPINNINGS

Nodal governance is based on contemporary network theory, which seeks to unpack how multiple actors operate within social systems, along networks (Burris *et al.*, 2005). These networks are recognised as the means through which nodes exert their influence, enabling them to govern the systems that they form part of (Burris *et al.*, 2005). Whilst contemporary network theory considers networks as a central element in governance theory (Rhodes, 1990, Burris *et al.*, 2008), nodal governance places emphasis on the nodes themselves and how the nodes exert influence within those broader networks (Burris *et al.*, 2008, Tefre, 2010). Nodal governance therefore highlights how these nodes are the sites where governance takes place, seeking to better understand how they govern (Burris *et al.*, 2008, Tefre, 2010). By analysing the nodes, nodal governance draws attention to what Burris *et al.* (2008:127) characterise as the nodes' individual "internal constitutions, their cultures, their resources, and the strategies they use to amass and project power". Nodal governance therefore provides a theoretical model for understanding governance and for empirically describing what is, rather than normatively arguing what ought to be (Tefre, 2010).

Burris *et al.* (2005, 2008) define nodes broadly, explaining how they may take any form: they can be individual actors or a group of actors, formal or informal institutions, government or non-government entities, or even local communities and organisations. Braithwaite (2004:300) defines nodes more narrowly, arguing that they are "a point in time and space where a cluster of actors collaborate to mobilise pooled resources". Braithwaite's (2004) understanding of nodes reflects network theory, in the sense that networks are seen as an outcome of interdependent actors coming together to pool resources (Powell, 1990). The exchange and allocation of resources in this context does not take place through discrete exchanges, but through "networks of individuals engaged in reciprocal, preferential, mutually supportive actions" (Powell, 1990:303). Shearing and Johnston (2010:501) combine these two understandings of nodes, arguing that nodes are brought together not only by the resources they pool, but by similar activities or tasks:

> "[Nodes] may comprise individuals, groups (and parts of groups), organisations (and parts of organisations) or states – may be large or small, tightly or loosely connected and inclusive or exclusive in membership; they may engage in similar activities, or they may be specialised to undertake particular tasks."

When establishing nodes, there are two important factors that need to be taken into consideration. Firstly, a node is seen as a node when it actively plays a role in the identified governance network. A collaborative governance approach, as envisioned by Djalante (2012) and Holley *et al.* (2011), would define a node more broadly as any actor within traditional 'government' spheres, as well as external actors who work together in mutually beneficial ways to shape the flow of events. Ansell and Gash (2007) differentiate these two groups of actors as 'public' actors (referring to government agencies and departments) and 'non-state' or 'private' actors (referring to all other interest groups and concerned citizens as individuals and as organised groups). In line with a disaster governance approach, this thesis leans towards a collaborative governance definition of actors, arguing that a node includes any public or private actor(s), institution(s) or groups directly or indirectly involved in the management of disaster risk and carrying out particular DRR activities.

Secondly, the type of node needs to be established: nodes can be single unitary actors (or institutions and groups), assemblages of nodes, or a super-structural node (Drahos, 2004, Burris *et al.*, 2005, Burris *et al.*, 2008). Nodal assemblages comprise many nodes, thereby integrating multiple networks in order to govern more effectively. A super-structural node, on the other hand, does not integrate networks, but rather brings together the nodes representing particular networks, in order to concentrate resources and technologies for more effective governance. In other words, a nodal assemblage is made up of various nodes with the same overall common goal, whilst the super-structural node brings together nodes with different goals, simply to rely on their often different and diverse technologies and resources, in order to achieve a higher-level goal. According to Drahos (2004:404), a super-structural node is the "organisational product of two or more networks [of nodes] which are tied together for a common purpose". These super-structural nodes are seen as the command centres of networked governance (Drahos, 2004, Burris *et al.*, 2005); super-structural nodes do not integrate networks, but rather bring nodes and their networks together, so as to concentrate resources and technologies in order to achieve a common goal. Burris *et al.* (2005:38) summarise this concept in the following way:

> "Tying together networks is one very important way in which nodes gain the capacity to govern a course of events. This tying together creates a node with increased resources at the same time as it creates a structure that enables the mobilisation of those resources to produce action by other nodes in the network."

In the international emergency relief literature, Kapucu (2011) describes how the international disaster relief arena is made up of independent nodes responding to disasters individually, with their own individual capacities, with nodal assemblages and superstructural nodes forming as these nodes see the benefit of coordinating their actions. Pooling resources in this type of collaborative, networked structure is seen as not only beneficial to all actors reciprocating within the network, but crucial for addressing such complex issues that require a diversity of resources: financial, physical, and knowledge- and information-based (Powell, 1990, Lipson, 2005, Kapucu, 2011). A national-level or city-level multi-actor platform that brings multiple nodes together to make decisions about disaster risk (*e.g.*, the Flood Task Team in the Cape Town case study) could, for example, be seen as a nodal assemblage. This nodal assemblage brings multiple nodes together to pool the multiple resources and technologies that each node has, as well bring together the unique knowledge that helps this nodal assemblage make more informed decisions.

2.1. Characterising the nodes

Nodes differ in their ability to shape events and govern, as a result of their different mentalities, access to resources and technologies, and institutional structures enabling them to govern (Burris *et al.*, 2005). Analysing these four characteristics provides a better understanding of how nodes govern, what constrains or enables them to govern effectively, and what influence they exert on other nodes and on the system that they are governing. It is these four characteristics that nodal governance seeks to unpack and analyse, and onto which this conceptual framework focuses: mentalities, technologies, resources and institutions.

A mentality refers to the way nodes think about and view the world and the 'events' they govern (Burris *et al.*, 2005, Tefre, 2010). A mentality determines how nodes interpret their perceptions and worldview, and therefore how these thoughts are translated into action (Tefre, 2010). The intangible, subjective quality of mentalities means that these thoughts and perceptions cannot be explicitly determined, but need to be implicitly inferred by analysing the actions of the nodes, since the argument with mentalities is that they ultimately shape the actions of the node in question. Tefre (2010) argues that the notion of mentalities guiding actions follows with Foucalt's understanding of truths constituted in discourses. This refers to the notion that discourses are ways of seeing the world and that they determine how people choose to act towards the world (Tefre, 2010). People have agency to choose which discourse they will

inhabit and this difference in discourse can often result in people (and their discourses) not being compatible with one another (Tefre, 2010).

Resources are the assets that the node uses to support their operation and their exertion of influence on the world and events they govern (Burris *et al.*, 2005, Tefre, 2010). Resources refer not only to financial resources, but include local knowledge and information, social capital, expertise, authority, legitimacy, strategic position, and organisational capacity (Black, 2003, Burris *et al.*, 2005, Tefre, 2010).

The technologies refer to the set of methods and tools a node relies on to exert influence over and to manage the world and events that they govern (Burris *et al.*, 2005, Tefre, 2010). Tefre (2010) sees these 'tools' as comprising physical, legal, symbolic, or personal tools; these tools vary in strength, differ between nodes, and are dependent on the resources available to the node. The capacity of a node to govern, based on the technologies it uses, does not only determine the accessibility a node has to a particular tool, but its ability to combine tools (Tefre, 2010).

Finally, institutions are the structures in place that enable the node to direct resources, mentalities, and technologies over time (Burris *et al.*, 2005, Tefre, 2010). As defined by Shearing and Johnston (2010:503), institutions within a nodal governance approach relate to the "structures that enable the mobilisation of resources, mentalities and technologies in pursuit of security" (*i.e.*, in their case, 'security', and in my case, flood/disaster risk reduction). Pahl-Wostl *et al.* (2008) define institutions as "the formal and informal rules that provide the framework for the behaviour of human beings". Pahl-Wostl *et al.* (2008) see formal institutions as comprising the laws and regulations, the formal organisational structures, and the formal procedures that guide and frame decision-making, while informal institutions are the socially-shared rules and norms that have developed in social practice. Burris *et al.* (2005) argue that nodes can take on a variety of organisational forms, be it legislatures, government agencies, neighbourhood associations, NGOs, firms, or gangs. In this thesis, institutions refer to the temporary or permanent, and formal or informal organisational forms that enable nodes to mobilise resources, as well as the regulatory frameworks that a node draws on and is often bound to (*e.g.*, policies, laws and by-laws, contracts, and other legal documents).

3. BARRIERS TO DISASTER GOVERNANCE

The literature on governance, DRM, and collaboration all recognise that challenges exist, which might impact on and hinder activities and processes. Although not a new concept in the above discourses, the concept of challenges to particular processes has been packaged differently by Moser and Ekstrom (2010) and Ekstrom *et al.* (2011) within climate change adaptation (CCA) scholarship. Barriers to adaptation is a framework presented by these authors as a way to identify challenging, but malleable barriers that have an impact on society's ability to deal with climate change impacts and impede CCA. Moser and Ekstrom (2010) use the IPCC's (2007) definition of limits, seeing them as obstacles that are absolute and have a threshold, beyond which existing activities and system states cannot be maintained. Barriers, on the other hand, are seen by Ekstrom *et al.* (2011) as instances where those seeming limits can be stretched or overcome. Ballard *et al.* (2010:1) use the terms 'constraints and enablers', defining them as "issues that lie outside the direct scope of the project or activity in question, but which have a significant effect on its outcome". Chapter 16 of the IPCC's 2014 report (Klein *et al.*, 2014) also refers to the term 'constraints' instead of 'barriers', highlighting how factors considered to be constraints make adaptation planning and implementation more challenging, but unlike 'limits', they can be overcome or addressed.

Ekstrom *et al.*'s (2011) framework for barriers to adaptation is centred on actors who are actively participating in and governing activities (*e.g.*, adaptation processes), recognising that these actors and their actions are embedded in social-political, natural, economic, and institutional contexts. This framework also recognises the shift from 'government' to 'governance', with regards to there being multiple actors, sectors, and institutions making decisions and determining a particular course of action, rather than the state making all the decisions (Ekstrom *et al.*, 2011). The omission of certain actors from the governance process, for example, is considered to be a barrier, depending on the perspective of the actors analysing the process; be it top-down or bottom-up (Ekstrom *et al.*, 2011).

3.1. Overcoming potential barriers: Considering the opportunities

Considering the 'opportunities' to adaptation and how to overcome potential barriers is less explored in climate change literature. This gap in knowledge is highlighted in the IPCC's report (Klein *et al.*, 2014) where the chapter dedicated to discussing adaptation constraints, limits, and opportunities, has only three pages dedicated to 'opportunities' compared to eleven pages on constraints (barriers) and limits. Coming from ecology scholarship is the notion that limits and thresholds within natural and ecological systems can be stretched or overcome with the implementation of technological innovations (Moser and Ekstrom, 2010). An example of this is genetically modified crops that have higher heat tolerance (Moser and Ekstrom, 2010) or drought tolerant crops. Moser and Ekstrom (2010:22027) argue that barriers can be overcome with "concerted effort, creative management, change of thinking, prioritisation, and related shifts in resources, land uses, [and] institutions". Adger *et al.* (2009) argue similarly that malleable barriers are those barriers that can be overcome with sufficient political will and social support. Moser and Ekstrom (2010:22030) highlight the conditions necessary for overcoming potential barriers, which include "leadership, strategic thinking, resourcefulness, creativity, collaboration, and effective communication". These conditions are what Ballard (2013) refers to as 'enablers' and the IPCC report (Klein *et al.*, 2014) refers to as 'opportunities'.

Ekstrom *et al.* (2011) do not consider overcoming barriers to be a normative must, but rather approach this process descriptively, as something that can impact on the adaptation process in one way or another. Overcoming barriers, Ekstrom *et al.* (2011) argue, can be seen as either good or bad, depending on the perceptions of the actors analysing or taking part in the process. Adger *et al.* (2009:350) support this view, arguing that:

> "what may be interpreted as a limit or a failure of adaptation may in fact be a successful adaptation for another actor, resulting from different priorities and values held within society."

If, however, barriers are not overcome, it is recognised that adaptation will be less efficient and effective, and more costly in the long-term (Moser and Ekstrom, 2010). Moser and Ekstrom (2010) highlight the importance of recognising that sometimes barriers might present themselves as limits, which cannot be overcome (*e.g.*, laws and regulations). By not questioning whether these limits are in actual fact malleable barriers, this perception could in itself become a barrier to the adaptation process (Moser and Ekstrom, 2010). Although barriers are seen as

factors that could stop, delay, or divert the governance process, overcoming these barriers will not ensure successful outcomes (Moser and Ekstrom, 2010). I argue that recognising and addressing barriers is a critical step towards strengthening governance processes and helping actors move towards their common goal.

3.2. The nature of potential barriers

In the literature on barriers and enablers, various authors have tried classifying the barriers by their source, spatial and temporal scale, sphere of influence, or types of impacts that they might have. With the aim of deepening understanding of potential barriers to adaptation in developing countries, Shackleton *et al.* (2015) have provided a review of the types of barriers that sub-Saharan Africa experience, as highlighted from related empirical studies. These authors highlight how most of the research on and understanding of barriers in developing countries are focused on biophysical, knowledge, and financial barriers; missing from these studies are a better understanding of the more 'hidden' barriers, which include political, social, and psychological barriers (Shackleton *et al.*, 2015). From my own review of some of the literature on barriers to adaptation, the common categories of barriers and enablers are summarised in Table 3.

Table 3: Description of different barriers and enablers from the literature

Type of Barrier/Enabler	Description	Cited by:
Contemporary or legacy	Interfering with current processes or resulting from past decision-making.	Moser and Ekstrom (2010)
Ecological and physical	Related to the environment and physical hazards or obstacles.	Adger *et al.* (2009), IPCC (2012), Klein *et al.* (2014)
Economic and financial	Market systems and financial structures. Available funds.	Adger *et al.* (2009), IPCC (2012), Klein *et al.* (2014)
Governance, institutional, and regulatory	Including leadership, guidance, motivation, vision, high skill levels, strong integrity, and trust.	Moser and Ekstrom (2010), Ekstrom *et al.* (2011), Measham *et al.* (2011), Klein *et al.* (2014)
Knowledge, information, and communication	Including technical information; expert, indigenous, or local knowledge. Question how and what information is interpreted and communication, if any.	Moser and Ekstrom (2010), Ekstrom *et al.* (2011), Measham *et al.* (2011), IPCC (2012), Klein *et al.* (2014)
Participation and engagement	Who is allowed to participate and in what way.	Ekstrom *et al.* (2011)
Proximate or remote	Within or beyond an actor's sphere of influence. Including scales of influence.	Moser and Ekstrom (2010)
Psychological, cognitive, and behavioural	How people think and act. Including trust.	Adger *et al.* (2009), Moser and Ekstrom (2010), Ekstrom *et al.* (2011), IPCC (2012)
Resources	Including staff expertise and time.	Moser and Ekstrom (2010), Ekstrom *et al.* (2011), Measham *et al.* (2011), Klein *et al.* (2014)
Socio-cultural	Including values, beliefs, and perceptions. Influences how people perceive, interpret, and think about certain processes, and what information and knowledge they value.	Adger *et al.* (2009), Moser and Ekstrom (2010), Ekstrom *et al.* (2011), IPCC (2012), Klein *et al.* (2014)
Technological	Related to the use of technology and technological development, in various forms.	Adger *et al.* (2009), IPCC (2012), Klein *et al.* (2014)

For the purposes of this thesis, the multiple types of barriers have been grouped in order to match the characteristics highlighted within a nodal governance framework (*i.e.*, mentalities, resources, technologies, and institutions). This helps to pin-point particular barriers to disaster governance that might arise when considering the nodes and how they draw on diverse mentalities, resources, technologies, and institutions. In Table 4, the key types of barriers reflected in the literature are grouped under the characteristics provided by the nodal governance framework. Using the nodal governance approach to identify and explore potential barriers and enablers also helps to ensure that the more 'hidden' barriers, such as socio-cultural, behavioural, psychological, political, and institutional barriers are not ignored or downplayed.

Table 4: Types of barriers applied to the nodal governance framework

Nodal Governance Characteristics	Types of Barriers and Enablers
Mentalities	Socio-cultural; Psychological, cognitive, and behavioural
Resources	Resources; Expertise; Knowledge and information; Financial; Ecological and physical
Technologies	Technological; Participation and engagement; Communication and information-sharing
Institutions	Regulatory and institutional; Participation and engagement

I argue that being able to identify different barriers forms a significant part of any governance process because recognising barriers in governance processes is a crucial first step before being able to address and even overcome these barriers. The process itself of identifying barriers can increase the resilience of the governance process, as well as increase the resilience of all actors involved because identifying the barriers is a form of increased knowledge and understanding. Barriers and opportunities can come in many forms, as summarised earlier in Table 3. By aligning the different types of barriers to the four characteristics highlighted under the nodal governance framework, the conceptual framework developed in this chapter will help identify potential barriers that might impede disaster governance processes in a given context.

4. DIAGRAMMATIC REPRESENTATION OF THE CONCEPTUAL FRAMEWORK

The conceptual framework in its simplest form is shown in Figure 5. This figure represents what a node would look like, with its four characteristics and the intersection of potential opportunities and barriers. Each node draws on multiple mentalities, institutions, resources, and technologies when exerting influence on other nodes and within the network. The four characteristics do not operate in isolation, but impact on each other. For example, a node's mentalities often dictate the types of technologies adopted, or the resources drawn on, whilst the mentalities might be a product of the institutional framework within which the node operates, or a by-product of the types of technologies it can adopt or the resources it has access to. The resources available to the node might also be a product of the technologies adopted, and/or the institutional framework within which the node operates. The opportunities and barriers are seen as both products of and factors impacting on the node's characteristics and therefore the node's capacity within the network and influence on other nodes. The barriers to

flood governance in the case study city of Cape Town, from a nodal governance approach, will be unpacked and explored further in Chapters Seven to Nine.

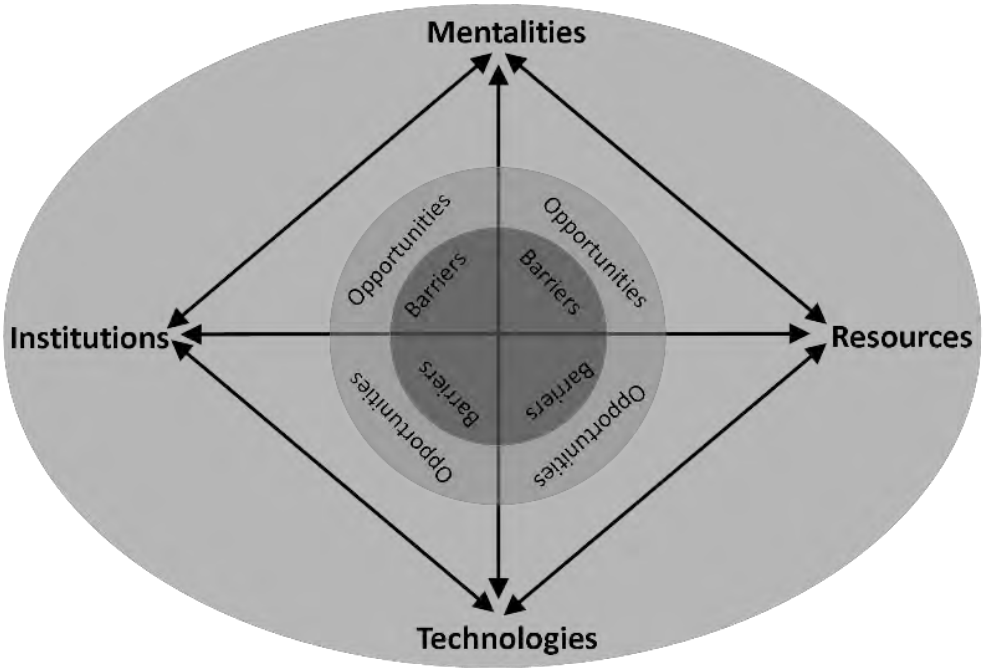


Figure 5: Conceptualisation of a node
(Source: Joy Waddell)

As understood in this thesis and explored earlier in this chapter, each node does not operate in isolation, but forms part of a bigger system, or 'nodal assemblage'. This nodal assemblage is represented in Figure 6. This figure tries to capture, on a very basic level, how each node, with its different characteristics that create potential barriers and opportunities, also interacts with and impacts on other nodes' capacities. Some nodes have a much stronger influence (*i.e.*, represented as bigger nodes in the diagram), while other nodes have a much smaller influence. I argue that disaster governance helps to understand who these nodes are and how they interact. Nodal governance, however, adds a layer of complexity and understanding to disaster governance, by helping to unpack what the different characteristics of the nodes are, how they enable nodes to govern and make decisions, and what impact these have in terms of barriers and opportunities for disaster governance.

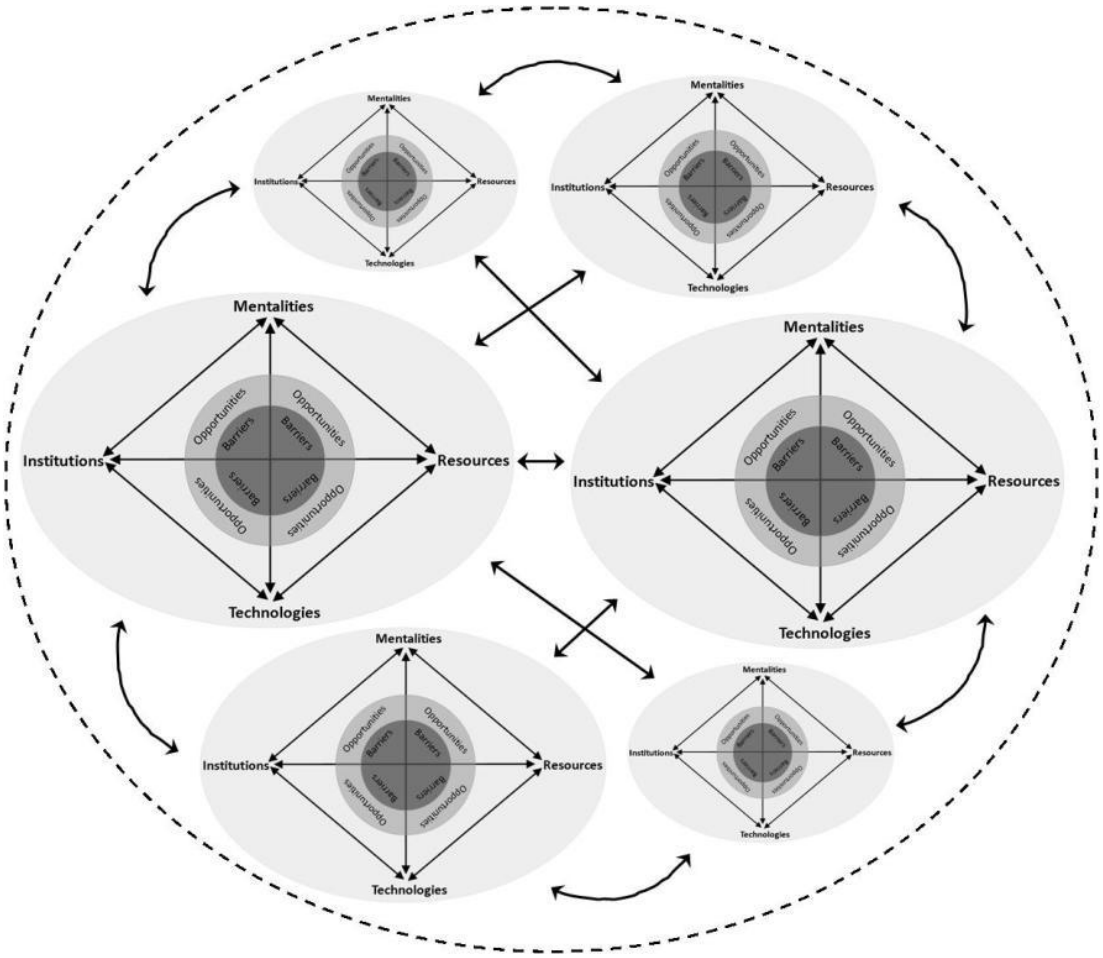


Figure 6: Conceptualisation of a nodal assemblage
(Source: Joy Waddell)

5. SUMMARY

The conceptual framework presented in this chapter draws on both nodal governance theory and barriers to adaptation discourse to help identify and describe each actor within a particular governance process, and the barriers preventing them from governing effectively. The conceptual framework draws on nodal governance to emphasise the actors (called nodes) governing events, arguing that these nodes are the sites where governance takes place and where groups of actors collaborate to mobilise resources. Nodal governance is a theoretical model for understanding governance and analysing how nodes govern and the capacities that they have, which allow them to govern. Nodal governance recognises that nodes differ in their ability to shape and govern events, as a result of their different mentalities, access to resources and technologies, and institutional structures enabling them to govern. Analysing these four

'characteristics' enables a better understanding of how nodes govern, what constrains or enables them to make decisions and implement interventions, and what influence they exert on the world and the social system that they are governing. The conceptual framework enables a better understanding of each actor's unique mentalities, which often dictates their actions, responsibilities, and understanding of the nature of the problem. This framework provides a way to look at the resources and technologies available to each node, and the institutional structures within which they govern and act.

Although public participation and multi-actor collaboration are recognised in the literature as essential for strengthening resilience of at-risk communities, there are obstacles that inhibit society's ability to collaboratively manage risk. Recognising that there are barriers constraining nodes from governing, this framework helps to identify key barriers that can impede or prevent governance processes from taking place. Adopting a nodal governance approach to identify and understand the potential barriers and enablers to disaster governance helps to better understand how nodes govern and what potential barriers might be preventing nodes from governing effectively. By better understanding how nodes govern and addressing the potential barriers, ways to combine the strengths of different nodes and mobilise resources more efficiently can be suggested in order to strengthen collaborative outcomes.

CHAPTER FIVE:

RESEARCH APPROACH AND METHODOLOGY

1. INTRODUCTION

Governments and municipalities that lack the capacity to address disaster risk often respond by prioritising reactive responses (Holloway, 2003), without adequately considering the barriers that might be preventing them from proactively addressing disaster risk and strengthening the resilience of society. Although disaster communities understand the strengths of collective action in addressing disaster risk, there is a lag in understanding how the actual process of bringing multiple actors together can present challenges. This highlights the need for better understanding of which actors should be governing disaster risk, what the various actors' unique ideologies and priorities are, and what potential barriers to collaborative governance might arise. This research attempts to address this gap in understanding by using a nodal governance approach (as outlined in Chapter Four) to describe and analyse the unique characteristics of the actors governing disaster risk and how these characteristics shape their actions. Added to this is an in-depth look at what barriers might be present as a product of these characteristics and relationships, and how these barriers impact on the ability of the actors to make decisions and implement DRR activities.

Emerging from the global South is the recognition that western urban theory is not sufficient for theorising and understanding cities of the global South (Kennedy *et al.*, 2011). This western urban theory is centred on the notion that the global North is the site for producing theory, while the global South is the site for collecting data (Kennedy *et al.*, 2011). Several academics critique this notion, arguing that theory needs to be produced from the South in order to provide insight on the multiple processes that are unique to the global South and which cannot be theorised from a Northern perspective (Oldfield, 2007, Ramutsindela, 2007, Roy, 2009, Watson, 2009, Kennedy *et al.*, 2011). There is a recognition also of the role that the global South can and should play in addressing taken-for-granted approaches to managing and solving the growing problems of poverty, inequality, and informality across the world (Watson, 2009).

Cities of the global South are unique as a result of their very different political, historical, and socio-economic circumstances; a good example here is the oft-cited impact of Apartheid in South Africa's current housing, socio-economic, and political issues (Oranje, 2010, Bénit-Gbaffou and Katsaura, 2014). In order to understand and account for phenomena that is unique to cities of the global South, Roy (2009) argues that researchers need to produce theory and different types of knowledge from their unique Southern perspective.

In South Africa, there is a dearth of empirical research that explores collaborative mechanisms of DRM, in spite of national and municipal legislation that stipulates the need for participatory and inclusive DRM strategies (Botha *et al.*, 2011, Van Niekerk, 2011). There are few empirical studies on local municipal examples of collaborative DRM platforms; a gap that I aim to address by focusing on an embedded case study of flood risk management in the municipality of Cape Town, South Africa. This research is explanatory because I attempt to identify the factors undermining collaborative disaster governance and explain the nature of collaboration between multiple actors governing disaster risk. In order to accomplish this, the methodology adopted for this thesis focuses on capturing data on how actors manage and address flood risk in Cape Town, at mainly the local government level, but also drawing on perspectives from residents living in a high flood-risk informal settlement in Cape Town.

In this chapter, I provide details on the embedded case study research approach that influenced the conceptualisation and implementation of my research. This is followed by a discussion on the multiple qualitative research methods that were adopted to conduct the research. I also address important ethical issues faced while conducting this research and the limitations of the research. Finally, this chapter ends with a reflection on the value of this research in DRM practice more broadly and the challenges of conducting research on politically sensitive and complex governance processes.

2. RESEARCH APPROACH

The methods adopted in this research are framed within an interpretist paradigm, where humans are understood as behaving the way they do because of their subjective perceptions and realities of the world around them and their immediate environment (Willis, 2007). I argue that in order to understand human behaviour, the environment they inhabit needs to be understood first; the context in which people make decisions, the perceptions they have of their

environment and the people in that environment, and the subjective perceptions others in their environment might have of them. This research draws on qualitative methods to examine an embedded case study because qualitative methods are seen as best suited to capturing, understanding, and describing people's environment in detail, and exploring their subjective perceptions of that environment (Denzin and Lincoln, 2011).

The methodology employed in this research facilitated an in-depth understanding of the actors governing risk in the context of Cape Town's flood risk landscape. I understand that the narrow case study focus on a specific hazard (*i.e.*, floods) in a specific city (*i.e.*, Cape Town) could limit the potential for generalising the findings to other cities, risks, or governance systems. Nevertheless, I argue that the methods and conceptual framework adopted in this research, if applied to other case studies, can provide important insights and understanding of the multiple actors governing risk and the barriers to collaborative governance that might arise in those other contexts. The focus in this study is therefore not only on the findings and outcomes of the research, but also on the *process* of identifying, understanding, and analysing the barriers to disaster governance. The case study of flood management in Cape Town presents an empirical focus for applying the conceptual framework and showcasing how to develop a more systematic and informed understanding of the disaster governance process in question. The research strategy adopted in this study is qualitative and idiographic because I aim to describe and analyse the particular actors and their actions, within the context of flood risk governance in Cape Town, and how their actions and perceptions shape events. The research approach that this study used to gather and analyse the empirical data is discussed below.

2.1. Embedded case study approach

This research adopted a single-case embedded or 'nested' case study approach, as opposed to a holistic case study (Yin, 2014a,b). The single case is the case of flood governance in the city of Cape Town, with the Flooding and Storms Emergency Planning Task Team (referred to as 'the 'Flood Task Team' throughout this thesis) and the informal settlement of Sweet Home as the two embedded units of analysis.

Case study research is a well-known and widely used methodology in many disciplines, including social sciences and political sciences. Case study research is also a growing theoretical field in itself; this body of literature addresses issues such as building theories from case study

research (Eisenhardt, 1989, Yin, 2014b), rigour in case study approaches (Eisenhardt, 1991, Scholz and Tietje, 2002), qualitative approaches in case study design (Kohlbacher, 2006, Baxter and Jack, 2008), and how the case study approach is well-suited for conducting research in the global South (Duminy *et al.*, 2013). Orum *et al.* (1991) explain how case studies have been used in the past to uncover social phenomena and provide fundamental insights and detailed analysis of the social world. Case studies allow researchers to examine not only the complex realities people live in, but also the complex social interactions that happen between people and between people and their environment, as well as people's perceptions of and decisions on social interactions and their environment (Orum *et al.*, 1991). Orum *et al.* (1991:9) argue that because case studies allow researchers to study 'social interaction patterns', case studies of a single phenomenon allow researchers to understand and analyse social action and interaction in its "most complete form". Duminy *et al.* (2013:163) argue that because case studies pay close attention to reality and the details of unfolding events, they are well-suited to unpacking and analysing "complex causality, power relation, ethics, and judgments", and providing nuanced views of reality.

Since the research aim in this thesis is to apply a nodal governance approach to understanding disaster governance, two groups of actors were seen as the most appropriate units of analysis in the Cape Town case study: the municipal officials represented on the City of Cape Town (CCT) municipality's Flood Task Team, and residents living in informal settlements. For the purposes of this study, an informal settlement called Sweet Home (Figure 7) was selected as part of the case study. These two groups are seen to capture two sides of the same coin: those formally selected to make flood management decisions, and those affected by the outcomes of those decisions. The Flood Task Team is seen to represent the municipal level of decision-making, whilst the residents represent those at the local level who are affected by this decision-making. The case study context and details are presented in Chapter Six.

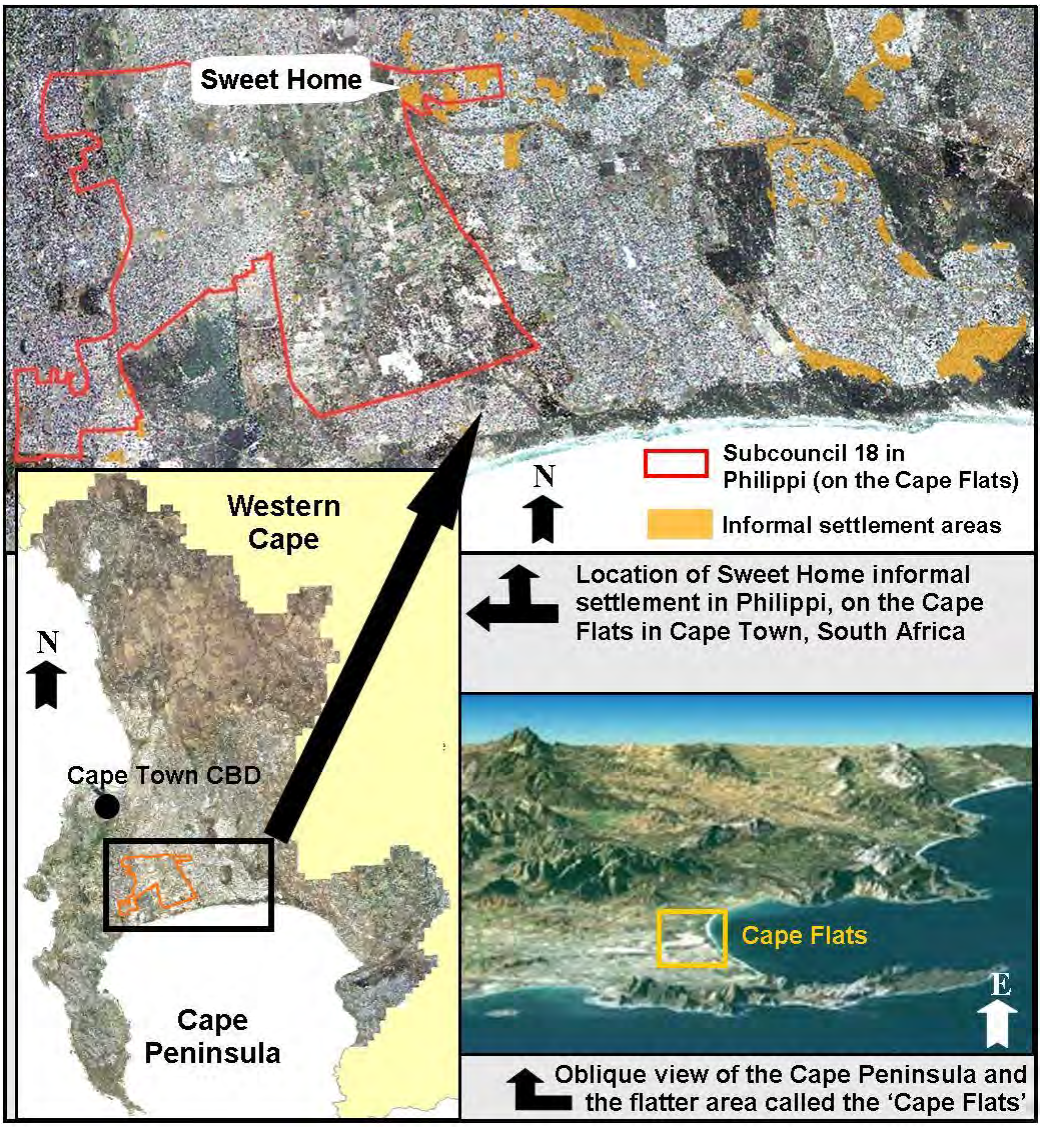


Figure 7: Location of Sweet Home informal settlement in Philippi, Cape Town[6]
(Source: compiled by Joy Waddell, using images from Bouchard *et al.*, 2007 and CCT GIS)

Eisenhardt (1989) and Orum *et al.* (1991) argue that case studies are useful for generating theories and theoretical generalisation, particularly in terms of generating new ideas and theories in social science. Theoretical generalisation is understood by Orum *et al.* (1991:13) to involve "suggesting new interpretations and concepts or re-examining earlier concepts and interpretations in major and innovative ways". Duminy *et al.* (2013) argue that case study research can help to support quantitative data gathering methods by providing critical insights into what the quantitative results mean and some of the more nuanced complexities that

[6] Subcouncils are the decentralised governmental structures in South African municipalities, which enable residents to communicate/engage with local government (see: https://www.capetown.gov.za/en/subcouncils/yoursubcouncil/Pages/default.aspx?subcouncilcode=18 [Accessed: 02/01/2016]). Cape Town has 24 subcouncils; Sweet Home informal settlement falls within Subcouncil 18, which overlaps the suburb called 'Philippi'. For more maps showing the location of Sweet Home within Philippi, see Appendix 10.

quantitative surveys might miss. Although single case studies are often criticised because generalisations cannot be made from them, Duminy *et al.* (2013) argue that case studies can be used to disprove or verify propositions and hypotheses, and in this way, contribute towards theory. Although governance and flood management is not a new research area or theory, the approach of looking at the governance of floods through a nodal governance and barriers lens is new. The case study provides a way to limit the scope to a smaller unit of analysis, allowing me to apply this theoretical lens and framework to draw new insight and conclusions on contemporary flood governance.

I consider Cape Town to be a 'deviant case' because although it is a city of the global South, its disaster risk and political landscape differs from the rest of South Africa: Cape Town experiences winter floods, rather than the more typical summer floods; the Province is led by the Democratic Alliance (DA) political party, whilst other provinces are led by the ruling African National Congress (ANC); and its Disaster Risk Management Centre (DRMC) is considered to be the best in the country, with DRMC officials often called on by other municipalities to share its best practices and help set up similar Task Teams. Therefore, insights from this case study cannot be generalised in the sense that the findings should be similar across different cities and disaster risk profiles, but the aim of this research is to highlight how applying the conceptual framework to other cases, as it is done in this case, can help develop different insights into the actors governing risk and the potential barriers to collaboration, unique to the different cases. Orum *et al.* (1991), for example, argue that 'deviant cases' are able to provide insight into more general social processes, or help understand the extent to which more generalised theories are applicable to unique cases. In my thesis, the 'deviant' case of Cape Town's flood governance can help to build on disaster governance theory, in particular the barriers to collaborative disaster governance that other cities of the global South could face or need to address.

3. QUALITATIVE METHODS OF DATA COLLECTION

This research adopted qualitative methods of data collection in order to provide rich, 'thick description' (Geertz, 1973) of the actors (called 'nodes'), their actions, and the events that shape and are shaped by their actions. At its core, a qualitative research approach tries to understand ('*verstehen*') the social world, through the eyes of the social actors themselves (Bryman, 1984, Babbie and Mouton, 2007). Qualitative research implies an intensive, holistic description and analysis of a contemporary phenomenon within its natural setting (Merriam, 1998, Hartley,

2004, Babbie and Mouton, 2007, Baxter and Jack, 2008). Qualitative approaches allow the researcher to focus on the 'how' and 'why' questions in a study, as well as highlight the contextual factors that are seen as significant in shaping phenomenon within a particular context (Hartley, 2004, Baxter and Jack, 2008).

In the context of conducting research in African cities, Duminy *et al.* (2013) argue that it is necessary for researchers to adopt qualitative approaches because there is generally a lack of reliable city-wide census and survey data to inform policies and planning; even in the cases where reliable and up-to-date data is available, qualitative methods are more suited to understanding the complex, fluid, and rapidly changing nature of Africa's cities. This insight is extended to this research on disaster governance in cities of the global South because qualitative methods are seen as best suited to understanding the socio-political complexities and multi-faceted nature of disaster risk, where often disaster data is sorely lacking.

In line with an interpretist and constructivist paradigm, a qualitative approach helps to identify and describe how each actor managing disaster risk in a particular context has a different reality and logic of the situation; enabling these actors to describe their reality, whilst allowing the researcher to construct a deeper, and stronger understanding of these actors' actions and behaviour as they are embedded in their unique realities. Bryman (1984) refers to the fluidity and flexibility of qualitative approaches, which not only allow researchers to discover novel, unanticipated findings, but to alter their methods to pursue these emerging leads. In addition, a qualitative approach favours a deeper, thicker understanding of the behaviour, perceptions, mentalities, and less tangible (*i.e.*, not easily quantifiable) aspects of DRM and actors' capacities to make decisions.

This study drew on multiple qualitative methods to:

- help build a more complete understanding of the governance processes within a particular setting;
- triangulate the findings to provide better rigour; and
- ensure the method selected is best suited for collecting particular data within a particular setting.

Denzin and Lincoln (2011) argue that qualitative research is inherently multi-method; the use of multiple methods, which they call 'triangulation', is used not only as a tool for validation, but for securing an in-depth understanding of a particular context or phenomenon. In order to truly

capture social phenomena, Denzin and Lincoln (2011) argue that qualitative researchers need to draw on multiple, interconnected methods because combining methods enables the development of a fuller, richer, more complex picture of the world. Triangulation is seen by Denzin and Lincoln (2011:5) as a "strategy that adds rigour, breadth, complexity, richness, and depth to any inquiry". Understood in this way, triangulation does not help to present data in a linear, sequential fashion, but rather presents multiple, smaller pieces of reality (Denzin and Lincoln, 2011). I argue that it is by combining these smaller pieces of reality that you are able to develop a deeper, more rounded understanding of the phenomena you are studying. This is an important approach for understanding complex phenomena, such as disaster governance, where there are multiple actors with multiple interests and priorities, and not all of these are clear or visible to outsiders.

Case study research emphasises the importance of multiple data sources to reach a holistic understanding of a complex social phenomenon, ensure convergence of data, and enhance data credibility (Hartley, 2004, Babbie and Mouton, 2007, Baxter and Jack, 2008). Data sources this research relied on include CCT reports, academic research and reports, interviews with multiple participants at multiple levels of governance, field visits, direct observations, and participant observation. As with other qualitative studies, data collection and analysis occurred concurrently and was an iterative process (Hartley, 2004, Baxter and Jack, 2008). The analysis kept in mind the original objectives, ensuring that the data collected contributed towards a deeper understanding of the flood governance context and the multiple actors within that system. This iterative analytical approach not only helped to avoid the temptation of collecting data or analysing data beyond the scope of the study, but helped to increase confidence in the findings by continuously questioning the data and findings.

The four key methods used in this research, which are presented in the subsections that follow, were:

1. Fieldwork;
2. Participant photography and reporting;
3. Semi-structured, in-depth interviews; and
4. Workshops and group discussions.

3.1. Fieldwork

Duminy *et al.* (2013:167) highlight the need for researchers to 'get their shoes dirty' and to conduct 'bodily research'; research that relies on in-depth fieldwork where the researcher uses their eyes and ears to gather information, and makes gestures that gain the trust and rapport of interviewees. Fieldwork is therefore understood in this thesis to be a way to observe the world and record it in a way that brings reality to theoretical thinking.

This research formed part of the broader *Flooding in Cape Town under Climate Risk* (FliCCR) project, which was funded by the International Development Research Centre (IDRC) and the Department of International Development (DFID) under the Climate Change Adaptation in Africa programme. This three-and-a-half-year project (2010-2013) aimed to identify actors involved in inland flood management and sea-level rise, and to explore the potential for collaborative mechanisms of flood and sea-level rise management, at both municipal and local community levels. The fieldwork for this thesis (2011-2013) fell under the 'inland flooding' component of FliCCR, which sought to understand the nature of flood risk in informal settlements and capture the experiences of flooding and examples of flood risk management at the household, community, and municipal level in Cape Town. This research met FliCCR's aims by exploring and assessing existing civic and CCT initiatives to manage flood risk in informal settlements, in order to guide the development of more inclusive, collaborative DRM approaches. Whilst other FliCCR colleagues conducted research that was focused on the community level (Anderson, 2010, Orangio, 2012, Desportes, 2014, Drivdal, 2014), my research contributed towards an understanding of flood risk governance from the perspective of local government; in particular, the CCT and their Flood Task Team, which is mandated to carry out the CCT's annual flood risk reduction strategy.

The research questions developed for this case study, in order to achieve the aim and objectives of this thesis, included:

1. How do (a) municipal officials and (b) residents living in informal settlements make decisions on and manage flood risk in Cape Town's informal settlements?
2. What flood risk reduction activities are carried out in informal settlements by (a) the municipality, and (b) residents living in informal settlements?
3. How do flood management-related decisions made at the municipal level impact on the local level?

4. How do flood management-related decisions made at the local level impact on development-related activities carried out by the municipality?
5. What are the perceptions of flood governance processes and outcomes that exist at (a) the municipal level and (b) the local level?
6. What technologies are prioritised to manage flood risk in informal settlements by (a) the municipality and (b) the residents?
7. What policies and legislation guide or challenge flood risk management activities?
8. What resources are needed for effective flood management, and which of these are limited or lacking in Cape Town?
9. What challenges are there to managing flood risk in informal settlements?
10. How do different actors aim to address the challenges to flood risk management in informal settlements?
11. What combination of actors need to work together to strengthen flood risk management?
12. What is needed to strengthen any existing collaborative processes or to develop collaboration between multiple actors?

Although research in an informal settlement was beyond the initial scope of this research, I decided that it was important to capture residents' experiences of flooding, validate and ground the findings at the CCT level, and understand how residents in an informal perceived and responded to decision-making and activities planned and implemented by local government. It was for these reasons that I decided to also conduct research in the informal settlement of Sweet Home, which CCT officials had identified as a high flood risk informal settlement.

To ensure the boundaries of fieldwork are created, Katz (1994:67) argues for the clear 'marking off' of the field 'in time and space'. The fieldwork for this research was 'marked off' in terms of which participants were included. In this research, the two main groups of participants were clearly marked out: (1) CCT officials engaged in flood risk reduction activities in Cape Town's informal settlements (all represented on the Flood Task Team); and (2) residents living in Sweet Home informal settlement who experienced flood risk. A third subset of participants, which included NGOs engaged in flood risk reduction activities, were interviewed during the last phase of the fieldwork, based on the findings in this research and their participation in FliCCR's multi-actor workshops towards the end of the project. The fieldwork was also 'marked off' by three phases (presented below), which were carried out over different times, had unique aims, included particular participants, and relied on unique methods.

3.1.1. Phase 1 (2011)

I conducted several initial, semi-structured, and in-depth interviews with CCT officials represented on the Flood Task Team in order to validate data collected during interviews carried out by FliCCR colleagues in 2010. These initial interviews also helped me to gain an understanding of flood risk reduction initiatives carried out by the CCT and the roles and responsibilities of the Flood Task Team. Participant observation was also used during CCT meetings: weekly Flood Task Team meetings, and quarterly Disaster Management Advisory Forum (DMAF) meetings. These interviews and meetings provided a preliminary understanding of the dominant actors involved in flood governance, and which informal settlements were most at risk from flooding, as assessed by the CCT. This phase also included a FLICCR-hosted workshop[7] with Flood Task Team officials in 2011, which was aimed at validating data collected in 2010 by FliCCR colleagues and exploring flood risk reduction approaches by the Flood Task Team.

3.1.2. Phase 2 (2012-2013)

The bulk of the data collection was conducted during this phase. This included participant observation during weekly visits to Sweet Home and at CCT meetings. In-depth interviews were carried out with selected CCT officials, Flood Task Team representatives, and individuals living in Sweet Home. Sweet Home was selected during this phase, based on input from DRMC field officers and following engagement with the locally-elected community leader of Sweet Home. Two transect walks were carried out in Sweet Home (Figure 8) to explore areas where flood risk is most challenging and to see examples of residents' coping strategies. Group discussions were carried out with Sweet Home residents to discuss the challenges that they face when addressing flood risk.

[7] For details of this workshop and for a list of FliCCR's workshops, see Appendix 6.

Figure 8: GPS points taken during the second transect walk of Sweet Home (14/03/2013)

(Source: GPS and GoogleEarth, 2013)

3.1.3. Phase 3 (2013)

The final phase of the fieldwork aimed to consolidate findings and collect data needed to refine the conceptual framework. Follow-up interviews were carried out with selected participants, including CCT officials, Flood Task Team representatives, Sweet Home residents, and representatives from a few NGOs engaged in flood risk reduction activities. Three final FliCCR workshops were held in 2013[8], with the aim of disseminating findings from the inland flooding component of the FliCCR project and bringing multiple actors together into dialogue on issues of collaboration as a tool for flood risk reduction in Cape Town's informal settlements.

[8] For details of this workshop and for a list of FliCCR's workshops, see Appendix 6.

In order to facilitate an understanding of the overall research process, Figure 9 outlines the process and the methods used during the three data collection phases and the data analysis. The red arrows highlight the iterative process of collecting, analysing, validating, and refining the conceptual framework.

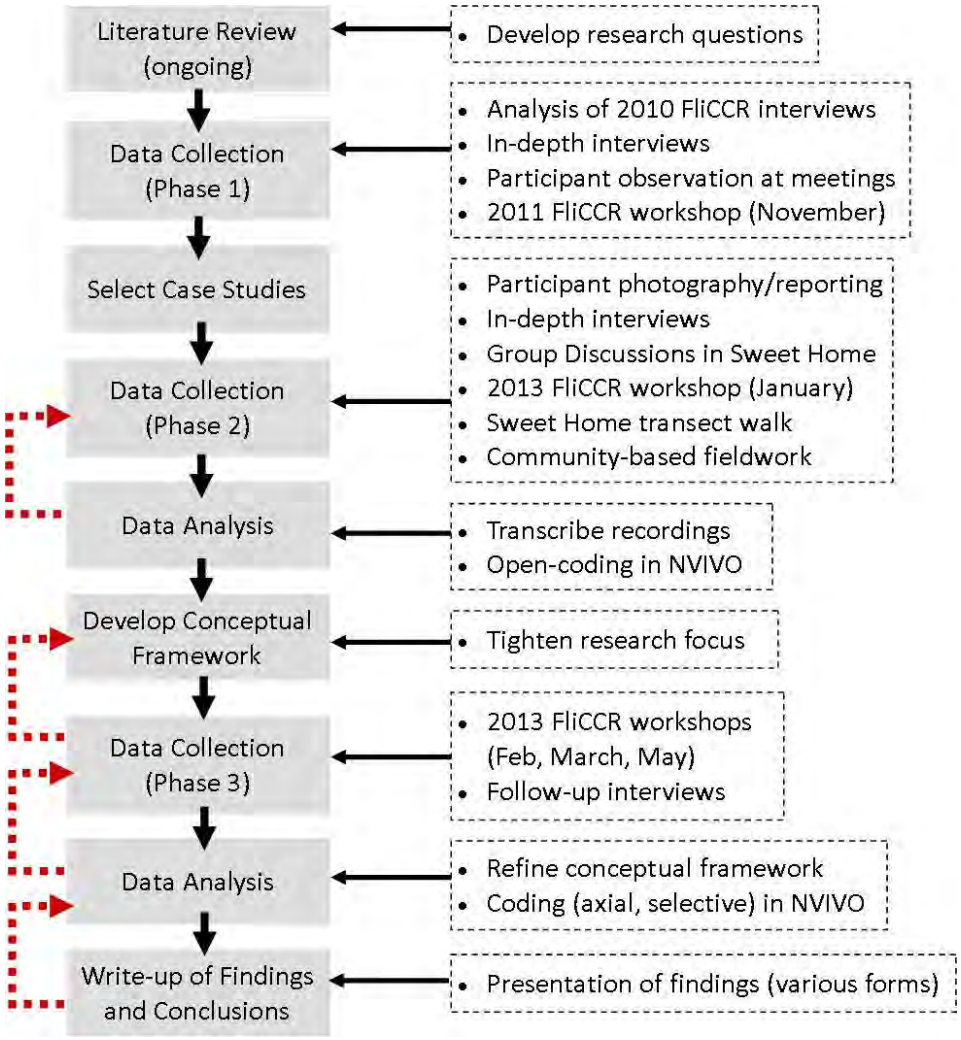


Figure 9: Outline of the research process adopted in this study
(Source: Joy Waddell)

3.2. Participant photography and reporting

In order to gain a deeper understanding of the reality and causes of flooding in Sweet Home informal settlement, I adopted a method called participant photography, or 'photo-reporting'. Firstly, this method was adopted because I felt that as an outsider, it was difficult to enter certain spaces within informal settlements (*e.g.*, people's homes), at certain times (*e.g.*, at night). I also realised that as an 'outsider', I could not capture certain activities, perceptions, and perspectives of particular causes of flooding. For example, one of the 'causes' of flooding and contaminated water that CCT officials and (some) residents highlighted, was from residents throwing used water, solid waste, and night-soil (toilet buckets) into open stormwater drainage systems or onto the roads/communal spaces outside their homes. This was an activity that I could not capture myself, through photography or observation, because these activities happened when I was not looking, or at times when I was not in the informal settlement (*i.e.*, hidden from outsiders). Participant photography was therefore adopted as a method to overcome some of these limitations, and to gain an 'insider' view of the reality of flooding in informal settlements.

The participant photography was carried out by two groups:

1. Two residents from Sweet Home informal settlement were hired to become 'community researchers' over a period of six weeks[9]. The two community researchers were asked to capture, through photography and narrative, examples of stormwater channel blockages and how the stormwater drainage system was used by residents in Sweet Home[10]. Over May and June 2013, the two community researchers were also asked to capture examples of flooding in Sweet Home and examples of how residents are affected by, or deal with, flooding[11]. This period was important because it was during the wet winter season, when flooding was a daily reality for people living in Sweet Home. Unfortunately, only one of the residents provided feedback from the May-June period.

[9] This activity was based on a similar activity carried out by Drivdal (a colleague on the FliCCR project) in neighbouring informal settlements in Philippi, Cape Town. The results of Drivdal's activity were presented as reports: one on Egoli informal settlement (Drivdal, 2011a) and one on Graveyard Pond informal settlement (Drivdal, 2011b).
[10] See Appendix 1 for the information sheets provided to participants. See Appendix 2 for the question sheet provided to participants, and an example of answers they provided.
[11] See Appendix 3 for the question sheet provided to participants, and an example of answers they provided.

2. As part of the FLiCCR project, a flood awareness and reporting activity was conducted at a local school in Philippi, with Grade 11 students[12]. This activity took place over three weeks and aimed to help students raise their awareness of flood risk and flooding impacts in their communities. As part of this activity, students were divided into nine groups containing three students (27 students in total). Each group was given a disposable camera to capture examples of flooding for their final project, which was to design and present a poster on flood awareness.

3.3. In-depth, semi-structured interviews

In-depth interviews, which Charmaz (2006) refers to as 'intensive interviewing', allows the researcher to explore in depth a person's understanding and experiences of the world. Charmaz (2006:28) defines intensive semi-structured, in-depth interviewing as an "open-ended but directed, shaped yet emergent, and paced yet flexible" method for exploring particular aspects of a participant's life. This type of interview method provides the flexibility for ideas and themes to emerge and be pursued during the interview, which would not otherwise be possible under a rigid, tightly focused interview approach where the questions are pre-determined and stubbornly adhered to (Charmaz, 2006). The semi-structured aspect of this approach meant that I did not embark on an interview without a list of themes and guiding questions, but instead planned questions and discussion points based on key themes beforehand. I preferred following a semi-structured format in my interviews because this allowed me the flexibility to only select the most pertinent questions in cases where participants had limited time for the interviews, and allowed me to question further a particular line of discussion which I, as the researcher, might not have thought of or known of beforehand.

From 2011-2013, in-depth, semi-structured interviews were carried out with 22 CCT officials, four local government ward councillors, seven representatives from NGOs, two informal settlement leaders (from Sweet Home and a nearby informal settlement called Graveyard Pond), and 22 residents from Sweet Home (Table 5)[13]. Specific names of CCT officials and ward councillors, residents, community leaders, and NGOs are omitted throughout this thesis to ensure anonymity.

[12] See Appendix 4 for the information sheets provided to students.
[13] See Appendix 5 for a detailed table of when interviews, workshops, and group discussions were conducted with particular departments, residents, and NGOs.

Table 5: Number of interviews and people interviewed during this research

CCT Officials		
Department/Directorate	**# Interviews**	**# Interviewees**
Development Services Department	1	1
Disaster Risk Management Centre	8	7
Engineering Services Department	1	1
Environmental Health Department	2	3
Informal Settlements Management Department	1	2
MAYCO (Mayoral Committee Members)	2	2
Roads and Stormwater Department	3	2
Solid Waste Management Department	0[14]	2
Water and Sanitation Department	1	2
Ward Councillors	3	4
TOTAL	**22**	**26**
Residents living in informal settlements		
Informal Settlement / Role	**# Interviews**	**# Interviewees**
Graveyard Pond Community Leader	1	1
Sweet Home Farm Community Leader	3	1
Sweet Home Farm Residents	23	21
TOTAL	**27**	**23**
NGOs		
Name	**# Interviews**	**# Interviewees**
Ikhayalami	1	2
The Mustadafin Foundation	1	2
The Jungle Theatre Company	1	1
The Warehouse	1	2
TOTAL	**4**	**7**

Actors from the CCT were selected because of their involvement and knowledge of flooding issues in informal settlements. These actors were often representatives of their department on the Flood Task Team and participated in ongoing workshops organised as part of the FliCCR project. The selection of officials involved an element of snow-ball effect, with officials either delegating interviews to their colleagues within the same department, or suggesting other officials within the CCT who they thought would provide better insight into the complexities of flood management. Actors from NGOs were also selected, based on their involvement with the Flood Task Team, their presence in Sweet Home, and/or their participation in FliCCR's workshops. Two groups of residents participated in the focus groups held in Sweet Home, as well as ongoing interviews, the transect walk, and FliCCR's workshops. Each group of residents was selected via a gatekeeper; the wife of Sweet Home's self-elected community leader (in order to gain initial access and rapport with the Sweet Home community), and a facilitator of a health-related civil society organisation (CSO) based in Sweet Home (in order to reach a broader audience and overcome potential bias from the wife of the community leader).

[14] Representatives from the Solid Waste Management Department did not consent to any interviews, but provided responses to some of the interview questions via email communication, on two separate occasions (2012 and 2013).

All of the interviews[15] were conducted face-to-face and most lasted between 60 and 90 minutes. In Sweet Home, 18 of the interviews with residents were carried out during the two transect walks, and as a result lasted between 20 and 40 minutes. Although most of the interviews were recorded digitally, some were not recorded because interviewees did not consent to them being recorded[16]. In those cases, notes were taken and data was extracted from those written notes. All of the recorded interviews were transcribed in full by me, and their content analysed using qualitative analysis software (*NVIVO 10*). All of the interviews with CCT officials and politicians, NGO representatives, and informal settlement leaders were carried out in English, whilst majority of the interviews with Sweet Home residents required a Xhosa or Afrikaans translator.

Nine interviews with CCT officials, which were carried out by FliCCR colleagues in 2010 as part of the broader FliCCR project, were also included in the analysis (Table 6). Five of these interviews were provided as digital recordings, and transcribed in full by me, in order to ensure their accuracy and strengthen their validity. Three of these were full transcripts provided by my FliCCR colleagues to include in my analysis. The issue of 'research fatigue' presented a major limitation throughout this research; the topic of flooding and flood management has (and continues to be) a highly researched field by many national and international students and NGOs in Cape Town. The very busy lives of government officials, as well as their past experiences of being interviewed relentlessly about flooding, flood management, and informal settlement issues, meant that CCT officials were often reluctant to grant initial and follow-up interviews. Some CCT departments and NGOs were also reluctant to grant interviews because they felt that they could not contribute any information on flood management. Solid Waste Management, for example, were adamant that they were not involved in flood governance issues and therefore refused any interviews. As a result of this research fatigue and unwillingness by some participants to be interviewed, the transcripts and interview recordings from FliCCR colleagues provided an important additional resource for this research.

Table 6: Number of interviews carried out in 2010 by FliCCR colleagues

CCT Department/Directorate	# Interviews	# Interviewees
Development Services Department	1	1
Disaster Risk Management Centre	4	7
Engineering Services Department	1	1
Informal Settlements Management Department	2	2
Transport, Roads, and Stormwater Directorate	1	2

[15] See Appendix 5 for a detailed table of when interviews were conducted with particular participants.
[16] See Appendix 5 for details of which interviews were recorded digitally and transcribed, and which were not.

3.4. Workshops and group discussions

As part of the FliCCR project, we carried out five workshops with unique aims and objectives[17]. The first two workshops (November 2011, Jan 2013) were conducted in order to engage directly with a group of CCT officials represented on the Flood Task Team; to report back on findings from the FliCCR project and validate these findings with input from the participants, collect more data relevant to the project and this thesis, and support ongoing flood management activities by the Flood Task Team. The workshop in February 2013 was provided for residents living in the informal settlements where FliCCR's research was conducted, to present our findings, and to seek feedback from residents on these findings. The March 2013 multi-actor workshop, which brought together actors from the CCT, informal settlement residents, and NGO representatives, was in response to findings from the FliCCR project and the research in this thesis. This workshop aimed to provide the opportunity for actors who would otherwise not engage directly, to enter into dialogue on findings from the FliCCR project, and to discuss the challenges of multi-actor collaboration. The workshop in May 2013 was aimed specifically at residents from Sweet Home, as an opportunity to present findings from this thesis, and to address the issue highlighted in interviews of a lack of engagement between CCT officials and Sweet Home residents on flood risk management.

Group discussions were held with Sweet Home residents in 2012 and 2013[18]. The group discussions drew on two types of methods: focus groups and participatory risk assessments (PRAs). A focus group is described by Silverman (2011) as a type of interview where the researcher takes on the role of a facilitator of a group discussion, rather than as a questioner. Focus groups are different to interviews because they are not "conversations with a purpose" (Burgess, 2002:84), but try to "create space for discussion amongst its members to flow more freely, with less direction and prompting from the facilitator" (Macun and Posel, 1998). The focus groups provided a space for participants to discuss and unpack key issues and explore themes collectively.

Participatory risk assessments is a methodology used in disaster practice, which aims to empower local communities and groups to define their disaster risk, decide on and implement solutions, and evaluate the results of those interventions (Holloway and Roomaney, 2008). In this research, the group discussions I conducted were used as a tool to not only capture data on

[17] See Appendix 6 for details of FliCCR's workshops.
[18] See Appendix 5 for a detailed table of when interviews, workshops, and group discussions were conducted with particular departments, residents, and NGOs.

how residents understand and respond to flood risk (*i.e.*, via a focus group), but to facilitate discussions with residents with the aim of helping them to define flood risk in their community, identify the factors contributing towards their vulnerability to flooding, and consider the options needed to strengthen their resilience to flooding. In 2012, an initial, exploratory group discussion was carried out with a mixed group of five men and three women. In this workshop, the problem tree method used in PRAs (Holloway and Roomaney, 2008:54) was used to identify the relationships between the underlying causes and impacts of flooding in Sweet Home. This activity was followed by discussions on coping strategies and a transect walk to identify problem areas in Sweet Home.

In 2013, a series of workshops that were facilitated together with two Masters students (Dixon (2013) and Desportes (2014)), were conducted with separate women-only and men-only group sessions to map flood risk in Sweet Home, identify assets available to residents to cope with and prevent flood risk, and identify and rank flood management activities carried out by the CCT and residents in Sweet Home. Desportes (2014) presents a detailed description of these group sessions and their outcomes in her Master's thesis. Relevant data from these group sessions on the causes and impacts of flood risk in Sweet Home and the types of flood management activities implemented in Sweet Home are presented in Chapter Six.

4. DATA ANALYSIS

In analysing and coding the data, insights on coding procedures were drawn on from Strauss and Corbin (1990) and Babbie and Mouton (2007). Coding is understood as the process of analysing text, questioning segments of the text, labelling these segments according to a meaningful category (or 'code), and comparing the codes within and between texts (Babbie and Mouton, 2007). From this process, the researcher is able to generate theory, refine theory, and/or critique existing theory. There are three key steps in coding procedures: open coding, axial coding, and selective coding (Strauss and Corbin, 1990, Babbie and Mouton, 2007).

Open coding, seen as the first phase of coding, can be approached in three different ways (see Babbie and Mouton, 2007:499-501):

1. you identify all possible categories ('codes') pertaining to a specific line of text;
2. you code a paragraph or sentence by noting its central theme ('code); and

3. you code the whole text by summarising what is going on in the text.

In coding the transcribed interviews, workshops, and focus groups, I adopted a combination of the first two open coding approaches. The approach depended on the text, with certain lines containing lots of important information and therefore requiring the identification of multiple codes. Other sections of text, which were often lengthy explanations from participants on particular events or activities, required a single code to summarise its core theme.

The second phase of coding is called 'axial coding'. Axial coding is the process of analysing data initially coded under open coding, in order to find new connections between the categories, or refining the categories to represent their finer detail (Strauss and Corbin, 1990, Babbie and Mouton, 2007). In this research, an example of axial coding was making connections within the broader category of 'challenges', and refining different sets of challenges into different types of barriers, as informed by my conceptual framework.

The third and final phase of coding is called 'selective coding', whereby categories established under the conceptual framework (see Chapter Four) are selectively identified from the text and sections of text already coded during phases one and two. An example is taking the existing codes of 'perceptions of different actors', 'mandates', 'approaches towards problems', and 'definitions of problems', and re-coding those as 'mentalities'.

In order to code the data collected in this research, qualitative analysis software called *NVIVO 10* was used. This software allowed me to create codes to categorise sections of text under different themes. Although this software allowed me to analyse the coded data quantitatively, this process did not provide meaningful results in the context of this thesis. I was more interested in finding examples of how different participants responded to different themes in the interviews and the details of those answers. The examples provided by the participants only make sense, for example, if understood within their particular environment and context (*e.g.*, whether they were a CCT official or a resident, the department they worked for, or the role they occupied in Sweet Home).

In the analysis chapters of this thesis (Chapters Six to Nine), the richness of the data and participants' responses are captured by presenting excerpts from the interviews. I use narration, in the form of direct quotations from case actors, as a mode of presentation. Not only does narration best capture the responses from in-depth interviews and workshop discussions, but as Duminy *et al.* (2013) argue, narration is well-suited to describing the complexities and

contradictions of real life, such as flood governance in informal settlements. By providing quotations of the actors managing and experiencing flood risk in Cape Town, this mode of presentation also gives a voice to those actors, who are otherwise silenced by political and social agendas.

5. ETHICAL CONSIDERATIONS AND RESEARCH LIMITATIONS

It is widely accepted that objectivity in qualitative research is a myth. Corbin and Strauss (2008:32) recognise the impact that researchers have on the research process; in bringing their "perspectives, training, knowledge, and biases, these aspects of self then become woven into all aspects of the research process". One approach to come to terms with this objectivity and still maintain validity in the research is for the researcher to be 'sensitive' throughout the research process. Corbin and Strauss (2008:32) define sensitivity here as "having insight, being tuned in to, [and] being able to pick up on relevant issues, events, and happenings in data". Being a sensitive researcher means that the researcher views the data through the eyes of the participants, and through that, understands the issues and themes from the participants' perspective; the researcher also recognises and reflects on the bias that impacts on how he/she interprets and understands this data. Corbin and Strauss (2008) explain further how being 'sensitive' in research also means that the researcher is aware of how they themselves influence interpretations of the data; recognising that their findings are the product of the data as well as the knowledge, background, and past experiences that the researcher brings to the data. The literature review also plays an important role in enhancing sensitivity, argue Corbin and Strauss (2008), because it can help the researcher more objectively interpret the data and compare it to findings from similar studies by other researchers.

The use of multiple FliCCR researchers when conducting fieldwork also provided value in enhancing confidence of the findings. Eisenhardt (1989) argues that using multiple 'investigators' can be advantageous because it allows each investigator to bring a different perspective to the data collection and analysis phases, which can enhance the richness of the study, increase the likelihood of finding critical insights from the data, and build confidence in the findings if there are conflicting perceptions of the data that are then addressed by the multiple investigators.

There were several challenges in conducting this research, which are similar to those highlighted by Duminy *et al.* (2013) in the context of conducting research in cities of the global South, and in particular in informal settlement contexts. Duminy *et al.* (2013) reflect on how residents can sometimes be suspicious of, or even simply resist researchers collecting information about their households because they fear that this might lead to government interference. For the most part, households in Sweet Home were receptive of me and my questions; although I attribute this to the gate-keepers that I had selected, who were known to community members and who introduced me as a researcher wanting to understand their 'problems'. Without these gatekeepers, I would not have had easy access to households.

The issue of validity and confidence of findings in terms of the interviews conducted for this research were also taken into consideration. Several actors were excluded from the data gathering process because they were not available for interviews or did not want to be interviewed. In Sweet Home, interviews were conducted from 11 am until 3 pm during the week, and therefore excluded the economically-active residents. Both gatekeepers to Sweet Home were women; this meant that most of the participants interviewed and invited to workshops were women and knew the gatekeepers prior to the fieldwork. These two logistical factors created a bias in the findings because the participants selected from Sweet Home represent only a small fraction of the community's experiences. Carrying out interviews in Sweet Home during the week and with a gatekeeper was, however, the safest option for me, as a female researcher and an outsider to the settlement. On two occasions in 2013, my colleagues[19] and I had to stop fieldwork and leave Sweet Home immediately because of gang-related, deadly shooting incidents in Sweet Home. I tried to address participant bias in two ways:

1. My colleagues (*i.e.*, the two Masters students) and I selected a second gate-keeper and translator and ran a group of workshops in 2013 with residents who were selected by that gate-keeper; these workshops were conducted with a different group of residents from the PRA-focused workshop I conducted in 2012. Although the second gate-keeper was also female, she was not from Sweet Home itself and had contacts through her community-based public health network; this was different to the original gatekeeper who lived in Sweet Home and introduced me mainly to her neighbours and close friends.
2. My colleagues and I invited men to participate in a men's only group discussion in 2013. In FliCCR's May 2013 workshop, we also asked for equal representation

[19] I introduced Isabelle Desportes and Juliette Dixon, two Masters students from Europe, to Sweet Home and its residents. In 2013, the three of us conducted group discussions in Sweet Home as a collective effort.

> from men and women, to counter the gender bias towards women attending our other group discussions.

As an outsider, there is always a hidden transcript (Scott, 1991, Cochrane, 1999). A hidden transcript is information that is hidden from the public and only accessible to someone who knows how to decode the transcript, has privileged access, and/or will know what is really going on. In this research, I was the outsider in both the CCT circles and in Sweet Home. It was often in the best interest of CCT officials, for example, to keep certain information 'hidden' from me. In addition, the CCT officials presented only information that was allowed in the public domain and could be published in my 'public' thesis. Any information that was questionable in terms of its public domain access was told to me 'off the record' in interviews.

In Sweet Home, residents had their own agenda and their answers were often framed in a way that served that agenda. This agenda related closely to the contentious issue of housing and service delivery in informal settlements. Using a translator also resulted in some of the information being lost in translation; especially when I used the wife of Sweet Home's local leader, who would often answer on behalf of residents or tell them what to say. Williamson *et al.* (2011) argue that cross-language interviews can be challenging not only because of logistics and the process itself of generating data, but because of the questionable influences these interpretations might have on the validity of the data and the conclusions drawn. One way I tried to get a sense of the hidden transcript and make it more visible for the purposes of my thesis, was to validate responses from participants with follow-up interviews and with interviews with different/multiple participants. In this way, the different or recurrent responses helped to build a more 'accurate' understanding of the issues.

Finally, the sensitive and highly political nature of flood risk in informal settlements meant that I, as the researcher, needed to position myself clearly, yet at the same time gain and maintain trust with participants. Silverman (2011) argues that building trust and confidence with participants is especially important when asking sensitive questions or dealing with sensitive issues. Numerous visits with Sweet Home residents were carried out to form a relationship with them. This was particularly important for discussions on CCT-resident conflict and misunderstanding and housing/services protests. However, this was problematic because I still needed to remain objective, despite the strong ties formed with residents and the reality of the situation, which is often quite desperate. It was difficult to remain objective and only collect data when many of the discussions with Sweet Home residents and local leadership were about people (NGOs, researchers, CCT officials) entering Sweet Home, just taking down

information/numbers, and leaving and not coming back or having any real follow-up and results. As a result, I tried to keep in contact with residents from Sweet Home, visit without the aim of collecting data, and provide feedback[20].

It was critical throughout the research process to present myself as a researcher and to not take that role for granted (Silverman, 2011). During interviews with CCT officials and NGO representatives, I was definitely positioned as the researcher. In Sweet Home, however, because I was asking questions about the CCT's strategies and was knowledgeable of the CCT's structure and policies, residents would often assume I was from the CCT or had influence with CCT officials. This was challenging because responses from residents would often be framed in a way that 'requested' extra help from the CCT (via me). I therefore had to constantly remind residents of my role as a researcher. With the May 2013 workshops, this boundary was blurred because I was one of the facilitators bringing CCT officials and residents together onto a common platform. In this workshop, I had to continuously steer discussions and action plans away from becoming 'my' responsibility and into the hands of the residents and CCT officials (*i.e.*, what can 'they' do/plan and take forward). This notion of actively encouraging CCT officials and residents to take responsibility was especially important at the close of the FliCCR project, during the March and May 2013 workshops, because the aim of these workshops was to nurture dialogue and action on flood risk between the CCT and residents, in a non-confrontational setting.

6. SUMMARY

A single-case embedded case study approach guided this research and several qualitative methods were drawn on to collect and analyse the empirical data and theorise about flood governance in Cape Town and disaster governance in cities of the global South more broadly. This diversity of methods reflects the complexity of understanding multi-actor governance processes and acknowledges the need to understand the conditions necessary for strengthening collaboration between multiple actors in order to strengthen those governance processes. The two embedded units of analysis in this case study (*i.e.*, the Flood Task Team and Sweet Home informal settlement) were particularly relevant for providing a detailed analysis of disaster governance processes and allowing me to examine the complex realities of governance

[20] Feedback was provided via the various FliCCR workshops, as well as via a booklet published by FliCCR on flood risk issues in informal settlements. A hardcopy version of this booklet was distributed to residents and CCT officials who participated in my research. For a PDF version, see:
http://static.weadapt.org/knowledge-base/files/1280/52556f59809edacc-fliccr-risingwaters-2013.pdf

processes and the complex social interactions between people within their particular socio-political context.

Throughout the research process (the data collection, analysis, and conceptual framework development), the dilemma of how to disseminate and apply the results in a manner that would address some of the challenges highlighted in the research and meet the goals of the FliCCR project, was increasingly apparent over time. The multi-actor workshops played a key role in not only providing opportunities for collecting more data from a wider participant list, but became the vehicle for disseminating the results in a way that would facilitate further discussion and potentially more tangible outcomes. This research and the workshops that disseminated some of the findings from this research were not designed to try and highlight examples of what the CCT and its Flood Task Team were doing wrong in terms of managing flood risk in the city's informal settlements, but designed to help these officials evaluate their approaches and consider what changes could take place to strengthen their flood management strategies.

PART FOUR:

CONTEXTUAL REVIEW AND ANALYSIS

CHAPTER SIX:

FLOOD GOVERNANCE IN CAPE TOWN: THE ACTORS, THEIR ACTIVITIES, AND THE CHALLENGES

1. INTRODUCTION

South Africa experiences severe floods annually; in 2014 alone, flooding was reported across six of the country's nine provinces (Hill, 2014a,b,c,d,e). In South Africa's second most populous city[21], Cape Town, where the case study for this thesis is based, 24 significant flood events were reported between 1989 and 2004 (DiMP, 2005). In August and September 2013, severe storms and the resultant flooding displaced 158,880 people (Hirsch, 2013a). Similar high-intensity cold fronts hit Cape Town in 2001, 2004, 2008, 2009, and 2012, causing extensive flooding, displacing thousands of informal settlement residents, and costing the City of Cape Town (CCT) municipality millions in direct damages and relief provision (DiMP, 2005, DRMC, 2010, Holloway *et al.*, 2010, DRMC, 2012b).

The multiple negative socio-economic impacts on informal settlements from these types of extreme floods in Cape Town, as well as the less-publicised chronic, annual flooding, is well documented in the literature. Based on research conducted in Cape Town, Bouchard (2007), Nestegard (2009), Drivdal (2011a,b), Orangio (2012), Dixon (2013), Machiridza (2013), Desportes (2014), and Jozipovic (2015) all highlight the multiple impacts of flooding on low-income communities:

- residents' health is at risk because of waterborne diseases, flu and coughs, and rashes from contaminated water;

[21] According to the 2011 South African census, the City of Johannesburg has the highest population with 4.4 million people, while the City of Cape Town has the second highest population with 3.7 million.
See: http://beta2.statssa.gov.za/ [Accessed: February 2015].

- residents are prevented from going to work or school because of flooded communal spaces/paths/roads and heavy rainfall;
- residents' belongings and homes are damaged by rising/standing water and leaks;
- psychological impacts; and
- physical displacement.

Holloway *et al.*'s (2010) assessment of the impacts on high-value coastal properties and developments from the 2004 floods and Pharoah's (2013) thesis on flood risk in subsidised, formal housing[22] highlight how informal settlements are not the only areas of Cape Town that are at risk from flooding.

Both the high-intensity rainfall events of recent years and the studies on the socio-economic impacts of floods on Cape Town's residents, particularly the urban poor, confirm the need to proactively manage flood risk in Cape Town. In this chapter, I begin with an overview of the nature of flooding in Cape Town's informal settlements; this overview captures the reality of annual flooding as experienced by majority of the urban poor living on marginalised land in an area of Cape Town called the Cape Flats. I then present the key actors governing flood risk in Cape Town's informal settlements: the collaborative efforts of the CCT's Flood Task Team, the coping strategies of residents living in the high flood risk informal settlement of Sweet Home, and the activities by some of the NGOs to respond to flood events. I then discuss some of the more general challenges of managing flood risk in Cape Town's informal settlements, as identified by the actors engaged with during my research.

2. THE NATURE OF FLOODING IN CAPE TOWN'S INFORMAL SETTLEMENTS

Located in the south-western corner of South Africa, Cape Town has a Mediterranean-like climate: it experiences cool, wet winters (May-September) and warm, dry summers (November-February). The winter rainfall and dry summers experienced in Cape Town are in contrast to much of southern Africa, which experiences dry winters and summer rains (Midgley *et al.*,

[22] In South Africa and South African literature on housing, there are different 'types' of housing described; these range from the shacks (informal housing) in informal settlements, to the more solidly built brick and cement houses (formal housing) in state-funded RDP (public) housing, or privately-owned and built houses in more affluent areas. For more on housing types in South Africa, see Landman and Napier (2009), Pharoah (2013), and CCT (2013).

2005). Cape Town also experiences two significant weather systems: the low pressure systems in the form of cold fronts, and the cut-off low pressure systems (see Midgley *et al.*, 2005:19 for detailed descriptions of these systems). These two weather systems are responsible for the high levels of rainfall and high-intensity storms that often precede heavy flooding across the city. For example, the August 2004 floods, which affected 20,000 residents living in Cape Town's informal settlements (Table 7) and cost the CCT ZAR 6.5 million in direct damages (Holloway *et al.*, 2010), was the result of two large cold fronts that hit Cape Town successively. The 2008 and 2013 flooding during Cape Town's August and September months, which affected about 22,000 and 40,000 households in Cape Town, respectively, were the result of cut-off lows that followed cold fronts. These large-scale, high-intensity storms were accompanied by gale force winds and extended periods of precipitation.

Table 7: Number of affected households and displaced people from flooding in Cape Town (2001-2012)

Year	Affected Households	Displaced People
2001	11,000	44,000
2004	4,000	16,000
2007	8,000 – 8,600	32,000 – 34,000
2008	22,323	75,258
2009	11,507	29,011
2010	3,497	9,099
2011	2,636	6,500
2012	5,504	14,000
2013	39,505	158,880
2014	19,723	69,108

Source: Flood Task Team reports (DRMC, 2009, 2010, 2011b, 2012), Hirsch (2013a), and DMAF (2014).

In August 2013, Cape Town received 168 mm compared to the average 85.3 mm in other years. This heavy rainfall, which happened mostly in the first two weeks of August, affected 65 areas across Cape Town (De Lille, 2013). According to the Mayor's statement following the flooding, the CCT spent over ZAR 2.6 million on social relief to residents whose structures were damaged by the flooding; majority of whom lived in informal settlements (De Lille, 2013). From January until September 2013, the South African Weather Service recorded a total rainfall of 807.6 mm, beating 2012's 715 mm, which was the highest rainfall for the period since 1997 (Hirsch, 2013b).

Extreme rainfall events have increased in frequency in South Africa over recent years (Ziervogel *et al.*, 2014a). These changes are likely to continue with climate change, yet it is less certain what the precipitation changes will be in terms of direction and magnitude (Ziervogel *et al.*, 2014a). A report on climate trends and scenarios for South Africa by South Africa's Department of Environmental Affairs (DEA, 2013) claims that there will be an increased rainfall variability in Cape Town, with a tendency towards a significant decrease in the number of rain days and an increase in the intensity of rainfall events and the duration of dry spells. This all points towards an increased frequency in extreme events, in terms of both potential droughts and floods (DEA, 2013).

Majority of Cape Town's 378 informal settlements[23], which house most of the 21.6 per cent of residents living in 'informal' housing (StatsSA, 2011), are located on the low-lying, sandy, and waterlogged wetlands of the 'Cape Flats' (Bouchard *et al.*, 2007, DRMC, 2009, Ziervogel and Smit, 2009) (Figure 10). The Cape Flats is a large expanse of inland wetlands and coastal land about 30 kilometres from Cape Town's central business district (CBD). The informal settlements on the Cape Flats are hidden from the CBD behind the city's iconic Table Mountain; a distinct spatial and socio-economic polarisation that many authors attribute to the legacy of race-based segregation policies during Apartheid (Wilkinson, 1998, Lalloo, 1999, Huchzermeyer, 2002, Huchzermeyer and Karam, 2006). The segregated location of these informal settlements from the CBD also reflects many authors' arguments about the physical and socio-economic marginalisation of the urban poor who are forced to live on the outskirts in many cities of the global South (Huchzermeyer, 2002, Huchzermeyer and Karam, 2006, Douglas *et al.*, 2008, Pelling and Wisner, 2009). These informal settlements in Cape Town are densely populated, with an estimated 144,000 households living on the Cape Flats (Housing Development Agency, 2013).

[23] The Housing Development Agency (2013) report provides this statistic. The official number of informal settlements is constantly changing and many different reports/officials provide different tallies. For example, a report by the CCT's Human Settlements Directorate states that there are 204 informal settlements listed in their database (CCT, 2014). The number of informal settlements is constantly changing because of new settlements cropping up, smaller neighbouring settlements merging, or settlements relocating, dispersing, or dissolving. One CCT official explained that for political reasons (*i.e.*, to show that government is addressing the issue of informal settlements), the official stated number of informal settlements is lower than in reality.

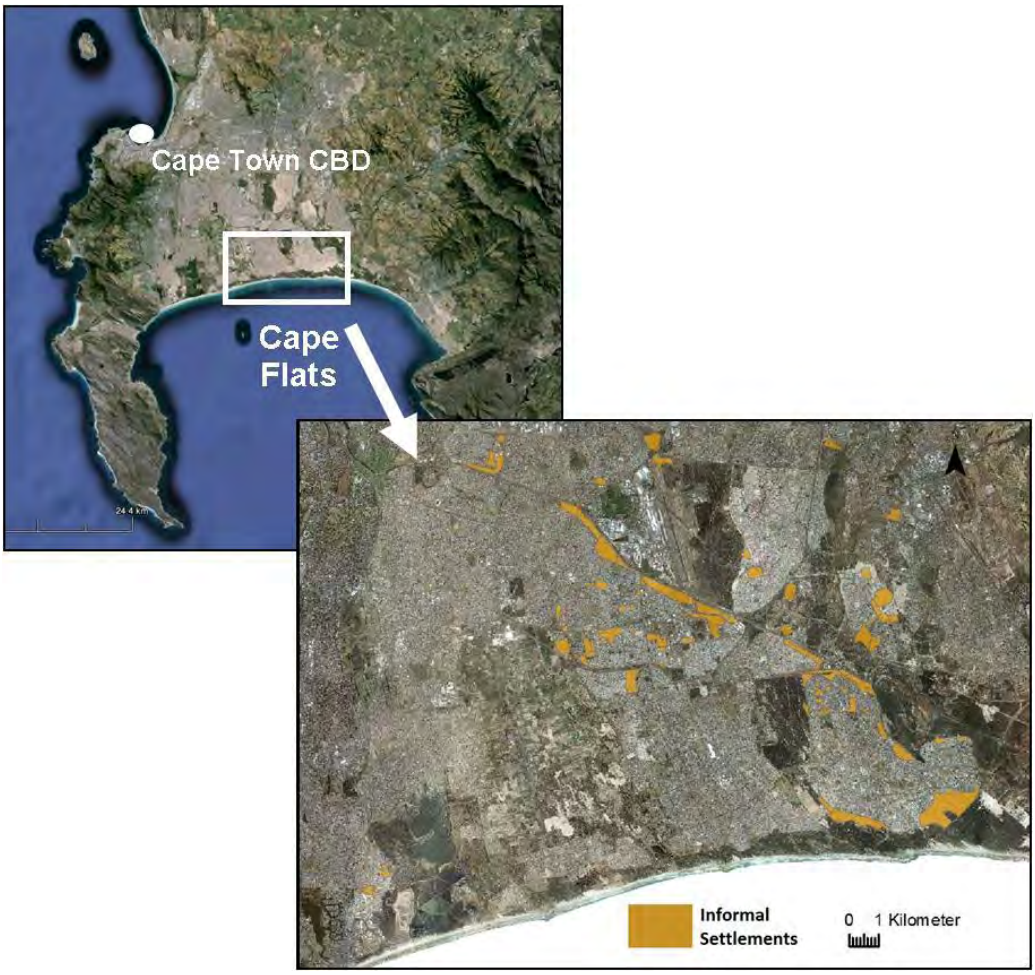


Figure 10: Location of informal settlements on the Cape Flats in Cape Town
(Source: Google Earth and the CCT, 2013)

Every year, the DRMC and the Flood Task Team carry out disaster risk assessments (DRAs) to identify the informal settlements that are 'high risk' and 'medium risk' (in terms of flooding), and those informal settlements that 'need to be relocated' (Table 8). In 2009, for example, DRMC's (2009) 'Winter Preparedness Strategy' stated that 88,000 households on the Cape Flats were at risk of flooding, and 51 informal settlements had an 'above average' risk of flooding should 'normal' winter rainfall take place. In more recent DRMC assessments[24], however, the total number of 'high risk' and 'medium risk' informal settlements has reduced as a result of:

1. activities by the Flood Task Team, which have successfully addressed flood risk in a small number of these informal settlements; and
2. the Flood Task Team re-classifying the 'at-risk' informal settlements from 'high-risk' and 'medium-risk' to 'high-risk' and 'need to be relocated'.

[24] Because of the confidential nature of the reports and lists, the exact lists are not referenced or copied here. Information about these lists needs to be directed to the DRMC.

Table 8: Summary of flood risk classification of informal settlements from 2009-2013

Year	No. of 'high risk' informal settlements[25]	No. of 'medium (above average or average) risk' informal settlements	No. of informal settlements 'to be relocated'	No. of informal settlements where mitigation measures need to be implemented
2009	12	44 (above average) 170 (average)	-	-
2011	22	-	9	20
2012	-	-	24	9
2013	9	-	24	-
2014	7	-	22	7

The 'need to be relocated' category acknowledges that some informal settlements are located on unsuitable land (*e.g.*, those built on road reserves, detention ponds, wetlands, and private land) where the only viable solution, from the CCT's point of view, is to relocate the residents to appropriate 'flood-safe' and serviced/serviceable land. The politics and challenges around relocation are discussed further in Section 5.1 of this chapter. To illustrate the issue of people building their houses in flood-prone areas, Table 9 shows the number of informal settlements identified as those built in flood-prone ('unsuitable') areas in 2008/9.

Table 9: Numbers of informal settlements and houses built in flood-prone areas in Cape Town

Flood Hazard Locality	Estimated Number of Informal Settlements	Estimated Number of Dwellings[26]
Un-drained, trapped low-lying areas	33	3885
Designated watercourse floodplains	6	987
Within 25 m of a watercourse	18	861
Formal stormwater ponds (*e.g.*, retention and detention ponds)	7	457
Environmentally-sensitive wetlands	2	927

(Data from DRMC, 2009)

The nature of flooding on the Cape Flats is not characterised by rivers overflowing their banks, but rather by rising water from saturated water tables, localised flooding from blocked stormwater systems, and natural or engineered retention ponds, in which informal settlements are often illegally located, filling with water during the rainy season (see: Benjamin, 2008, Drivdal, 2011a,b):

Five examples of flooding experienced in Cape Town's informal settlements are provided in Table 10, as witnessed and photographed during the fieldwork in Sweet Home and surrounding informal settlements.

[25] Majority of these informal settlements are located on privately-owned land, stormwater ponds, wetlands, or road reserves; this limits the DRR measures that the CCT can implement.
[26] The CCT calculates the total number of people based on an average of four people per house.

Table 10: Examples of flooding in Cape Town's informal settlements

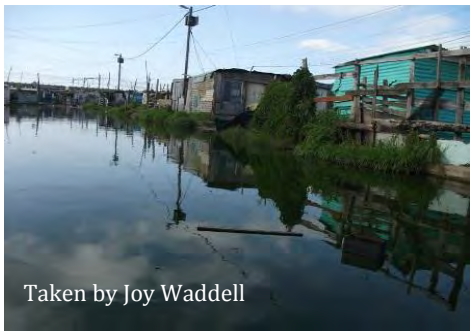
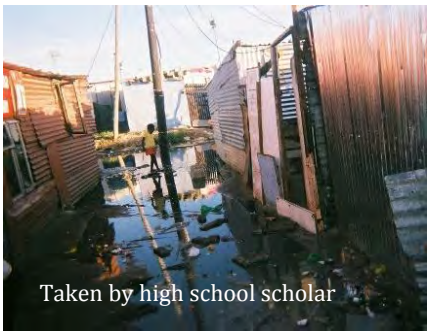
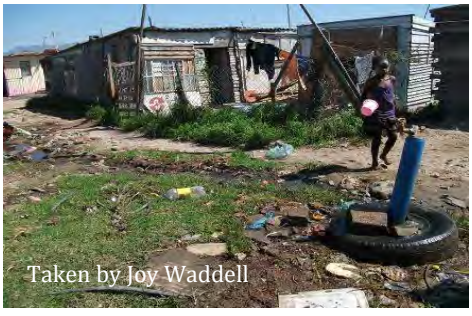
TYPE	PHOTOGRAPHED EXAMPLES
Water ponding in communal areas: high/saturated water tables + informal settlements located in wetlands = some areas of the informal settlement are lower (in depressions) than the rest of the settlement/roads	 Taken by Joy Waddell  Taken by high school scholar
Rainwater or surface runoff entering houses through the cracks in roofs and walls (of badly-constructed shacks made from recycled materials) or through open doors	 Taken by Sweet Home resident  Taken by high school scholar
Stormwater and greywater/sewage overflowing from blocked/unmaintained stormwater channels: this water ponds in communal areas/roads and enters houses built below the road/ground level	 Taken by Joy Waddell  Taken by Joy Waddell
Informal settlements built in transient wetlands or retention/detention ponds during the dry season, which become flooded during wetter seasons	 Taken by Sweet Home resident  Taken by high school scholar
Water collecting from standpipes that lack formal drainage systems, or water collecting in areas where residents dump greywater (or toilet waste).	 Taken by Joy Waddell  Taken by Joy Waddell

Table 11: Key underlying factors that increase flood risk in Cape Town's informal settlements

<table>
<tr><th colspan="6">Biophysical and geographical factors:</th></tr>
<tr><td>1</td><td colspan="5">High-intensity weather events overwhelm existing stormwater drainage systems</td></tr>
<tr><td>2</td><td colspan="5">Wetlands and depressions = ponding</td></tr>
<tr><td>3</td><td colspan="5">Informal settlements built on old solid waste/rubble dumping sites or sand dunes = undulating topography = stormwater runoff channelled into depressions or low-lying areas</td></tr>
<tr><td>4</td><td colspan="5">Sandy soils and high water table = saturation during winter rainfall. Standing water evaporates very slowly during cold winters = flooding in winter</td></tr>
<tr><th colspan="6">Socio-economic and behavioural factors:</th></tr>
<tr><td>1</td><td colspan="5">Residents dig their shacks into the ground to secure against strong Cape winds = shack at risk from rising water (from high water table) and from stormwater runoff flowing 'down' into their homes</td></tr>
<tr><td>2</td><td colspan="5">Some informal settlements built on private land = CCT unable to legally service that land</td></tr>
<tr><td>3</td><td colspan="5">High density informal settlements = difficult (often impossible without relocation) for CCT to build drainage services (i.e., in-situ upgrade)</td></tr>
<tr><td>4</td><td colspan="5">Increased hardening of surfaces = increased stormwater runoff flowing into houses and flooding paths</td></tr>
<tr><td>5</td><td colspan="5">Low-quality housing in informal settlements = shacks leak from rainfall, seepage from the ground (i.e., shacks often built directly on muddy ground with only a carpet covering the floor)</td></tr>
<tr><td>6</td><td colspan="5">Residents build houses in flood-prone areas (e.g., wetlands, retention and detention ponds, low-lying areas, and along natural water courses) for a number of reasons:</td></tr>
<tr><td></td><td>Residents have no alternative and are forced to build their shack wherever they find open space</td><td colspan="2">People migrating to Cape Town from other (drier) provinces or countries have no prior knowledge of where it is safe to build = they build somewhere that looks dry in summer, but floods in winter. New migrants lack social ties, so neighbours/ communities do not warn newcomers of flooding hotspots</td><td colspan="2">Political motivations: Political parties pay residents to build shacks in controversial areas close to election time, to gain extra votes or to make the ruling party look bad (make the province/city 'ungovernable'). Some residents build their shacks in flood-prone areas so they can be moved up the housing or relocation list/queue[27]</td></tr>
<tr><td>7</td><td colspan="5">Existing open stormwater channels blocked = localised flooding when channels overwhelmed by surface runoff. Reasons for blockages include:</td></tr>
<tr><td></td><td>Residents fill open channels with rubble and sand to cover the smell of stagnant, contaminated 'green' water, and to prevent children from playing/drowning in this contaminated water. Contaminated water is from residents emptying 'night-soil' (toilet buckets) into open channels every morning because communal toilets are broken (or non-existent, too far away to use at night, or unsafe for children/women to use at night. Stagnant water also from long-term blockages and rotting solid waste</td><td>Residents fill the open channels directly in front their house to allow easier access by foot, to park their cars right in front of their front door, or to expand the size of their house into that space</td><td>Residents build infrastructure over stormwater systems: e.g., a personal toilet over a stormwater cover, a driveway over the stormwater channel, or bridges/ walkways. These cause blockages, especially when solid waste enters the system or collects in/around the 'informal' infrastructure</td><td>Solid waste = from residents throwing solid waste into open channels, or solid waste being blown into open channels. These issues relate to inconsistent solid waste removal or central collection points (= large green shipment containers) being locked when residents want to dispose of refuse bags. Dogs (or scavenging children/adults) rip open refuse bags left by locked containers and the winds/rain blow the solid waste into open stormwater systems</td><td>Stormwater systems not maintained, cleaned, or unblocked regularly = bad blockages and localised flooding</td></tr>
</table>

[27] The Housing database, which the CCT developed in the early 2000s (and went live in June 2006), is a centrally-managed list that the CCT uses to allocate housing (rental and subsidised) (CCT, 2014). This housing database is what many residents and officials refer to when talking about 'being on the waiting/housing list'. As of April 2013, the CCT had assisted 57,349 applicants, but 276,920 applicants were still awaiting housing opportunities in Cape Town (CCT, 2014). The 'relocation list' refers to those houses or informal settlements that the Flood Task Team has identified as being high flood-risk informal settlements, where the CCT sees the only viable solution as permanently relocating those houses/informal settlements to higher ground or areas that are less flood-prone.

The multiple factors that cause flooding and increase flood risk in Cape Town's informal settlements are well-documented in the literature[28]. The key underlying factors (Table 11) were identified during interviews with CCT officials and Sweet home residents and observed during the transect walks in Sweet Home. From Table 11, it becomes apparent that many of the challenges around flood risk are closely linked to housing and deeply embedded in and shaped by socio-economic and political realities and factors.

In the following sections, the different actors who are seen as central to addressing flood risk will be introduced, as well as the multiple approaches that these actors are taking to address the underlying physical, socio-economic, and even political factors that increase/exacerbate flood risk.

3. IDENTIFYING THE KEY NODES GOVERNING FLOOD RISK IN CAPE TOWN'S INFORMAL SETTLEMENTS

During this research, a number of actors (called nodes) were identified as playing a key role in managing flood risk in Cape Town[29]. For the purposes of this thesis, the analysis and discussion will focus on the activities of 17 of these nodes, who were available for interviews and actively participated in FliCCR's workshops. Table 12 provides a breakdown of who these 17 nodes are and what their function and responsibilities are within the context of flood governance.

[28] For example, Drivdal (2011a,b), Orangio (2012), Dixon (2013), and Desportes (2014) consider the factors that increase vulnerability from a qualitative approach. Musungu (2012) uses community-based GIS to identify and analyse the hazard profile of two informal settlements, as well as residents' coping strategies.
[29] See Appendix 7 for an overview of all these actors.

Table 12: The functions and responsibilities of the selected nodes

Actor / Node	Number of people[30] interviewed	Responsibility / Nature of the Node
Development Services Dept.#	1	Coordinate with other departments to ensure the effective delivery of services in Cape Town's informal settlements.
Disaster Risk Management Centre (DRMC)	8	Manage and respond to disaster risk across Cape Town and in high risk communities. Conduct awareness campaigns and carry out DRAs. Coordinate the Flood Task Team and relief provided by NGOs.
Engineering Services Dept.#	1	Coordinate service delivery of essential/basic services/infrastructure. Responsible for incremental upgrade of services/infrastructure and identifying settlements for upgrade.
Environmental Health Dept.##	3	Preventing outbreak of diseases and monitoring underlying disease risk factors. Monitoring/referral of inadequate/damaged services in informal settlements to relevant departments. Health and hygiene education and safety advice.
Ikhayalami	2	NGO working closely with communities on multiple development issues, including re-blocking and de-densifying informal settlements.
Informal Settlements Management Dept.#	3	Management of infrastructure upgrade and service delivery in informal settlements. Assess and coordinate relocation to suitable areas. Prepare and register flood victims, supply emergency flood kits, and carry out annual DRAs of informal settlements.
Jungle Theatre Company###	1	Activated by the CCT to run annual fire and flood awareness shows.
MAYCO (Mayoral Committee Members)	1 (Utilities) 1 (Safety and Security)	Comprises 11 councillors appointed by the Mayor. Each member has a different portfolio of municipal government. *Utilities* is responsible for ensuring residents have access to basic services. *Safety and Security* is responsible disasters, crime, traffic, and by-law enforcement.
Mustadafin Foundation###	2	An Islamic NGO activated by the CCT to provide disaster relief. Also involved in community-based activities: *i.e.,* health/hygiene education.
Roads and Stormwater Dept.	4	Proactive stormwater and river cleaning, and regular maintenance of critical formal and informal stormwater systems. Design/implement constructed systems to address Cape Town's drainage needs.
SA Red Cross###	1	An international NGO activated by the CCT to provide relief during a disaster event. Also involved in community-based DRR activities.
Solid Waste Management Dept.	2[31]	Coordinating and monitoring community contractors who are responsible for the weekly collection of solid waste, area cleaning, and the removal of illegal dumping in informal settlements.
Sweet Home Residents	21	They live in an informal settlement that experiences annual flooding. Small-scale measures taken to prevent/cope with localised flooding.
Sweet Home Street Committee	3	Informally elected by Sweet Home residents to manage the daily issues in the informal settlement. Comprises representatives from each 'section' of Sweet Home and is chaired by a community leader.
The Warehouse###	2	FBO working closely with Sweet Home residents. Projects include a seniors' club, HIV/AIDS support, crèche, and teenage groups.
Ubuhle Bakha Ubuhle###	1	Community-based project working closely with Sweet Home residents to replace haphazard shacks and build clusters of sandbag houses.
Ward Councillors and Subcouncil	6	The formal interface between the CCT and communities. Responsible for a particular ward (ward councillor) or cluster of wards (subcouncil). Mobilise resources to address the needs of their ward.
Water and Sanitation Dept.	2	Responsible for the general maintenance and housekeeping of water and sanitation infrastructure. Unblocking and cleaning of existing sanitation and sewerage systems.

Located within the Housing Directorate ## Located within the Health Directorate ### NGO

[30] Tally of interviewees from interviews by Joy Waddell (2011-2013) and FliCCR researchers (2010-2011).
[31] Officials from Solid Waste Management did not consent to any interviews; they communicated by email only.

In order to discuss these 18 nodes in the following subsections, they are further categorised into three groups (called 'nodal assemblages'):

1. Departments and directorates that form part of the CCT and are represented on the Flood Task Team (eight nodes in total);
2. Residents and the street committee from Sweet Home informal settlement (21 residents and three street committee representatives); and
3. External actors (*e.g.*, NGOs, FBOS, CBOS, CSOs, and ward councillors) who carry out flood risk reduction and relief activities at the community level (seven nodes in total).

3.1. The Flood Task Team: The nodes coordinating flood governance in Cape Town

Flood risk management activities in Cape Town are coordinated by the CCT's Flooding and Storms Emergency Planning Task Team. This 'Flood Task Team' is chaired by the DRMC, which is the CCT department mandated to mitigate and respond to all types of hazards (*e.g.*, technological, natural, political) and related disaster events across Cape Town (DRMC, 2012a). In accordance with national and municipal DRM legislation (South Africa, 1998, South Africa, 2002, DRMC, 2012a), and in response to the destructive and costly winter flooding event in 2008, DRMC and the CCT's Development Services department were tasked with setting up the Flood Task Team. This Task Team was seen as the structure for relevant CCT departments to work together to prepare for annual, winter storms and flooding, and reduce the risk of vulnerable informal settlements to this flooding.

The rationale for establishing the Flood Task Team was recognition by the CCT departments active in informal settlements that the complexity of flood risk and the multiple underlying risk factors required a coordinated, holistic approach that brought together different experts and knowledge. The Flood Task Team was established as a CCT forum for coordinating activities, encouraging information-sharing between departments, and sharing the responsibility of managing flood risk internally between different departments. The Flood Task Team comprises around 30 CCT municipal departments[32] and selected external actors, who meet every two

[32] See Appendix 8 for a detailed representation of the nodes on the Flood Task Team. See Appendix 9 for a membership list of the Flood Task Team.

weeks during the winter season to design and implement their 'Winter Preparedness Strategy', which is based on the CCT's 'Flooding and Storms Plans' (DRMC, 2009).

The Flood Task Team's Winter Preparedness Strategy, which is supplementary to the CCT's 'Municipal Disaster Risk Management Plan' (DRMC, 2011a, DRMC, 2012a), involves "coordinating [flood] risk reduction, preparedness and proposed response and relief efforts… in accordance with the [CCT]'s Flood and Storms Plan" (DRMC, 2009). Although this Flood Task Team discusses issues of flood risk across the whole of Cape Town, their main focus is on the city's informal settlements, where the risk is most severe. The Flood Task Team uses DRAs and reports from various CCT departments to identify high-priority informal settlements at risk from flooding during the winter months, develop DRR strategies for these high-risk areas, provide contingency plans for potential flood events across the city, and monitor risk throughout the winter season (DRMC, 2009, DMAF, 2012, DRMC, 2012a). The Winter Preparedness Strategy's objectives include (DMAF, 2012):

1. integrating preparedness and response activities for flooding by the relevant CCT services, essential services, and external role-players;
2. reducing or mitigating the risks and impacts that severe winter storms have on communities within the municipal area of Cape Town; and
3. raise awareness of the risk of flooding with communities, through continuous communication.

A number of NGOs are also represented on the Flood Task Team, although they do not attend the fortnightly meetings. These NGOs are activated by the Flood Task Team for relief provision (*e.g.*, The Mustadafin Foundation, the South African Red Cross Society, the Salvation Army, and SANZAF) and community-based education activities (*e.g.*, the Jungle Theatre Company).

The Flood Task Team is seen by many of the CCT departments working in informal settlements as a positive step towards managing flood risk holistically and collaboratively. An Environmental Health department official (10/04/2013) explained that because of the people represented on the Task Team, reports or flood-related issues that are raised in these meetings are addressed more quickly:

> *"…during the flooding season, we complete a weekly flood report that is submitted to our representatives at the flood meetings.* [Our representative on the Flood Task Team] *then takes up the issues* […] *that we have identified. At* [the Flood Task

> Team's] *meeting, they would then request to take the necessary steps to rectify the issue, and give a report-back at the following meeting. So that's why, funnily enough, in the winter season, because of having this meeting… this flood committee…* […] *things are addressed because all the directors and management are sitting in this meeting."*

Several CCT officials see the Flood Task Team as an 'integrated' approach that helps to pool critical resources, hold CCT departments more accountable, and overcome otherwise silo-based approaches to addressing flood risk in Cape Town:

> DRMC (31/01/2013): *"The resources are equally spread because you have this platform, and your concerns and your area can be addressed. And you can ensure equity in the way things are dealt with."*

> Flood Task Team chairperson (31/01/2013): *"One of the key roles we play* […] *is coordination. In terms of pulling all departments together to make sure we actually eliminate all those silo-based management of the flooding. Making sure that we're all working as one, as a city, as CCT departments, and also including the outside stakeholders."*

The Flood Task Team is seen in this thesis as a nodal assemblage because it brings together multiple nodes (CCT departments and NGOs) onto a common platform in order to collectively govern flood risk. Table 13 presents the nodes that form this nodal assemblage, who were interviewed during this research and participated in some of FliCCR's workshops.

Table 13: Nodes represented on the Flood Task Team who participated in this research

Name of the Node	Type
Development Services Department	CCT Department
Disaster Risk Management Centre	CCT Department
Engineering Services Department	CCT Department
Environmental Health Department	CCT Department
Health	CCT Directorate
Informal Settlements Management Department	CCT Department
Roads and Stormwater Department	CCT Department
Solid Waste Management Department	CCT Department
The Jungle Theatre Company	NGO
The Mustadafin Foundation	NGO / FBO
Water and Sanitation Department	CCT Department

3.2. Sweet Home informal settlement: Grounding the flood governance question

Figure 11: Location of Sweet Home (outlined in yellow) in Cape Town
(Source: GoogleEarth and Joy Waddell)

Sweet Home (Figure 11) was selected as an embedded unit of analysis in the case study of flood governance in Cape Town because it represents indicative dynamics of informality, marginalisation, and some of the predominant socio-political developmental challenges and vulnerability to flood risk faced by majority of residents living in informal settlements on the Cape Flats, in Cape Town. The characteristics unique to Sweet Home are summarised in Table 14.

Table 14: Demographics and characteristics of Sweet Home

Type of Data	**Data Source:** CCT survey of Sweet Home in 2004 (CCT, 2005)	**Data Source:** CCT's overview of Ward 80, based on data from the 2011 census (CCT, 2013b)
Household Demographics	Average of 3.2 members per household	Average of 2.9 members per household
Demographic Profile	90.5% of residents originally migrated from the Eastern Cape Province (*i.e.*, majority Black African)	79.8% of the population are Black African; 17.3% are Coloured[33]
Age Profile	Age profile skewed towards job-seekers aged 16-34 and children under 5 years	49.3% are aged 25-64, and 28.7% are aged under 14
Education Level	8% of adults have matric[34]	73% have not completed matric
	39.1% of adults have not completed primary school, of which 4.1% do not have any formal schooling[35]	13.6% of adults have not completed primary school, of which 3% do not have any formal schooling
Employment	36% of adults are unemployed[36]	38% of residents are unemployed
	Majority of residents who work are in the construction industry, street trading, manual labour, farm work, and security (in descending order from the most common)	
Household Income	Average income per month is ZAR 1,272	78% have an income of ZAR 3,200 or less
Other Income Sources	61.5% receive no state grants[37] or other financial support: 28.9% receive child support, 6.9% receive disability, and 5.3% receive a state pension	

Sweet Home is located in the suburb of Philippi[38]. Falling under Ward 80[39] within Subcouncil 18, with an African National Congress (ANC) ward councillor, Sweet Home has a complex history that has had an impact on the expansion of the settlement, its service delivery status, and the vulnerability of its residents to flooding. Sweet Home was originally farmland, but became an illegal rubble dump for Philippi's farmers, industries, and builders (Sacks, 2012). In 1992, people already living in Cape Town's other informal settlements and backyard shacks, as well as immigrants from the poorer Eastern Cape Province, began moving into the area and building shacks on available parcels of land (Sacks, 2012). The settlement grew from 52 dwellings in

[33] 'Coloured' in South Africa refers to anyone who is of mixed Caucasian ('white') and 'black' African or Asian ancestry. See http://www.britannica.com/EBchecked/topic/126829/Coloured for a more detailed explanation.
[34] Matric is the term used in South Africa to describe the final year of high school (*i.e.*, Grade 12) and the qualification received on graduating.
[35] To be considered 'functionally literate' (CCT, 2005), adults need to have at least completed their primary education; these figures here highlight the percentage of 'functionally illiterate' people in Sweet Home.
[36] Unemployment rates are difficult to calculate accurately because some of the 'working' residents are under the age of 18 (thus not considered 'adults') and/or those who indicated that they were unemployed/employed were either casual workers who work occasionally, or worked part-time instead of full-time.
[37] In 2014, a child support state grant was ZAR 310 a month per child; a disability state grant was ZAR 1,350 a month; and a state pension was ZAR 1,350 a month or ZAR 1,370 a month if you are over the age of 75 (Source: South Africa, 2014).
[38] See Appendix 10 for a map of Philippi.
[39] See Appendix 10 for a map of Ward 80.

January 1993, to 2,217 dwellings in 2003 (DiMP, 2009). In 2012, there were an estimated 17,000 residents crammed into 4,000 dwellings (Sacks, 2012) (Table 15).

Table 15: Number of informal dwelling units in Sweet Home (2002-2005)

Year	1992	1993	1998	2002	2003	2004	2005	2006	2007	2011	2014
Number of dwellings	0	52	886	1480	2217	1785	1706	1974	2005	2700[40]	4000

(Source: CCT, 2005, CCT, 2006, Arthern, 2011, Sacks, 2014)

Sweet Home is divided into three sections (Figure 12):

1. one section is owned by the CCT and was serviced with water, sanitation, electricity, gravel roads, and stormwater drainage in 2006;
2. one section was privately owned until 2011 and is un-serviced (DiMP, 2009, Sacks, 2012); and
3. a thin section running along the railway track is owned by Transnet (railway company) as a 'road/rail reserve', and the shacks located on this land are un-serviced.

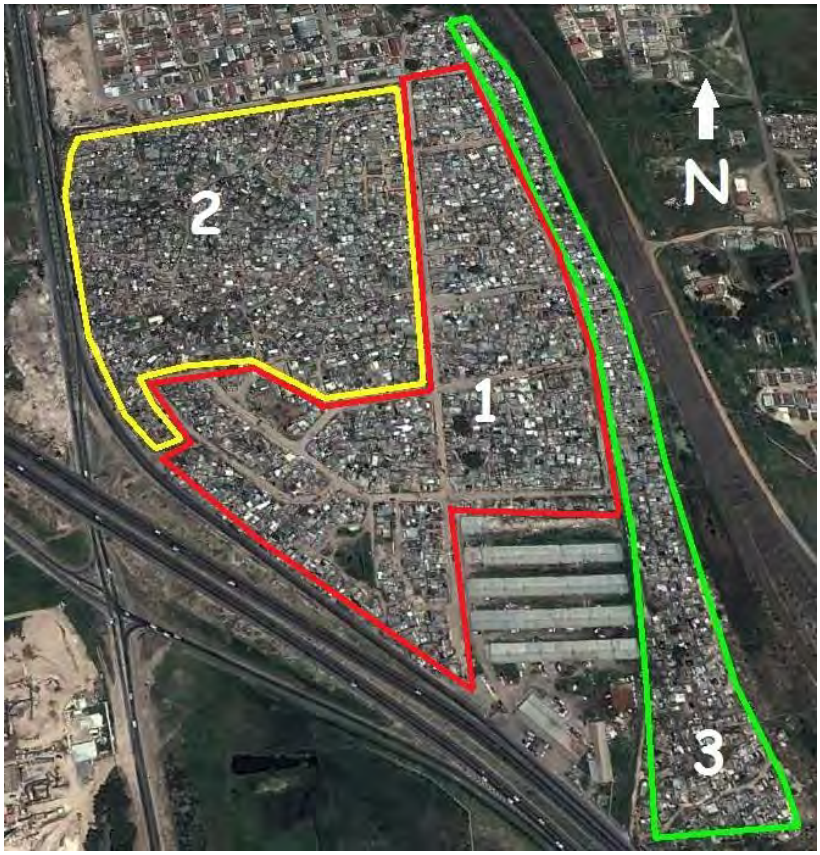


Figure 12: Map of Sweet Home, showing the three 'sections'
(Source: Google Earth and Joy Waddell)

[40] This figure was given during an interview (24/04/2013) with a Water and Sanitation department official.

The privately owned, un-serviced sections of Sweet Home are un-serviced because the owner of this land prevented the CCT from providing services, besides a few water standpipes and a few container (chemical) toilets. This large, un-serviced area has a considerable amount of illegal and dangerous electricity connections to the houses in the serviced section. This private land was finally bought by the CCT in December 2011, for ZAR 750,000 (Sacks, 2014). Sacks (2014) describes how this was a bargain for the company who sold that land to the CCT because their land was worthless: not only was the company losing money from the land because they were paying the compulsory monthly municipal rates, but they could not develop the land because of the thousands of people living there illegally. In 2013, the CCT started the lengthy process of de-densifying the closely-packed shacks in the un-serviced area, in order to provide the necessary basic services.

There are no formal houses in Sweet home and all of the shacks are made from recycled material. The only concrete building in Sweet Home is the local community hall, which is also used as a shelter during flood events, or for storage of flood relief supplied by local NGOs (*e.g.*, blankets and food). Figure 13 illustrates the open stormwater drainage channels (called 'hyson cells') and the sanitation drainage services that exist in Sweet Home. Service delivery in Sweet Home and across the Cape Flats remains a contentious issue, as reflected in local news stories and voiced in frequent protests by residents (Nombembe, 2012, Masiko-Kambala, 2013, Waddell *et al.*, 2013).

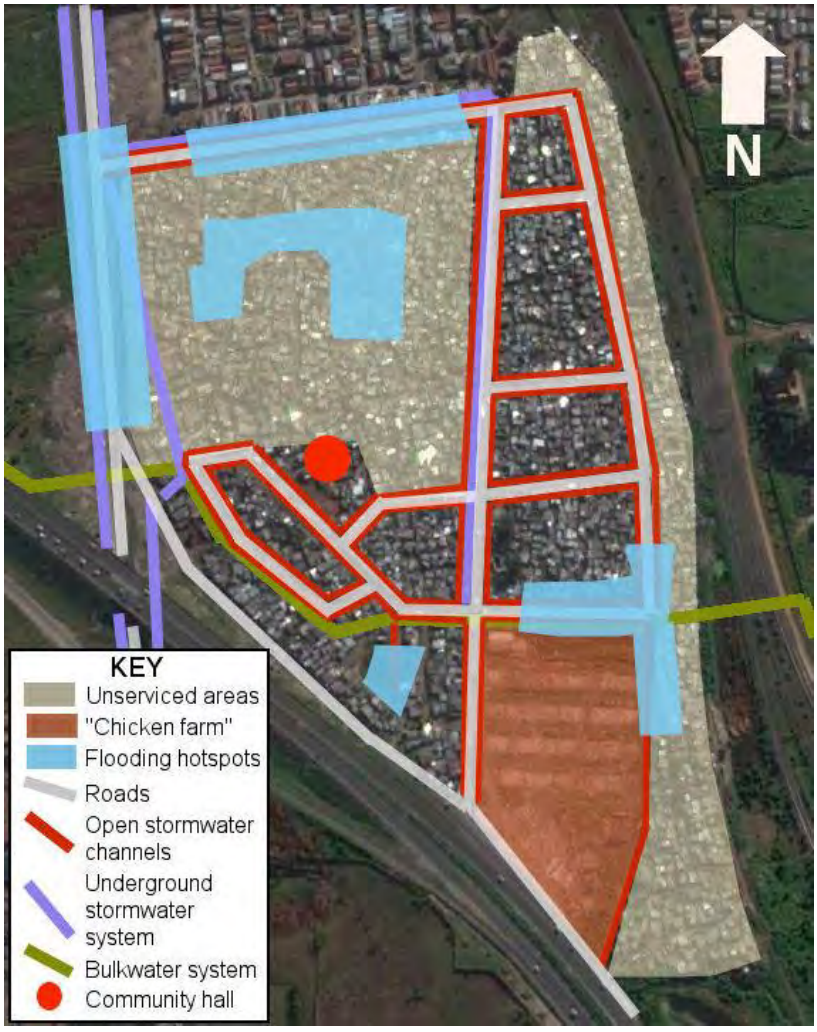


Figure 13: Map of Sweet Home showing the hotspots for flooding (as indicated by the residents) in relation to the un-serviced areas, the stormwater system, and the roads[41]
(Source: Google Earth and Joy Waddell)

Flood risk in Sweet Home, particularly during the winter rainfall period, is concentrated along the south-easterly corner of Sweet Home and in the middle-north-easterly section of Sweet Home (Figure 13). Although the south-easterly corner is in the serviced area of Sweet Home, flooding here is a result of the stormwater drainage system, which diverts runoff from the settlement to this low-lying area. The stormwater drainage system crosses through a private property ('chicken farm'[42] in Figure 13), which was blocked by the private landowner because the stormwater flowing through open channels in that person's yard is often mixed with foul-smelling sewerage and solid waste. This 'blocked' system causes the stormwater to back up

[41] This map is based on findings from transect walks in Sweet Home and information from the Roads and Stormwater Department (*i.e.*, for the various channels and systems). The flooding hotspots are based on observation, responses from interviews with participants, and from residents indicating on a map where the flooding hotspots are located.
[42] Sweet Home residents and CCT officials refer to this private property as 'the chicken farm' because it was a chicken farm in the past. In more recent years (date unclear), the chicken farm was converted to a car workshop (panel beater).

during heavy rainfall, flooding the streets and surrounding shacks. CCT officials explained (in 2013) that the CCT was in negotiations with the owner of this private land to buy the land; this was seen as the only viable solution for overcoming the long-standing battle with this landowner to divert stormwater from Sweet Home into the drainage system located on his land. From conversations with Sweet Home residents and CCT officials in 2014, it seems that the CCT was finally able to purchase this private 'chicken farm' and could begin to install proper stormwater drainage to reduce the flood risk in that corner of Sweet Home.

The middle of the top-left un-serviced area in Figure 13 is a high flood risk zone because there is a substantial depression in this area that fills with water during the rainy season. Since this pond-like area is in the un-serviced area of Sweet Home, the runoff is not diverted from the houses. As a 'high risk' informal settlement (identified as 'high risk' from 2009 until 2014), Sweet Home is prioritised in the Flood Task Team's annual Winter Preparedness Strategy. Despite the Flood Task Team's proactive interventions in informal settlements prior to the winter rains (*e.g.*, educational campaigns on how to 'waterproof' shacks by raising floor levels, building roofs at an angle, and digging trenches to divert water to formal stormwater drainage channels), every winter the DRMC has to provide relief to affected households in Sweet Home and relocate them to nearby shelters (*e.g.*, the community hall in Sweet Home).

Residents living in Sweet Home and their street committee (which was elected by the residents) are seen as a nodal assemblage in this research. Although considered as a nodal assemblage, this research recognises that this community is not homogeneous. As identified by Smit (2006), urban informal settlements are not internally heterogeneous; residents' perceptions vary depending on their socio-political and cultural background, their gender, religion and ideologies, and even their status within the community. Input from and analysis of Sweet Home residents are based on the outcomes from the various focus groups and interviews conducted with selected groups of residents and individuals. Although these findings cannot be applied to all the residents living in Sweet Home or all residents across all informal settlements, they do shed light on some of the key issues surrounding flood risk management that other actors (*e.g.*, CCT officials and NGOs) have highlighted during their respective interviews. It is these broader themes that I unpack and discuss in the analytical chapters that follow.

3.3. External nodes: NGOs, ward councillors, and community leaders

There are a number of external actors who were identified as key to the flood governance discussions in Cape Town. Since these actors vary in the roles that they play in terms of flood governance itself and because of their varying relationship with the Flood Task Team and residents living in Sweet Home, the external actors have been grouped into three categories.

3.3.1. Actors activated by the Flood Task Team

There are seven NGOs that are officially recognised by the Flood Task Team and the CCT as playing a role in responding to flood risk and educating residents about flood risk (DRMC, 2009): HDI Support, the Jungle Theatre Company, the Mustadafin Foundation, the Salvation Army, the South African Red Cross Society, the South African Zakah Fund (SANZAF), and the Trauma Centre. These NGOs are activated by the Flood Task Team to provide relief and humanitarian assistance (except for the Jungle Theatre Company) and help to run their education programmes on fire and floods (only the Jungle Theatre Company). Mfupi's (2013) thesis highlights the very reactive role that five of these NGOs play in governing flood risk. In contrast to Mfupi's (2013) findings, interviews with representatives from the South African Red Cross Society and the Mustadafin Foundation highlighted the active role that these organisations play in educating residents about flood risks and indirectly strengthening these communities' resilience to flood risk through their various poverty eradication and community development activities, and the various risk assessments that they carry out. However, since these activities are not conducted in partnership with the DRMC, the DRMC does not formally recognise or present this side of these NGOs' activities in the context of flood management.

The perception by the CCT that these NGOs only play a 'reactive' role to flood risk (*i.e.*, they only respond to a flood crisis by providing relief) ignores the other proactive activities carried out by these NGOs, such as awareness-raising and education on flooding, community-based DRAs, and so on. This perception is a direct result of the CCT and the Flood Task Team only highlighting the formalised partnership that the CCT has with these NGOs; this partnership only extends to the NGOs handing out relief and humanitarian assistance during disaster events, thus ignoring the 'private', but proactive activities of the NGOs. This very narrow perspective of what NGOs do/can and do not/cannot do in the context of flood governance, which is dominated by the CCT, is an issue that will be discussed further in Chapters Seven and Eight. The Jungle Theatre Company is excluded from this perception because their task is to support DRMC in their

education campaign (*i.e.*, a proactive activity), through their community/street theatre shows on flood and fire awareness.

Out of the seven NGOs mentioned above, only three[43] were interviewed during this research and participated in FliCCR's March 2013 workshop. These three NGOs are described below.

1. The Jungle Theatre Company

The Jungle Theatre Company uses theatrical shows and workshops with organisations, children and youth, and families to raise awareness on social and environmental issues[44]. The Jungle Theatre Company helps the DRMC with their annual flood and fire awareness programmes (Figure 14), which are held in winter and summer respectively. The shows explain how residents can protect themselves from flooding/fires and what they should do during flooding/fires.

Figure 14: The Jungle Theatre Company's annual flood awareness production held at a junior school in Philippi in May (left), and their fire awareness production held in Sweet Home in February (right)
(Source: Joy Waddell, 2013)

[43] The other NGOs were invited to FliCCR's workshops and were contacted for interviews, but were either busy or not interested.
[44] See http://jungletheatre.co.za/about-us/mission/ [Accessed: 04/11/2014].

2. The Mustadafin Foundation

The Mustadafin Foundation is an Islamic NGO that has five core functions: education, poverty eradication, health, community development, and disaster relief[45]. This NGO runs education programmes at the beginning and throughout winter for people who are affected by flooding. They run these education programmes in conjunction with their feeding schemes: when people are standing in the queues for food, or when people come to the Mustadafin Foundation's centre(s). When activated by the CCT to respond to a disaster-affected area, the Mustadafin Foundation provides relief in the form of blankets, warm clothing, hot meals, food parcels, sanitary packs (for women), and baby packs, for about three days, depending on the situation.

3. The South African Red Cross Society (SA Red Cross)

The SA Red Cross provides communities with a number of services: disaster relief and preparedness, health and care, psychological support, home-based care, and peer education[46]. The SA Red Cross has established local committees that conduct flood awareness programmes in the informal settlement communities where they work. The SA Red Cross also carry out DRAs within the various informal settlements where they work; these assessments identify the main hazards in those areas and the areas that are prone to flooding.

3.3.2. External actors not affiliated with the Flood Task Team

Other external actors include those who are not formally affiliated with the Flood Task Team, but are involved in community-based work and who are conducting development-related work that overlaps with and impacts positively on flood risk reduction activities. Some of these NGOs partner with the CCT on other activities/projects, but most of them work with informal settlements in their own capacity, with separate/external funding sources. These other actors include local churches and mosques, academic institutions (*e.g.*, the University of Cape Town), retail outlets and businesses (*e.g.*, hardware stores that provide building material after flood events and grocery stores that provide food parcels, *etc.*), service providers and contractors who work for the CCT (*e.g.*, Aurecon engineering consultancy, Eskom, contractors, and EPWP workers[47]), and other local civic organisations involved in poverty alleviation activities, food distribution, education, *etc.* There were three external NGOs that this research engaged with:

[45] See http://www.mustadafin.org.za/ [Accessed: 30/10/2014].
[46] See http://www.redcross.org.za/?page_id=25 [Accessed: 30/10/2014].
[47] The national Expanded Public Works Programme (EPWP) provides labour and income to poor households in the short-to-medium-term; EPWP projects employ workers on a temporary or on-going basis. In Sweet Home, EPWP workers are employed by CCT departments (*e.g.*, Roads and Stormwater and Water and Sanitation) to help clean the informal settlement and unblock drains. For more information, see www.epwp.gov.za [Accessed: 01/01/2016].

the Warehouse and UBU is active in Sweet Home and were identified by the residents as critical external actors, while Ikhayalami was not active in Sweet Home during the research period (2011-2014), but participated in FliCCR's workshops because of their involvement in other communities where FliCCR's researchers were based. These two NGOs are described below.

1. The Warehouse

The Warehouse is an FBO that was established in 2003 through the Anglican church in Cape Town[48]. The Warehouse has many projects that aim to alleviate poverty and address injustice in informal settlements. The Warehouse carried out several activities in Sweet Home, such as a senior citizens' club, a teenage discipleship group, soccer teams for boys, HIV/AIDS support groups, and soup kitchens. Many of the residents highlight how the Warehouse has built a strong relationship with Sweet Home, as exemplified through their ongoing activities in Sweet Home and not the once-off, once-a-year, or 'only when disaster strikes' approaches that other NGOs (*e.g.*, those activated by the CCT) have.

2. Ubuhle Bakha Ubuhle (UBU)

UBU is a CBO that was formed in 2014 in Sweet Home with the aim of providing Sweet Home residents with the design and know-how to build their own houses in a relatively short time[49]. UBU's approach is to build clusters of homes; the design concept of the houses, which were drawn and finalised by the residents themselves, is based on the idea of using sandbags as the main material for building the houses. In 2014, UBU began a partnership with the CCT's housing department to implement this design concept and ensure that the clusters of homes are serviced properly.

3. Ikhayalami

Ikhayalami[50] is a non-profit NGO that designs and implements affordable solutions for incremental and in-situ upgrades of informal settlements. Ikhayalami seeks to embed their projects within the community, so that they are driven by the community, with support from local government. A key aspect of their work is their re-blocking/blocking-out projects. Re-blocking involves the reconfiguration of settlements in terms of the settlement's whole layout (clustered houses around a communal area) and the design and dimensions of the shacks (better quality shacks with more internal space, which are less susceptible to fires, flooding, and break-ins). The idea of re-blocking caught the attention of the different actors who participated

[48] See http://www.warehouse.org.za/ [Accessed: 30/10/2014].
[49] See http://ubu.bz/ [Accessed: 30/10/2014].
[50] See http://www.ikhayalami.org/about/ [Accessed: 04/11/2014].

in FliCCR's workshops because of its potential for in-situ upgrades and service delivery and flood/fire risk reduction.

3.3.3. Ward councillors and community leaders

Ward councillors are the formally (legally) recognised and democratically elected local government representatives of the CCT who form part of the formally recognised interface between the municipality and the residents living in their allocated wards. These ward councillors are considered to be 'external actors' because although DRMC officials explained that ward councillors are invited to the Flood Task Team meetings, interviews with Flood Task Team representatives and ward councillors themselves highlighted that the ward councillors do not ever attend these meetings. The ward councillors play a crucial and central role in allocating and channelling resources (mainly financial) to their wards (and communities in their wards) for various activities and priorities, including flood relief and flood risk reduction activities. Each ward has a ward committee that is made up of selected residents representing specific sectors: senior citizens, youth, children and women, safety and security, community police forum, education, *etc.* The ward councillor chairs this committee, and the residents on the committee are not allowed to work for the CCT or be a politician themselves (*i.e.*, no competing agendas). Ward committees, which are established in all municipalities in South Africa, are a form of public participation; they are supposed to be non-partisan, but Piper and Deacon (2008) find that most ward committees are partisan. DRMC officials also argue that these ward councillors and their offices are the official channel through which communities are expected to lodge complaints and/or report flood-related problems and issues.

A community leader, on the other hand, is a representative of a particular community, who was elected by the local community, and is not legally (formally) recognised by local government or any statutory body (*e.g.*, the Independent Electoral Commission). A community leader often chairs a street committee, which is made up of representatives from each section of a particular informal settlement[51]. One ward councillor (03/02/2012) described how community leaders can be regarded as activists within a community. It is important to note here that each informal settlement is unique in how/whether they select a community leader and/or street committee. In Sweet Home, there is a street committee that is made up of locally elected 'section

[51] In Sweet Home informal settlement, the residents had divided the informal settlement into various sections; one or two residents from each section were voted as the 'street representative'. These street representatives formed the street committee, with the community leader as the overall leader/head of this committee.

representatives' who are responsible for one of the smaller sections of Sweet Home, and who collectively 'run' the informal settlement (*e.g.*, make decisions, lodge complaints/reports to the CCT and their ward councillor, distribute relief, *etc.*) and report to the community leader. The issue of community leaders and street committees is a contentious one, in both informal settlements and amongst CCT officials and ward councillors (discussed further in Chapter Eight). Many of the CCT officials interviewed expressed very negative perceptions of community leaders in general, highlighting in particular issues of corruption and nepotism, non-transparency of who the leaders actually are, and the short-lived and highly transient nature of community leaders:

> DRMC (10/04/2013): *"It's happened on numerous occasions: you come here, and this section has a street committee. And a month later, you find it's somebody else. And you ask: 'what happened to the other guy?' And they say, 'he wasn't ethical enough'. So they kicked him out and put in a new person. So now the negotiations have to start all over because there's a new guy involved."*

> MAYCO member (06/12/2012): *"You have* [street] *committee* [members] *purporting to be the leaders. You often get leaders coming and saying they're the leaders* [but they're not]. [These leaders] *often place strict demands* [on the CCT officials]*."*

> Informal Settlements Management (03/12/2012): *"I find that in the few informal settlements where there is no committee, it's a more peaceful environment. It depends how strong the committee leaders are* [… If] *there's no community structures in place* […] *that also causes a lot of [problems]. Because you get community leaders that can really lead their people and support us. But sometimes they also there for their own agendas."*

4. CURRENT APPROACHES TO MANAGING FLOOD RISK IN CAPE TOWN'S INFORMAL SETTLEMENTS

This section presents some of the current responses to managing flood risk that are carried out by the Flood Task Team and residents living in Sweet Home. Since examples of flood risk reduction interventions by the CCT and residents in Cape Town are extensively captured in the literature (see Pharoah, 2006, Anderson, 2010, Desportes, 2014, Ziervogel *et al.*, 2014b), this section will not provide an exhaustive list of the flood risk management interventions carried out across Cape Town, but highlight instead some of the key activities that are carried out in collaboration with other actors, or as silo-based, individual activities (*e.g.*, coping activities by residents).

Table 16 (on page 121) illustrates a range of flood management activities that were identified during interviews in 2013 with CCT officials, residents, and external actors[52]. During the interviews, respondents were asked to identify different flood management interventions that they carried out (as individuals and/or as a department), as well as interventions that they knew that other actors were currently doing to reduce flood risk. The respondents were then asked to identify which of these interventions had a very positive impact on reducing flood risk ("big change"), had a moderately positive impact ("good change"), had no impact ("no change"), and had a negative impact on reducing flood risk ("bad change").

From Table 16, it is apparent that there are many interventions that are carried out by individual departments, there are very few collaborative efforts (yellow boxes), and the limited number of interventions by residents (red boxes) are skewed towards 'no change' and 'negative change' in terms of their perceived level of effectiveness. Table 16 also highlights how there are more proactive interventions than reactive interventions that are currently being implemented in Cape Town, which is contrary to the widely-held perception of residents. Also interesting to note is that the majority of the reactive interventions currently implemented by the CCT and residents are seen as providing 'no change' or having a negative impact.

[52] This process was conducted in 2013 with Desportes (a colleague on the FliCCR project), with 7 CCT officials from 4 CCT departments (DRMC, Environmental Health, Roads and Stormwater, and Water and Sanitation), 1 ward councillor, 1 representative from the Mustadafin Foundation, a group of women from Sweet Home, and the community leader of Sweet Home. For more information on this process, refer to Desportes (2014:74).

Table 16: Perceptions of the impact of current flood risk reduction activities in Cape Town

Acronyms for actors:

CCT (City of Cape Town); **DRMC** (Disaster Risk Management Centre); **DS** (Development Services); **EH** (Environmental Health); **EPWP** (Expanded Public Works Programme); **FTT** (Flood Task Team); **R&S** (Roads and Stormwater); **SH** (Sweet Home); **SWM** (Solid Waste Management); **W&S** (Water and Sanitation); **WC** (Ward Councillor); **UBU** (Ubuhle Bakha Ubuhle)

	Activity * BOLD TEXT = Proactive activities	Actor Responsible * Red box = activities by residents only * Yellow box = collaborative, multi-actor activities	Identified By
Very positive impact	**** CCT depts. working together in Task Teams and interdepartmental workshops**	CCT; FTT; W&S	WC; W&S
	**** Concrete slabs to raise toilets above flood level**	Residents	W&S
	**** Continuous cleaning of drains; Working with residents and contractors to keep channels clear of solid waste; Cleaning ablution blocks 3x a week**	Contractors; EPWP; R&S; W&S; Residents	EH; Mustadafin; R&S; SH Residents; W&S
	**** Education and awareness activities on relevant issues (*e.g.*, health, floods, sanitation, dumping)**	DRMC; EH; Jungle Theatre; The Media; W&S; WC	DRMC; Mustadafin; W&S; WC
	**** Engage with ward councillors, community leaders, and communities**	W&S	W&S
	**** Lobbying for a ward-level DRMC plan**	DRMC; WC	WC
	**** Maintenance of sewerage infrastructure**	W&S	R&S
	**** Pushing if complaints are not being taken care of; Directing resources where needed; Public participation channels to decide budget and increase awareness**	WC; Subcouncil	WC
	**** Raise floor level of houses**	Residents	DRMC; SH Community leader
	**** Reporting and funding**	DS	DRMC
	**** Sandbag houses**	Residents; UBU; CCT	SH Community leader
	**** School Artscape Project**	DRMC and the Artscape Theatre	DRMC
	**** Service delivery**	DS; R&S; W&S	EH
	**** Service maintenance (*e.g.*, fix taps and toilets)**	EPWP; R&S; W&S	EH; DRMC; W&S
	**** Solid waste removal**	SWM	DRMC
	**** Use loudspeakers to call residents to community hall; Check that people do not extend their shacks or build in flood-prone areas, and that they leave spaces between their shacks**	Street Committee; Residents	SH Community leader
	Contacting the CCT when there is a flooding problem	DRMC; R&S	R&S
	Electrical repairs (despite delays)	Eskom	SH Residents
	Food and groceries donations	Retail Sector	WC
	Handing out relief (*e.g.*, food parcels, blankets, plastic)	DRMC; NGOs activated by CCT	WC; DRMC; SH Residents
	Moving people to churches and halls	CCT	WC
	Platforms for collaboration between multiple actors	FliCCR	Mustadafin
	Soup all the time from the support group	Support group	SH Residents

	Activity * **BOLD TEXT** = Proactive activities	Actor Responsible * Red box = activities by residents only * Yellow box = collaborative, multi-actor activities	Identified By
Moderately positive impact	**** Count households to determine demand (for services and relief)**	CCT depts.	W&S
	**** Educational drives and awareness raising (*e.g.*, theatre and distributing pamphlets)**	DRMC; EH	EH
	**** EPWP workers cleaning/servicing areas; Drains emptied quarterly by R&S**	EPWP; R&S; W&S	WC; R&S
	**** Fieldtrips to identify high risk areas**	FTT	W&S
	**** Good savings for emergency (*i.e.*, not buying on account) - end of year savings**	Residents	SH Residents
	**** Informal settlement plans**	Engineering Services	W&S
	**** Monitor and report on defects and flooding in the area (*e.g.*, weekly flood reports, using the CCT's notification system)**	EH; EPWP; W&S	EH; W&S
	**** Neighbours helping each other; 'Fight' with people when they do their washing or dump waste in the open stormwater channels; Put stones and crates in alley-ways and entrances**	Residents	SH Community leader
	**** Ongoing, long-term help by NGOs and not just once-off donations when there is a 'disaster'**	The Warehouse	SH Community leader
	**** Provide and clear solid waste containers and skips on a weekly basis**	Contractors; SWM	R&S; SH Residents; W&S
	**** Raise floor levels of shacks**	Residents; Street Committee	R&S; SH Community leader
	Call CCT officials to request help (*e.g.*, during floods and when drains are blocked) (despite delays); Emergency phone number	DRMC; SWM; Street Committee	SH Community leader; DRMC
	Dig trenches around shacks to divert surface runoff	Residents	Mustadafin
	Flood kits; Food and shelter	Human Settlements; Mosque; WC	WC; SH Residents
	Pump out water; Use gullies to get greywater out; Use people in the field to repair, clean, and unblock 'light' equipment/infrastructure	W&S	W&S
	Relocate people to temporary relocation areas (TRAs)	Human Settlements	W&S
No impact or change	**** Door-to-door pamphlets on flood risk/issues**	DRMC	DRMC; SH Residents
	**** Elevate floor with sand, bricks, tyres**	Residents	EH; Mustadafin
	**** Initiatives by residents to waterproof their houses**	Residents	Mustadafin; WC
	**** Relocate affected people/households (permanent & temporary)**	Human Settlements	WC
	Bring sand for residents to use	R&S	W&S
	Give flood relief kits	DRMC	W&S
	Mosques and churches dropping off things in informal settlements	Mosques; Churches	Mustadafin
	People clean inlets/drainage channels when there is a problem	Residents; R&S	EH
	Pump out stormwater channel with vacuum trucks; Repair pumps (used by R&S to remove water in flooded channels/areas	R&S	EH; SH Community leader
	Put furniture on bricks inside houses	Residents	Mustadafin
	Residents inform the community leader that there is water in their shacks	Residents	SH Community leader
Negative	Bad savings (*e.g.*, buying on account and/or with credit)	Residents	SH Residents
	Bringing food parcels &blankets (once-off donations during floods)	NGOs; FBOs; Churches; Mosques; DRMC	SH Community leader; W&S
	People relocated temporarily to community halls and fed there	DRMC	W&S

Nodes explained how certain measures, which were not currently (or always) happening, would have a very positive impact if they were carried out. These included:

1. If conflicts and disputes between actors were resolved (*e.g.*, between residents and the ward councillor, and between residents and CCT officials) (identified by Sweet Home's community leader and Water and Sanitation);
2. Human settlements directorate and engineers coming up with long-term engineering plans and interventions, rather than piecemeal, 'quick-fix', short-term interventions (identified by Roads and Stormwater);
3. Social entrepreneurship-related activities that improve residents' livelihoods (*e.g.*, residents sell second-hand clothes to raise funds to invest in flood risk reduction initiatives) (identified by the Mustadafin Foundation); and
4. If Roads and Stormwater replaced damaged infrastructure more frequently and put in more drains (identified by a ward councillor).

There are also contested views between actors of whether some activities are positive or negative. For example, the provision of relief to affected residents is seen by Water and Sanitation has having 'no impact', whereas the ward councillor, residents, and the DRMC (who activate the relief) see this relief provision as 'very positive'. However, Sweet Home's community leader explained how once-off donations (*i.e.*, relief activated by DRMC only after a flood/fire event) made 'no change' because residents still returned to flooded/burnt houses and were no better off than before. Sweet Home's community leader went on to argue that NGOs who provided long-term support and relief (*i.e.*, the Warehouse and its ongoing activities in Sweet Home, as well as UBU's partnership with residents), did in fact make a very positive impact. This argument highlights the need for ongoing support to and partnership with residents and communities, with external actors who get to know the people and their needs, as opposed to once-off donations from external actors who only enter the scene following a crisis/emergency. The Mustadafin Foundation (25/03/2013) argued that once-off donations, such as blankets, food parcels, and soup, had a negative impact because it made people complacent.

In terms of education/awareness activities, majority of the CCT actors argued that these activities have a very positive impact. However, some actors, especially Environmental Health, argued that distributing pamphlets about flooding[53] has a slightly lower impact than others perceive, while Sweet Home residents said that the pamphlets made no impact at all. In

[53] See Appendix 11 for examples of these pamphlets.

interviews with various actors, the impact of these pamphlets was more contested, with most actors highlighting that although education/awareness is a critical component of flood risk management, pamphlets are not the way forward. One field-based DRMC official (29/11/2011) and several Sweet Home residents argued that distributing pamphlets door-to-door made no change because residents simply throw the pamphlets away without reading them. Another DRMC official (08/04/2013) argued that the effectiveness of the pamphlets would be increased if they were combined with other activities, such as the community theatre production (by the Jungle Theatre Company) in communities and at surrounding schools. A Ward councillor (07/06/2013) argued similarly that since people often cannot read or interpret pamphlets correctly, CCT officials need to sit with residents and explain the information on those pamphlets.

Important to note here is that although there are more proactive interventions listed in Table 16, they do not necessarily have the positive impact that people perceive, either because the intervention is not monitored properly and/or its beneficial outcome is undermined by other activities. For example, providing and servicing stormwater systems is not always successful because residents see these open drainage channels are negatively impacting on their health and safety (of children especially), and thus fill them in with rubble, which increases their risk to flooding during winter. The answers provided by respondents in Table 16 are also perceptions, and the actual impact (positive or negative) has not been quantified in the context of Cape Town.

The rhetoric and perception in Cape Town is that the activities carried out under the capacity of the Flood Task Team are the formal, accepted, and 'most beneficial' activities. This is in line with a technocratic, state-centred approach to DRM, whereby the experts, engineers, and government (essentially the actors making up the Flood Task Team) are seen as the central actors who are best equipped to govern risk. When Flood Task Team representatives were asked during FliCCR's January 2013 workshop to list the interventions implemented across Cape Town to reduce flood risk, the only interventions listed were those carried out and run solely by the CCT (Table 17). Many of the proactive interventions that the Flood Task Team plan and implement before winter, for example, are structural and involve minimum engagement with communities: constructing and unblocking stormwater systems, raising shack and toilet levels, mapping of informal settlements, updating the CCT's GIS data/maps, *etc.*

Table 17: Examples of current proactive and reactive flood interventions by the CCT in Cape Town

Proactive Interventions	
Description	**Dept./Actor[54] Involved**
Sending out Early Warnings and Media Releases	DRMC
Implementation of a formal Early Warning System in Diep River (area in Cape Town)	R&S: modelling DRMC: message
Monitor river systems; Recommend interventions to CCT departments, private sector, and Property owners	DRMC
Outreach programs to the public: education and awareness on flooding and health (*e.g.*, community theatre, pamphlets)	EH, DRMC, Health directorate
Increased media communication and proactive briefing of press	DRMC
Project to assess the capacity of the bulk stormwater system	R&S
Proactive stormwater cleaning program: increased frequency of cleaning and cleaning of stormwater river systems	R&S, EPWP
Requests for the cleaning of stormwater channels and unblocking of drains	EH to R&S
Removal of solid waste from settlements before and during winter	SWM
Establishment of an Illegal Dumping Law	SWM, Law Enforcement Unit
Coordination of all activities regarding flooding (*i.e.*, Flood Task Team)	DRMC
Update GIS layer of Informal Settlements – mapping	DS
Flood risk assessment and site visits to identify locations/settlements most at risk – identify hotspots and priority issues	DRMC, ISM, EH, DS
Identify issues that can be addressed before the event (*e.g.*, roof/wall leaks, shacks built below ground level, *etc.*)	ISM
Task teams address issues in high risk settlements; link with ward councillors	Multi-departmental, Housing Directorate
Stockpile and identify resources needed flood relief (*e.g.*, blankets, food, *etc.*)	DRMC
Improve operational work plans for solid waste and stormwater systems	R&S with SWM
Increase the inspection of underground infrastructure in order to identify system functionality	R&S
Increased mechanical cleaning methods – especially in informal settlements	R&S
Identify basic short-term interventions and refer to relevant line departments	DRMC
Stopping people from settling in flood prone areas	Housing Directorate, Land Invasion Unit
Recommendations for re-blocking of informal settlements	Housing Directorate
Sandbagging of river channels (*e.g.*, Diep River)	DRMC
Rescue exercises (*e.g.*, Lourens River Rescue Exercise in 2012)	DRMC and EMS
Clarify the definition of flooding	All depts.
Provide sand to at-risk settlements/residents ('Sand Protocol')	ISM, R&S
Reactive Interventions	
Unblock stormwater systems	R&S
Area staff responds to community calls and activates relief measures	DRMC
Assessment and referral of affected flooded households to DRMC	DRMC, EH, Housing Directorate, R&S
Provide sand bags and water pumps	R&S
Request of starter kits (to ISM), sand (to R&S), plastic sheets to cover roofs (to DRMC, ISM)	DRMC and EH to ISM, R&S, and DRMC
Area-staff monitor relief (*e.g.*, supply of sand/bags, food, blankets, *etc.*)	DRMC
Monitor greywater and solid waste going to stormwater channels	SWM, R&S, EH
Low-lying/flooded people relocated to higher ground and community shelters	ISM, DRMC
Prioritising the most affected informal settlements	EH, DRMC

[54] Acronyms: DRMC (Disaster Risk Management Centre); DS (Development Services); EH (Environmental Health); EMS (Emergency Management Services); EPWP (Extended Public Works Programme); R&S (Roads and Stormwater Department); and SWM (Solid Waste Management Department).

DRMC coordinates the Flood Task Team to carry out flood risk assessments that help to identify the high risk informal settlements for flooding prior to winter. Short- and medium-term flood risk reduction and prevention measures are then identified for the particular areas, including short-term proactive interventions that could mitigate flood risk, such as infrastructure improvement and maintenance, or relocation of settlements (in full or in part) (DMAF, 2012). The Flood Task Team meets every two weeks, where the multiple departments represented on this Task Team report on their progress in terms of the interventions that each department is mandated to carry out. Each department also raises issues that their department has flagged (*e.g.*, blocked drainage system, broken taps, *etc.*), and the relevant department is then expected to address that issue (*e.g.*, Roads and Stormwater are responsible for unblocking blocked stormwater systems that are flagged).

The monitoring and evaluation of the Flood Task Team's annual progress is based on individual assessments for each department with regard to the interventions that they were mandated to carry out. This silo-based approach to monitoring and reporting reflects the institutional framework that the CCT departments have to work within; although the Flood Task Team portrays itself as a collaborative, multi-actor platform, the institutional framework of the CCT means that CCT departments still have to function within their own portfolios and mechanisms. The Flood Task Team is therefore a mechanism more for departments to share their activities and hold each other accountable for their progress, than as a collaborative, inter-departmental platform. The Flood Task Team is therefore collaborative in the sense of each department having the same end goal in mind (reduce flood risk), but not in the activities themselves (separate portfolios, mandates, resources, and reporting structures). These issues and the challenges that they bring are discussed in Chapters Eight and Nine.

Residents from Sweet Home indicated various flood risk reduction and coping strategies that they adopted before and during the winter season. Although some CCT officials and external actors perceive residents' strategies informal, short-term, and ineffective (*i.e.,* made no impact, as shown in Table 16), the literature on coping strategies and community-based DRR activities often contradicts these perceptions. Akter and Mallick (2013) found in Bangladesh, for example, that although poor households a coastal community were more exposed to tropical cyclones and related risks, they were better able to respond to and recover from the shocks than their 'richer' neighbours. The poorer communities had better access to post-disaster relief and rehabilitation aid, as well as exhibiting signs of being able to learn from the experiences and take preventative measures against future losses (Akter and Mallick, 2013).

Residents in Sweet Home have developed what Parkinson and Mark (2005) refer to as a 'hazards culture'; residents see their short-term coping strategies as part of their usual activities. When it rains, for example, residents perceive the following activities as a normal part of the winter season in Cape Town: using buckets to empty water from their houses, raising their furniture onto bricks, relocating temporarily to friends or relatives in drier, neighbouring areas/houses, sending their children to relatives/friends in drier settlements, or temporarily moving into local community halls if their houses are too flooded to live in. Residents indicated that the activities they do before winter to reduce their flood risk is limited because they lack the resources and knowledge to reduce risk. Some of the precautionary measures that residents take include putting plastic on their roofs, raising their shack's floor levels, clearing solid waste from existing drainage infrastructure, putting a slope on their roof so that water drains away from their house, building concrete steps in front of their doors, and/or putting concrete/bricks around their house to raise its level compared to the surrounding street/communal areas (Figure 15). During flood events, residents try to dig trenches, use sandbags around their house, dump sand/rubble/bricks in flooded pathways, or relocate temporarily to neighbours or relatives who live in dryer areas.

Figure 15: Examples of flood risk reduction initiatives carried out by residents (*e.g.*, covering their roof with plastic, using bricks to raise the level of communal spaces, building steps/barrier in front of their house to prevent water from entering).
(Source: Joy Waddell)

5. THE CHALLENGES OF MANAGING FLOOD RISK IN CAPE TOWN'S INFORMAL SETTLEMENTS

There are many challenges to managing and addressing flood risk in Cape Town; this section provides a brief overview of some of the broader challenges identified through the various interviews and workshops with multiple actors. A more detailed discussion on the barriers that emerged from the analysis of flood governance in Cape Town, from a nodal governance perspective, is presented in Chapter Nine.

In South Africa, as with many cities of the global South, it is recognised that there are a wide variety of external factors that impact on local government's ability to manage informal settlements and address development issues such as service delivery backlogs, rapidly-expanding informal settlements, capacity constraints, and international and social dynamics (Holloway, 2003, Graham, 2006, Huchzermeyer and Karam, 2006, Ziervogel and Smit, 2009, Satterthwaite, 2011). CCT officials are aware of some of these external factors that hinder their progress; in particular, issues around rapid in-migration and urbanisation, service and housing backlogs, a lack of available land for development, and high levels of poverty and unemployment. In the context of flood governance, the challenges that the Flood Task Team reported during their feedback session at the Disaster Management Advisory Forum (DMAF) in 2012 (DMAF, 2012) included:

1. Continuous need and high demand for service delivery;
2. Lack of progress reporting of proposed interventions by line departments;
3. Lack of capacity, funding, and dedicated resources;
4. Lack of land for relocation;
5. Communities building houses on existing infrastructure, which damages/blocks infrastructure (*i.e.*, stormwater, sanitation, electricity, water, etc.);
6. Reluctance of affected communities to move to identified sites because those sites are too far away; and
7. Impossibility of preparing for every possible eventuality, despite a wide range of contingency and preventative measures already being in place before the winter season.

In Anderson's (2010) research on the Flood Task Team[55], she found four main challenges to flood management in Cape Town:

1. Residents settling in flood-prone land;
2. Lack of available, suitable land to provide serviced housing to at-risk people;
3. Gap in what is outlined in policy and what happens in practice; and
4. Lack of public participation.

Although my research corroborated Anderson's (2010) findings, two key challenges emerged, which highlight in particular the complexities of managing flood risk because of its embeddedness in broader socio-political and economic issues:

1. Issues around upgrading housing, the lack of available land for relocating at-risk communities, and the politics of relocation and in-situ upgrades; and
2. Individual (*i.e.*, not collective), piecemeal, and once-off/short-term 'flood management' strategies that increase or shift risk, instead of reducing risk.

These two challenges are described in more detail below.

5.1. Issues around land, space, and relocation

The lack of land in Cape Town is a major challenge that was highlighted by the CCT officials and the Flood Task Team. The lack of land not only increases the risk of flooding for many inhabitants (because they are forced to live and settle on marginal, flood-prone land), but provides a challenge for the CCT to relocate at-risk informal settlements, either temporarily (*i.e.*, during in-situ upgrades or during flood events) or permanently. With regard to the issue of residents settling on flood-prone land, a DRMC official (26/03/2012) and Informal Settlements Management official (2012/03/12) explained how an 'anti land-invasion unit' does exist, but legally and politically there are many constraints for this unit to act and stop people from building shacks on any available land, whether public or private land. Examples of court cases and politically charged situations in South Africa can be found in the literature (Huchzermeyer, 2003, Miraftab and Wills, 2005) and in the media: the Marikana settlement in Cape Town is a

[55] Anderson (2010) only looked at four departments represented on the Flood Task Team: Development Services, DRMC, Informal Settlements Management, and Roads and Stormwater.

perfect example of the political and legal battle that followed the evictions of land occupiers on private land, at the beginning of 2014 (LRC, no date, Daily Maverick, 2014, Knoetze, 2014)

The CCT owns pieces of land in Cape Town, whether for future industrial, commercial, residential, public services, road reserves, or macro-infrastructure (*e.g.*, stormwater infrastructure such as retention/detention ponds). The problem that CCT officials identified was new migrants, backyard shack dwellers, or people who need to move from their current shack/informal settlement seeing this 'open' land and building their houses there. This land could be 'open' for development reasons, as mentioned before, or simply because it is a wetland or detention pond that is dry in summer, but floods naturally in winter. Informal settlements built on private property cannot be serviced or upgraded legally by the CCT, as experienced in the one section of Sweet Home.

> MAYCO member (06/12/2012): *"When it comes to informal settlements, people invade land and choose to locate there. Residents don't ask questions of suitability of the land.* […] *Cape Town people* [are] *able to recognise which land is flood-prone, but people coming outside Cape Town* [*e.g.*, the Eastern Cape] *aren't able to recognise which land is flood prone."*

There are many perceptions, by CCT officials, as to why residents 'invade' open land. One perception is that it is a move of desperation; migrants and inhabitants have no other options and settle wherever they can find land, an issue that is often attributed to housing shortages in South Africa. Another perception is that it is related to economics; some people own multiple shacks in informal settlements and rent them out to others (called 'shack farming'), or people rent out their formal state-provided houses and live in a shack in an informal settlement because rent/rates are cheaper/free. Another perception, which is the most pervasive amongst CCT officials, is that it is purely political:

> MAYCO member (19/06/2012) responding to the evictions in Marikana, Cape Town[56]: *"There has been a concerted effort to invade both private and public land across the city of Cape Town as a means to promote lawlessness and in an attempt to make the city ungovernable. We believe that the situation playing out in Philippi East is an example of these determined efforts to promote the illegal occupation of land for political objectives."*

[56] See Knoetze (2014) for a newspaper article on the Marikana evictions.

CCT officials also highlighted how the process of de-densifying highly dense informal settlements, in order to upgrade the settlement (*i.e.*, to provide services such as stormwater drainage), results in people having to move out of the informal settlement because the number of houses the area can accommodate is greatly reduced. On the one hand, this process can be blocked and politicised because alternative land is not available for those residents who need to move. On the other hand, some residents do not want to move, either permanently or temporarily while the upgrades are happening, because residents fear that the government will not return their houses, or that it is just a ploy to remove them from the area. Some CCT officials highlighted how the alternative land provided to residents, especially for temporary relocation, often lacks adequate services, which exacerbates the existing problems instead of addressing them.

Another issue raised by CCT officials is that if people are relocated permanently from a flood-risk area (*e.g.*, retention pond) to safer, higher ground, then new people simply replace them in those unserviceable, flood-prone areas. Officials highlight how this results in the issue remaining and never being properly resolved. Another related issue is that of who should be relocated first; the normal process involved a 'last in, first out' approach because those residents were usually the ones living the most marginal of the marginalised land (*e.g.*, right in the wetland itself or in the lowest, most flood-prone area), and were therefore seen as the most 'desperate' and in need of relocation more urgently. This approach created conflict and raised issues of social justice because those people who were relocated might be the most 'desperate', but they were not living in the settlement the longest. Officials are therefore concerned that people might consider relocating to very flood-prone areas in order to jump the queue on the relocation and/or housing list. This has resulted in the approach whereby those who live furthest in (*i.e.*, built their shacks in the area first, or less recently) would be relocated first and then people on the edges (*i.e.*, the last to move to the area, who are often in the more flood-prone areas) could slowly move inwards to replace those who had been relocated.

5.2. Risk reduction strategies that shift risk instead of reduce risk

A major challenge to flood risk reduction in Cape Town that CCT officials highlighted was the contradictory approaches of residents and CCT officials, which often exacerbate the problem of flooding instead of solving it. CCT officials argued that residents often try to implement their own ideas and DRR strategies that sometimes work against what the CCT has tried to

implement to address the problem. An example is that of the open stormwater drainage channels that CCT officials choose to construct in informal settlements, and which residents see as posing a health risk (*e.g.*, children fall into the open channels, contaminated water collects in the open channels) and therefore close up or cover. When there is heavy rainfall, this means that the covered or filled in channels are therefore compromised and increase the risk of flooding instead of reducing it. Residents also put bricks or pallets inside or over the open channels to allow them to walk across the channels when they are filled with water (Figure 16); this also decreases the ability of the stormwater channels to drain high volumes of water away and often results in the channels becoming blocked.

Figure 16: Examples of residents filling the open stormwater channels with bricks and covering them with pallets or 'bridges'.
(Source: Joy Waddell)

In other cases, residents often work individually to protect themselves from flood risk, instead of collectively as a community; this results in activities that shift risk from one resident to another. One example of this is where one household digs a trench to divert water away from their house, but because they have not worked with their neighbours, this water often gets diverted directly into their neighbours' houses. DRMC officials explain that this situation is often a result of communities not being advised properly on how to channel water effectively into existing stormwater drainage infrastructure instead of just 'away' from their houses. Another example of residents 'shifting' the risk to their neighbours is where they build sloping roofs that divert the rainwater away from their houses; these sloping roofs are often constructed without

regard for their neighbours, in very densely-packed settlements, which means that the rainfall flows off their roofs and directly into their neighbours' property or houses.

Another problem with some of the initiatives that residents take is that the initiatives increase their risk instead of actually reducing/addressing it, or the initiatives have no impact at all. For example, residents sometimes build their houses below the road or surrounding ground, in order to stabilise their house during floods and protect them from the very high velocity winds that Cape Town often experiences. This means that when there is a high rainfall event, surface runoff either flows down into the person's house (*i.e.*, if they are built below the road level/surrounding area), or the high water table means that their house fills up with water (*i.e.*, if they have built their house down into the ground, to stabilise it).

> Water and Sanitation (31/01/2013): *"People in general would also think that* [it is] *a good idea to dig their whole house deeper into the ground. Then they will call us* [the CCT] *and say, 'look, my house is flooded'. Whereas they're actually creating a flood situation because they're below the water level, and this causes the whole house to be flooded.* […] *In general, people will also try and implement their own ideas, which sometimes works against what we're trying to implement in order to address the problem."*

Another issue relates to residents getting bricks and building rubble from contractors and/or local contacts (*e.g.*, friends, neighbours, family in the construction business). Residents pay a small amount of money to the contractors so that they will dump their building rubble in the informal settlement, instead of a CCT/company-approved dump. Residents use this rubble to raise the level of the surrounding areas, pathways, or even their houses (Figure 17). The CCT officials find this problematic, however, because this rubble is sometimes used to fill in open drainage systems, or is simply washed away into the surrounding infrastructure during heavy rainfall events; this results in critical infrastructure (*e.g.*, stormwater and sanitation drainage, water pipes, *etc.*) becoming damaged, which would then increase the risk of residents to flooding and other environmental/health risks.

Figure 17: Examples of pathways and communal areas covered with rubble to raise their levels and provide access to residents during winter.
(Source: Joy Waddell)

CCT officials also explain how the lack of monitoring of their Sand Protocol results in residents using the sand improperly and then blaming the CCT for its failure or ineffectiveness. The Sand Protocol is carried out in response to residents requesting sand from their ward councillor and/or the CCT, in order to raise the levels of their houses. Residents who receive this sand would instead use the sand to raise the ground level outsider their homes, or to fill flooded pathways and communal areas. This is problematic because when it rains, the sand outside washes away. The sand is also sometimes used to raise the level of the pathways, which creates a gradient that results in surface water flowing 'downhill' from the raised outside path and into the insides of the 'lower' houses; this results in houses filling up with water and possessions being destroyed, which residents then claim from the CCT because it was the CCT who provided the sand in the first place.

6. SUMMARY

In this chapter, I have provided an overview of the flood governance landscape in Cape Town, with respect to the nature of flooding in Cape Town, the key actors governing flood risk, and the current approaches adopted by the various nodes. Although the Flood Task Team is seen by the CCT as the key, central platform for coordinating flood risk management activities, this chapter has highlighted the key role that other actors, including residents, play in managing flood risk.

The current challenges to flood management, especially in terms of a lack of resources (*e.g.*, land) and a lack of know-how (*e.g.*, residents' initiatives that exacerbate or shift risk), highlight the complex nature of flood risk management in Cape Town and how the multiple actors need to work together in order to strengthen flood governance processes. Despite this recognition that multiple actors bring with them multiple capacities and resources, the reality of the different mentalities, perceptions, and approaches of the various actors impacts on the ability of actors to collaborate effectively. In Chapters Seven and Eight, I unpack some of these issues from a nodal governance approach, highlighting how multiple actors bring with them very different mentalities and priorities, and tools and resources that enable them to govern risk.

CHAPTER SEVEN:

THE REALITY OF FLOOD GOVERNANCE IN CAPE TOWN FROM A NODAL GOVERNANCE PERSPECTIVE

1. INTRODUCTION

Using a nodal governance approach, I explore in this chapter the unique characteristics of the actors (called 'nodes') governing flood risk in Cape Town and the factors that impact on their ability to govern. A nodal governance approach helps to map the unique mentalities, technologies, resources, and institutions that the various nodes governing flood risk in Cape Town possess. Recognising the unique characteristics that define each node's actions and decisions is a critical first step to understanding the potential barriers that impact on their ability to make decisions[57].

In this chapter, I discuss how bringing multiple nodes together to reach consensus and carry out collaborative disaster-related activities is a complex and messy process because multiple nodes bring multiple capacities, technologies, and ideologies to these multi-actor platforms. I argue that this inherent 'strength' (bringing multiple capacities together) is also a challenge for collaborative disaster governance because multiple types of knowledge (*e.g.*, indigenous, scientific, engineering, *etc.*) and capacities often result in clashing and contrasting ideologies. These clashing ideologies can impact negatively on the outcomes of the activities and decisions and become a barrier to effective disaster governance. This also makes it challenging, in practice, to adopt a collaborative disaster governance approach, especially in a highly politicised, informalised context such as Cape Town's informal settlements. By identifying the often conflicting mentalities and how these impact on the types of approaches that nodes

[57] A very short summary of some of the key issues discussed in this chapter was presented in a paper at the 5th Resilient Cities Global Forum on Urban Resilience and Adaptation, in Bonn, Germany, 2014. See: Waddell and Ziervogel (2014).

choose to govern, one can start to critically analyse the strengths and weaknesses of each actor in terms of their capacities to manage disaster risk.

2. MULTIPLE MENTALITIES AND UNDERSTANDINGS OF FLOOD RISK AND ITS SOLUTIONS

According to nodal governance theory, mentalities, which refers to the way that nodes think about the issue that they are governing, determine how a node translates these perceptions into action (Burris *et al.*, 2005, Tefre, 2010). By analysing the actions (or lack of actions) of a particular node, one can infer what mentalities are ultimately guiding their actions. Upham *et al.* (2009) argue that perceptions can be biased by pre-existing beliefs and views, and that these perceptions can in turn guide behaviour. Arguing from a cultural theory perspective, Tansey and O'Riordan (1999) state that people's perceptions are not independent of social context; perceptions are shaped by the nature of the social groups to which they belong, and the degree to which they feel bonded to that social group. Accepted in the literature on perceptions of risk is how nodes' perceptions of disasters and risk influence how (and whether) they choose to respond to and manage disasters (Whitmarsh, 2008, Upham *et al.*, 2009); this results in nodes handling DRM and protection issues very differently (Messner and Meyer, 2005). In previous years of flood risk management, for example, civil engineers dominated this field and therefore prioritised technical and financial aspects of flood management, often neglecting socio-economic factors and other social science-related methods (Messner and Meyer, 2005). Adger *et al.* (2009) highlight how these differences in perceptions often create barriers because it makes it very difficult and often impossible for nodes to agree on how to address particular issues.

Fatti and Patel (2013) found in their research on local government and residents' perceptions to urban flood risk in Johannesburg, South Africa, that the perceptions of different actors often did not overlap; this impacted on which solutions were sought and how the solutions were implemented. Ziervogel and Taylor (2008) found similarly in their research on perceptions of climate change in a rural part of South Africa, that local government and residents have different points of entry for understanding various issues. As a result, rural communities and local authorities differed in the types of issues that they prioritised, and thus the actions that they chose for addressing the identified issues.

In Cape Town, nodes governing flood risk are embedded within different disciplines and are guided by different mandates and experiences. These diverse backgrounds in turn shape the way that a particular node defines the problem (of flood risk) and how they approach the solutions and decisions. Roads and Stormwater, for example, is a node that is mostly made up of civil engineers who are trained to see the world in terms of the infrastructure that is needed to divert surface runoff and minimise flooding in inhabited areas. Environmental Health is mostly made up of experts in environmental and public health who see flooding in terms of the hazards and risks that can impact negatively on people's health. DRMC, which is made up of officials trained in disaster and emergency management, often consider the underlying causes of disasters, as well as the impacts that these have on people's wellbeing and livelihoods. Informal Settlements Management, Development Services, and many of the NGOs, on the other hand, have representatives from across multiple disciplines and therefore have a variety of viewpoints and knowledge that inform their mandates and how they approach decisions; whether it is from the perspective of housing, health, environmental, livelihoods, and/or service delivery.

Since each node draws on the disciplinary backgrounds of their officials to inform their decisions, flood risk management approaches by the various nodes are not necessarily conceptualised in the same way across all the nodes. Bringing multiple nodes together, who each draw on a diversity of knowledge, skills, and disciplinary backgrounds, can be both a strength and weakness when governing disaster risk. Multiple nodes with multiple sources of knowledge can result in a variety of solutions for complex problems, but this diversity of experience and knowledge can also result in conflicting ideas and a lack of agreement on the appropriate solutions. In this chapter, I therefore highlight some of the diversity in terms of mentalities, knowledge, capacities, and technologies that different nodes in Cape Town possess, in the context of flooding and flood management.

2.1. Multiple definitions of 'flooding'

Nodes governing flood risk in Cape Town were found to have different definitions of flooding (Table 18) and understandings of the nature of flooding and the actual needs of residents affected by flooding. Nodes saw this mismatch in definitions and understanding as impacting negatively on their ability to reach agreement on how to respond to flooding and which solutions would be more effective. Engineers from Roads and Stormwater, for example, defined

flooding by the level of water (above knee level) and duration of the flood (more than three days). On the other hand, social and health workers from particular NGOs or Environmental Health defined flooding as any amount of water that impacts on and disrupts the livelihoods, activities, and health of individuals. Although residents do not define flooding in technical terms (*e.g.*, height or duration of the water), they often described their experiences of previous 'bad' flooding as the water being "up to their ankles, or midway between their ankles and knees" (29/11/2012), and impacting directly on their livelihoods and well-being.

Table 18: Multiple definitions of flooding by selected nodes

Node	Flooding definitions
Development Services	If the water stays for more than 6-12 hours.
DRMC	A temporary rise in water level or the overflow of water onto land not normally covered by water: results in socio-economic disruption, property damage, or threatens the health and safety of the public. Informal structures are considered to be flooded when they are situated in areas of extensive ponding of water, which has resulted in a substantial amount of water covering floors and areas around dwellings, for an extended period of time (more than 48 hours) (DRMC, 2009).
Mustadafin Foundation	Water seeping from the ground up, not from the top down. If a roof leaks, it is not a flood. If you are shin deep or ankle deep in water.
Roads and Stormwater	Based on a catchment definition: when stormwater runoff exceeds the capacity of drainage systems (natural and constructed) or when ground water flows into structures or when water accumulates in depressions (ponding) (DRMC, 2009). A temporary rise in water level, including groundwater or overflow of water onto land not normally covered by water (CCT, 2002b). Measure flood risk in terms of probability and risk, as given by hydrology and storm models (*e.g.*, 1 in 10 year flood is low risk and high probability, but 1 in 100 year flood is high risk and low probability).
Sweet Home Residents	When the floor is wet; water comes in the door and into the house; blocked channels that overflow and are contaminated with 'green' water; and when there is water outside your house.
Ward Councillor	Anything water-wise that will inconvenience a family/person/community. It doesn't need to be a big flood or be standing water for three days; if the water inconveniences you in your house, then immediately, it is a flood, you must report it, something needs to be done, and the CCT must become involved.

Several nodes were critical of the different definitions and understandings of flooding and the responses by nodes that were based on these definitions:

> Development Services (12/06/2012): *"They call it flooding, but give it a couple of hours and it will drain away.* […] *The* [CCT] *has to provide relief, even if the 'flooding' is not what I would define as flooding."*

> Ward councillor (03/02/2012): *"Sometimes people will say that they are flooding when there is water that can't even fill a ruler* [of] *30 mm. There has been a lot of definitions* [of flooding] *used, even by the* [CCT…]. *Our understanding, given by* [DRMC] *is that when the water is above your knees, then you can regard that as flooding. But you can't say you are flooding just because water is protruding from below and doesn't even reach your ankle. People* [residents in informal settlements] *will say, 'no, we are flooding'."*
>
> The Mustadafin Foundation (25/03/2013): *"If a roof is gonna leak, it's not gonna be constituted as a flood* [by the CCT]*; only if the water reaches your shin height, then it will be constituted a flood. Which I think is very unfair."*

As shown by the three statements above, several nodes indicated that the definitions of flooding used by the CCT nodes are different from the definitions used by residents living in informal settlements. This disparity can be attributed to the community's lived experiences of flooding, versus certain CCT nodes' more theoretical and technical understanding of flooding. A community defines flooding by whether it damages their belongings (*i.e.*, water damage on their furniture, clothes, and/or floor) or impacts on their health (*i.e.*, prolonged damp conditions causes coughs/rashes). The Flood Task Team, on the other hand, has adopted Roads and Stormwater's definition of flooding, which is based on more technical terms (*e.g.*, water is above two metres for an extended period of time). When a community member contacts the CCT to lodge a 'flooding' complaint, the CCT would sometimes identify the reported 'flood' as just a 'wet' situation, or a problem of 'leakages'. DRMC explained how the definition of flooding is often context specific; in one informal settlement, a flood situation is reported immediately if the river floods and residents cannot walk around, whereas in another informal settlement, a flood situation is reported only once water sits around (ponds) for more than a few days.

The lack of a standardised definition of flooding causes frustration when CCT nodes try to evaluate situations, decide on whether resources (*e.g.*, relief, financial, human) need to be activated (or to what extent), and in responding to flood-related 'emergency' calls. Residents also expressed their frustrations at reporting a 'flood' situation to the CCT's call centre, only to be told that it is not a 'flood' (or severe enough). Different definitions of flooding reflect a lack of education/training of nodes, a lack in understanding of the specific and divergent priorities of different nodes, and a lack of communication between nodes. The very different definitions of flooding can also be attributed to the different disciplinary backgrounds of nodes and multiple understandings of the nature of flooding (essentially, their 'mentalities'). Figure 18 illustrates

some of the nodes' perceptions of the nature of flooding; whether they see it as the result of excess water, people living in the wrong place, or both. Most of the nodes felt that flooding was attributable equally to excess water and people constructing their houses in flood-prone areas, although the Health Directorate felt more strongly that it was a problem of excess water, and Roads and Stormwater felt that it was the opposite. Although Development Services indicated that they see flooding as equally a problem of excess water and people living in the wrong places, they explained that they are more inclined towards seeing it as a problem of excess water; this is in line with their directorate's view that informal settlements are part of the current urban landscape, and that water should be moved/diverted to allow people to live where they are.

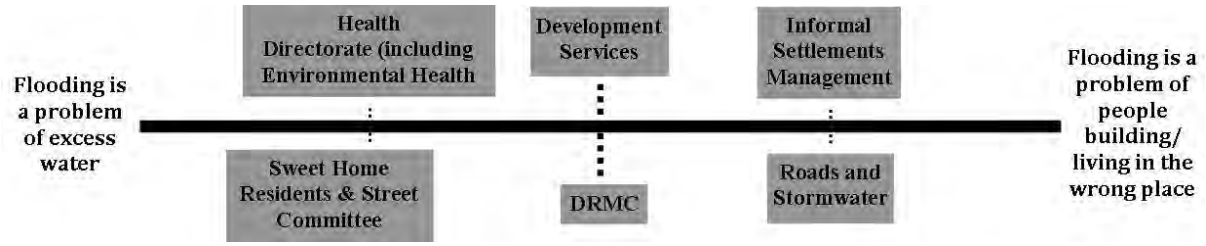


Figure 18: The nature of the problem (flooding) as perceived by the various nodes[58]
(Source: Joy Waddell)

2.2. Multiple understandings of the 'nature of flood risk'

Nodes' understanding of the nature of flood risk is shaped by their mentality, which is understood in this thesis to be a combination of their conception and perception of the world, as well as their disciplinary and knowledge background. For example, DRMC see the city in terms of the multiple hazards and risks posed to residents, infrastructure, service delivery, and events. This much broader view of disasters (*i.e.*, disasters are the result of multiple underlying factors) and the city (*i.e.*, the city is shaped by and embedded in socio-political, historical, environmental, *etc.*, factors) in turn shapes their approach to managing risk across Cape Town. DRMC have a five-pronged approach[59] to DRM that recognises that there are multiple underlying factors that contribute to risk and disasters, and therefore these need to be addressed holistically. This

[58] See Appendix 12 for the original list of questions and responses by nodes represented on the Flood Task Team.
[59] DRMC's five-pronged approach is based on what they call the five 'Es': (1) Engineering and technological interventions; (2) Education and awareness training; (3) Enforcement; (4) Emergency preparedness and response; and (5) Economic incentives.

approach takes into consideration the whole cycle of disasters (from preparedness to response and recovery), and attempts to also address issues that cause vulnerability or strengthen resilience: socio-economic factors, infrastructure, and illegal activities (*i.e.*, law enforcement and issues around illegal dumping of solid waste and/or construction in land not zoned for development/housing). DRMC also recognises the interconnectedness of urban risks and the need to therefore rely on expertise from multiple nodes; this mentality is illustrated through their coordination of the Flood Task Team's activities and the reliance that the DRMC has on multiple nodes' contributions towards the DRAs carried out in their 'high risk' informal settlements.

> DRMC (10/04/2013): *"The underlying causes really need to be addressed, and failure to effectively make inroads into those underlying causes is what is leading to this situation…* [where] *we're* [just] *addressing the effects* […]. *We adding a band-aid* […]. *We* [are only] *managing the effects."*

Roads and Stormwater see the world in terms of the physical interventions (infrastructure) that can be used to improve access, reduce flood risk, and divert stormwater runoff from one area to another. They see the world in terms of the geography, topography, and layout of settlements: high risk areas are therefore identified as those that are located in low-lying areas and depressions, or where there is no stormwater infrastructure that can protect citizens up to a certain level (understood in terms of a 20-, 50-, 100-year flood return period[60]). The challenges to flood governance, as perceived by Roads and Stormwater, lie in residents/society interacting with and disrupting watercourses and stormwater infrastructure. Roads and Stormwater also see the city in terms of the floodplains and catchment areas, rather than as individual settlements (formal or informal); they argue that flood risk can be found across the whole city, and flood risk in informal settlements is only one small component of a much broader issue.

[60] A storm/flood return period (also called recurrence intervals) is defined by the CCT (2002b:xii) as "the average interval between [storm/flood] events". A return period gives the probability of an event of a similar size/intensity occurring in any given year. For a 100-year return period, the probability of that type of event occurring in a given year is therefore 1% (*i.e.*, very low). In Cape Town, the major stormwater systems are designed to cope with large infrequent events (*e.g.*, 20-year and 50-year return periods), while minor systems are designed to cope with more frequent events (*e.g.*, 2-year, 5-year, and 10-year return periods). New developments in Cape Town should be designed to safely contain floods with a 50-year return period, and conditions should be checked for the 100-year return period (although most development types are permissible with limited requirements/conditions within the 'flood fringe' zone, which comprises the area between the 50-year and 100-year flood return period – see CCT 2002a,b). The CCT's guidelines in terms of recurrence intervals (return periods) and where new developments (including residential and critical infrastructure) should be constructed (and protected) are provided in the Roads and Stormwater Department's various policies on stormwater management planning (CCT 2002a,b).

> Roads and Stormwater (08/09/2010): *"Flooding is not only confined to informal settlements, but because of press coverage, that is the perception that is created. There is significant flood risk elsewhere, but the probability of occurrence in a particular year is low so people don't see that often."*

Informal Settlements Management sees the flooding of informal settlements as more of a problem of people being in the wrong place, than of water being in the wrong place. This mentality reflects the main challenges that this node faces, which relate directly to the spread and high-densification of informal settlements and trying to manage people who occupy low-lying, poor-draining areas that are not suitable for residential use (in their present state).

A theme that emerged from interviews and workshops was the perception of flooding being a completely overwhelming problem; CCT nodes highlighted how the lack of finances, resources (*e.g.*, land), and political support made it almost impossible to solve the issue of flooding, while residents often explained how their lack of know-how and resources made it almost impossible for them to reduce their vulnerability to flooding. This mentality of flooding being 'overwhelming' can lead to inaction by CCT nodes, who feel that they lack the human resources, skills, and finances to address the problem. This mentality can also lead to inaction by residents, who feel that they lack the capacity, knowledge, and resources to protect themselves. Flooding is perceived by residents to be a recurrent phenomenon that is beyond their capacity to prevent, which often creates a mental obstacle to addressing risk.

> Informal settlement community leader[61] (21/02/2013): *"When it's raining a lot… the water… it's like a dam outside. Like a river.* […] *The things I am trying to do about flooding, to help my community, is to just go report to the councillor… to bring us some sand so that we can throw outside the house. That's the only thing I can do."*

> Graveyard Pond[62] resident (21/02/2013): *"I really doubt that there's that much that* [the CCT] *can do, except for relocating the people; because really, that place is meant for the water, not for the people to live.* […] *Unfortunately for us, we are living in a detention pond. There's not much* [the CCT can do] *because the area we're living in is in a lower place and it's meant for the water."*

[61] A resident (and community leader) living in a re-blocked informal settlement called Sheffield Rd, located 5 km away from Sweet Home in Philippi, Cape Town.
[62] Graveyard Pond is an informal settlement built in a detention pond in Philippi, Cape Town. Drivdal (2011a,b) and Organio (2012) conducted some research in this informal settlement and some of Graveyard Pond's residents attended FliCCR's workshops.

Residents feel that they are incapable of doing anything to reduce their individual or community's flood risk; they therefore rely completely on the government because the government (CCT in the Cape Town case) is seen as having the financial resources and technical expertise to solve the issues.

> Sweet Home resident (21/05/2013): *"We wish there is a lot we could do ourselves, but we do not have the resources to do things on our own. All we can do is to cry out to the government and tell them about the problems affecting us."*

This fatalistic perception and residents' complete reliance on the CCT and external nodes to manage flooding makes it challenging for CCT nodes to encourage residents to proactively address their individual and community-wide flood risk. CCT nodes' mentality of flood governance in Cape Town as a completely overwhelming and complex problem is based on their experiences of having to manage flood risk in the face of the following issues:

1. the massive scale of problems: *e.g.*, growing informal settlements, service delivery backlogs;
2. the limited resources to address the problems: *e.g.*, uneven ratio of CCT officials to residents/need, limited land for relocation, limited tax base that limits available finances;
3. and political interference or the lack of political backing: *e.g.*, residents damaging critical infrastructure when demanding services and housing; and South African political parties using residents in informal settlements to either gain votes or make the majority political party look bad.

Many of these issues are related to two major challenges when it comes to flood governance:

1. the often unclear and blurred understanding of the real needs and capacities of residents and the perceptions of each node with regards to residents' behaviour and the types of solutions that residents implement; and
2. the lack of communication between nodes and the CCT, which often excludes residents from decision-making and planning (*e.g.*, very non-transparent, state-centric planning processes).

3. NODES' DIVERGENT NEEDS AND PRIORITIES

There is a mentality by CCT nodes that they know what is best, as the professionals and experts in the field of DRM, service delivery, stormwater maintenance, environmental health, *etc*. This mentality often translates into plans and actions where CCT nodes make the decisions and implement designs that do not necessarily align with those of residents and other nodes. An example of this in the Cape Town is the open stormwater channels that Roads and Stormwater has designed and built in many of Cape Town's informal settlements. These open drainage systems (called hyson cells) are seen by Roads and Stormwater engineers as the best design for highly dense and topographically challenging informal settlements; hyson cells are cheap to construct, flexible (*i.e.*, easy to build in small, tight spaces), and easy to clean and unblock when filled with solid waste, rubble, and sediment. Residents, on the other hand, argue that open drainage systems are a bad solution for flooding because they create a range of risks: they are unsafe for children (*i.e.*, children play in the open channels and can drown or get infections from contaminated water), they easily fill with solid waste and become blocked, they are often filled with contaminated, foul-smelling 'green' water, and they block residents' access to their homes/driveways (Figure 19).

Figure 19: Examples of open stormwater channels in Sweet Home, which are blocked by solid waste, filled with contaminated water, and where residents have placed concrete pipes, sandbags, and/or rubble and sand to bridge open channels.

With the aim of mitigating the risk of these stormwater channels becoming blocked and collecting contaminated water, as well as providing access to their driveways/shacks, residents often fill in these open channels with rubble and sand, or lay concrete pipes, sandbags, or wooden pallets across the open channels. CCT nodes, especially Roads and Stormwater, perceive these actions by residents as 'bad behaviour' because it exacerbates the risk of localised flooding and makes it challenging for Roads and Stormwater to maintain and unblock the channels.

> Environmental Health (10/04/2013): *"Unfortunately the channels are quite deep. People had to access their driveways, had to access their homes. So what they* [residents] *used to do, they used to fill up the channel to pull the vehicles into the yards, or whatever."*
>
> Water and Sanitation (24/04/2013): *"People in general will put rubble in there* [the stormwater channels]*, so they can get into their yards. They would also dump solid waste in there.* […] *If this* [resident] *now wants to get to a* [solid waste] *container on this side of the road where they can dump their solid waste, he's not going to walk through all this water. So they dump it* [the solid waste] *next to the road. And that obviously blocks everything."*
>
> Informal Settlements Management (03/12/2012): *"People have built on top of the main water supply pipes of the* […] *area. And last year we had an incident where some of the pipes were so damaged by the people building there… they* [residents] *knock it* [the water supply infrastructure]*.* […] *The water then came through the areas where it was damaged.* […] *they* [residents] *had to sweep the water out* [of their houses]."

Findings from Mozambique and Nepal on community risk perceptions show that risks highlighted by local authorities (*e.g.*, disaster risk managers) are not necessarily the same as those prioritised by communities: for example, residents ranked issues such as cholera, earthquakes, and hunger lower than issues of governance and poverty (IFRC, 2009). Ziervogel and Taylor (2008) found similarly that actors at different scales (*e.g.*, village level versus local municipality) had very different priorities and needs, which influenced how they chose to address those issues and which types of responses they prioritised. Ziervogel and Taylor (2008:37) attribute these differences in priorities and actions to the different levels and types of actors and their "access to resources (including funding), decision-making power, and [the] extent of influence and responsibility" that these actors have.

In Cape Town, because the priorities of residents and local government often do not align, there is this perception by residents that the local government is doing nothing for them. For example, residents prioritise housing and services in the face of ongoing flooding, and not the clearing of drainage systems or the provision of disaster relief. One resident in Graveyard Pond informal settlement[63] started saying in the interview that the CCT was doing nothing for them, but as he started remembering some of the activities that the DRMC did carry out in his informal settlement, he concluded that the CCT was actually helping them:

> Graveyard Pond resident (21/02/2013): *"They* [the CCT] *are doing nothing! For instance when there are rains, or floods, they… provide us with a blankets. And helping people with maybe… soups when they have no places to go. And they* [the CCT] *provide us with walls in the community. And they also provide us with the teaching before floods;* [for example] *how to handle floods, what must we do when there are floods, and all that stuff… So I wouldn't say they* [the CCT] *are not helping..."*

In this example, because the government is not providing houses and services, which are high priority needs for residents, the government is seen as doing nothing; this is in spite of the long list of flood risk reduction activities that are implemented currently by the CCT (see Tables 16 and 17 in Chapter Six). Residents tend to also de-value the responses provided by the CCT because these responses are not aligned with their immediate priorities: the blankets are seen as causing more problems, the sour milk does not keep them warm during the wet/cold winters, the soup only helps them for a very short time, and being relocated temporarily to a community hall does not make the problem go away. The overall mentality of residents is thus very negative towards short-term, reactive responses by the CCT.

The Isandla Institute (2011) sees contestation in South Africa' service delivery as a result of differences in priorities within government structures and in different local communities. CCT officials, residents, and external actors often have very different priorities (and needs); for example, local municipality is concerned with macro issues, whereas local communities are more concerned with the micro issues. CCT nodes highlighted how they also often had very different priorities amongst themselves, which are challenging to align. CCT nodes highlighted how they lack the resources and time to address all the priorities and needs that exist in Cape Town. Residents in informal settlements, for example, have an urgent need for services, but assessing the risk is a lengthy process and the backlogs for services are already so high. This

[63] An informal settlement built inside a retention pond in Philippi, about 5 km east of Sweet Home. See Drivdal's (2011b) report on the flooding situation in Graveyard Pond.

notion of authorities being responsive to the priorities and needs of residents is termed by Satterthwaite and Dodman (2013) as the 'political dimension' of resilience. In order for cities to be more resilient to disasters and climate change, local authorities, who have the power to provide services and address the needs of citizens, need to be genuinely responsive to those needs. As seen in the Cape Town case study, and as echoed by Welsh (2014), this political dimension is often overlooked.

> Environmental Health (10/04/2013): *"Everybody's got their own priorities, and what might be a priority to us is not a priority to somebody else, or for another department.* […] *The case in point: we sent through an issue about solid waste. Compared to what they* [Solid Waste Management] *were dealing with, that little solid waste that we were complaining about was nothing comparing to what they had to deal with. So they* [Solid Waste Management] *have ten tons of the stuff lying somewhere else and we were complaining about 500 kilos. So what is more a priority? Everyone else got their own priorities and unfortunately, we just have to wait until such time as they* [other CCT departments] *can come and deal with our problem. And we also have to be understanding… in our case, the resources are stretched to the limit."*

4. THE ROLES AND RESPONSIBILITIES OF NODES: A WAY TO GOVERN THAT IS SHAPED BY THEIR MENTALITIES

From a nodal governance approach, I argue that the roles and responsibilities of nodes are both a mentality and a technology. The various roles that nodes play (*i.e.*, a method for exerting influence and thus a technology) are shaped by the various responsibilities that nodes have. These roles and responsibilities, which refer to the mandates and activities that nodes have, are also shaped by and reflect each node's disciplinary background and how they think about the world (*i.e.*, their mentalities).

Emerging from the data are four key roles that nodes are seen as having in the context of flood governance: coordinating, monitoring and reporting, operational, and response and relief provision (Table 19). Roads and Stormwater explain how there are operational boundaries that the CCT has to work within; for example, Roads and Stormwater are responsible for anything that impacts on their roads and stormwater infrastructure, while Solid Waste Management or

Water and Sanitation are responsible for issues relating to solid waste and water and sanitation, respectively. Despite these clear operational boundaries (*i.e.*, roles and responsibilities), the activities, or lack of activities, of one node might impact on another node. For example, residents dumping solid waste might cause blockages in stormwater systems, or solid waste failing to remove solid waste one week due to strikes/protests might result in solid waste blocking the stormwater systems. As explained by Roads and Stormwater (09/11/2011), any non-performance by one department might reflect badly on other departments.

Table 19: The multiple roles/responsibilities of selected nodes, with regard to flood governance

Node	Roles and Responsibilities
Development Services	**Coordinating** service providers and other CCT nodes responsible for providing/maintaining services in informal settlements.
DRMC	**Coordinate** other nodes on the Flood Task Team to holistically identify and address flood risk. Activate external nodes to provide relief during flood events.
Environmental Health	**Monitoring** of health- and environment-related risk factors in informal settlements. **Reporting** of issues (*e.g.*, faults, leaks, broken/disrupted services) to relevant nodes.
Informal Settlements Management	**Monitoring and reporting** issues that arise in informal settlements. Assessing and coordinating the upgrading of informal settlements – coordinating nodes in this respect.
Jungle Theatre Company	Implementing the DRMC's education and awareness campaign (**operational**).
Mustadafin Foundation	**Provision of relief** during and after a flood event.
Roads and Stormwater	Providing and implementing roads- and stormwater-related services in informal settlements. Maintenance of related services where necessary (**operational**).
Solid Waste Management	Providing and implementing solid waste-related services in informal settlements. Maintenance of related services where necessary (**operational**).
Sweet Home Residents	**Reporting** and **monitoring** issues in their informal settlement, which might increase their risk and/or impact on their well-being, to the street committee and/or community leader. Receive relief/resources during/before flood events.
Sweet Home Street Committee	**Reporting** and **monitoring** issues in their informal settlement to the CCT and/or ward councillor. Distributing and **coordinating relief/resources** during/before flood events (**operational**).
Ward Councillor	Channel resources to their ward (**operational**). **Coordinate** other nodes to respond to calls/complaints from residents. Play and oversight role.
Water and Sanitation	Providing and implementing water- and sanitation-related services in informal settlements. Maintenance of related services where necessary (**operational**).

During FliCCR's workshop in November 2011 with Flood Task Team representatives, each department was asked to discuss where their core flood management activities (flood responses/strategies) lay. Each department was asked to place themselves on a spider matrix; the final outcome is presented in Figure 20. If a particular flood management response was seen as core to their current operation, the department was asked to place themselves near the centre of the spider matrix. If they were not centrally involved, then they were asked to place

themselves at the edge, or along the line depending on the extent of their activities. Roads and Stormwater felt that they play an advisory role in terms of relocation. DRMC argued that they play a central role in terms of temporary relocation for flood-affected households, but sit on the periphery in terms of permanent relocation activities (which is the mandate of Human Settlements). The Health department saw their central role as making recommendations for infrastructure upgrades, spatial planning and regulation, and proactively supplying materials to at-risk household. The Health department argued that they play a central role when it comes to temporary relocation.

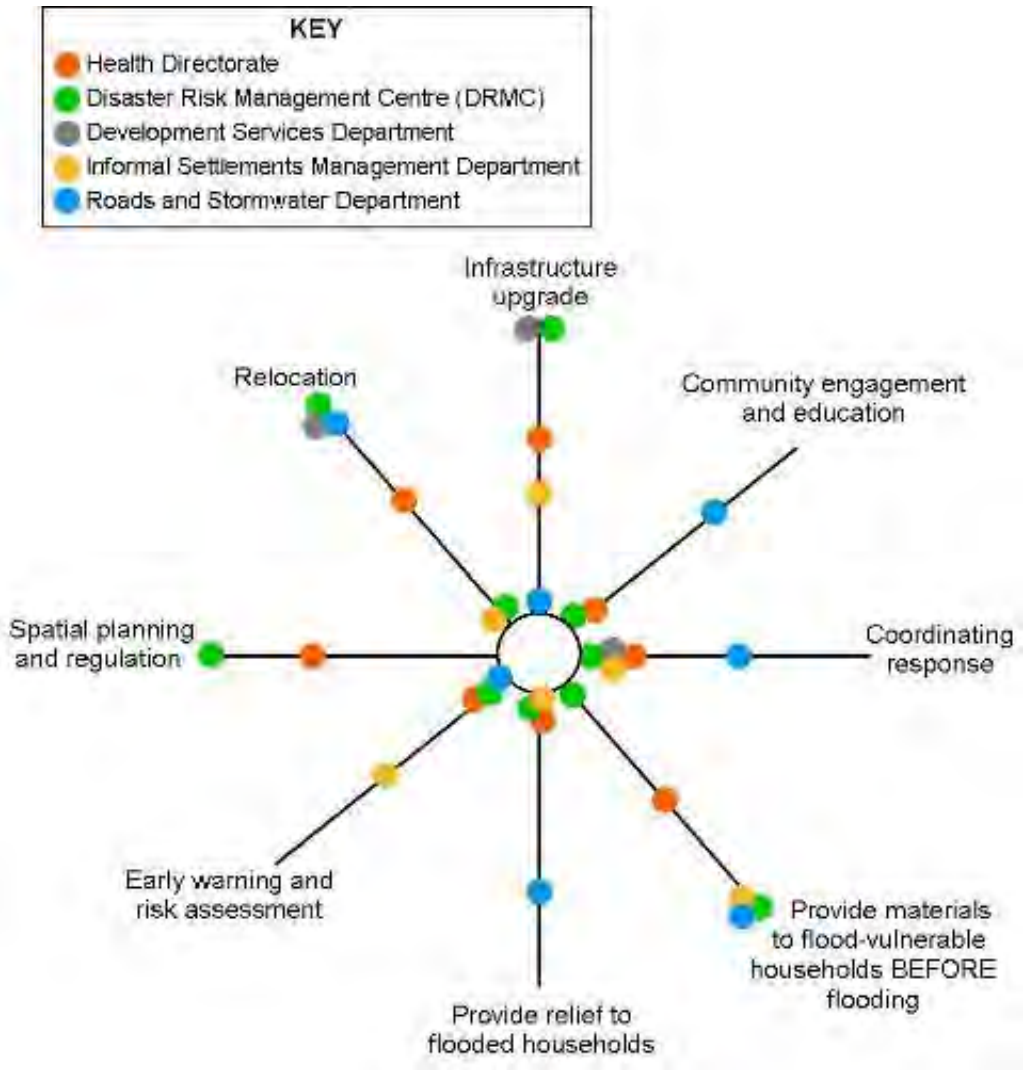


Figure 20: Spider matrix showing where CCT nodes position themselves in terms of central versus peripheral roles that they perceive themselves as playing
(Source: FliCCR's workshop, November 2011)

There is often a mismatch in how other nodes see a particular node's role, which can cause frustration or an overlap in activities that nodes carry out. For example, Environmental Health identifies their role as monitoring and reporting, yet residents perceive Environmental Health as playing an operational role (*i.e.*, delivering services and repairing/maintaining infrastructure). When issues are identified by Environmental Health field officers in an informal settlement (*e.g.*, a leaking toilet), residents expect those officers to fix the problem immediately. However, Environmental Health's role is to report these issues to the right CCT node (*i.e.*, Water and Sanitation in this case) because they are not equipped (financially, and expertise- and mandate-wise) to fix these issues. Residents do not see this, as it is a very non-transparent process, and instead the residents get frustrated with (and often abusive towards) any Environmental Health officials who are seen, by the residents, as not doing their perceived 'operational' job.

Water and Sanitation also identified how their 'operational' role is misunderstood by other CCT nodes that often rely on Water and Sanitation to 'coordinate' activities or respond to issues that are beyond their mandate and for which they lack the resources (financial and human). Referring to the call centre that they run, called the Technical Operations Centre (TOC), Water and Sanitation explained how other CCT nodes often use this call centre for any issue, even when it is obviously not Water and Sanitation's responsibility, expecting Water and Sanitation to address the issue.

> Water and Sanitation (24/04/2013) referring to an issue that was sent to their TOC: *"Like that thing that came through this morning* [issue related to unpaved roads in an informal settlement]*. It's obvious that is a transport department* […] *public transport has to see to it. They send it to us. We send it to the* [CCT's centralised] *TOC saying 'Guys, there's a public transport problem, send it to them!' They send it back to us."*

This issue causes frustration for Water and Sanitation because although they send the call to the CCT's centralised TOC, the issue is still noted as a Water and Sanitation call on the CCT's internal notification system, called the C3[64] system. Water and Sanitation argued that other CCT nodes relying on them to carry out activities beyond their mandate is also an issue that causes frustrations; this is related to a lack of clarity of nodes' roles and responsibilities, as well as an

[64] This system allows CCT nodes to log and track issues. Any calls made through the various CCT's call centres are recorded and logged on the C3 system. Any other CCT departments and ward councillors can see the log to track its progress. The notification will only be closed once the issue has been addressed. Through this system, the CCT can track progress, hold departments accountable, and measure how long it took departments to resolve notifications (thus an indicator of delivery success and improvement). For more info, see CCT (2010).

issue of nodes not wanting to take extra responsibility. Although issues are diverted towards Water and Sanitation, the necessary resources (human and financial) are not made available:

> Water and Sanitation (24/04/2013) reflecting on an example of Informal Settlements Management organising a fieldtrip to an informal settlement, which multiple nodes were expected to attend: *"Since yesterday, I received a call from a guy from Roads and Stormwater that we must send out our surveyors to level the areas* […] *and our internal guys asked us to pay for the graders that the Roads* [and Stormwater] *guys will send out. And I think that they* [Roads and Stormwater] *must go to Human Settlements. It's nothing to do with us!* […] *You see, everybody comes to us because it's water and sanitation, so we must pay for it.* […] *The whole attitude* [in the CCT] *is that* […] *if there's a door broken, it doesn't matter, it must come to us.* […] E*veryone agrees that it's not our function. But no-one says, 'hey, I'll take it'. Keep it* [they say, but] *we'll complain about* [when something goes wrong]. […] *Now, if they said, 'Alright, we'll send you all the people. We'll all send you so much admin, so much more managers to handle the situation.' It's fine! But they said, 'No, no, no, we haven't got money for that… but take responsibility!"*

A lack of resources and capacity to take on certain responsibilities or to address flood risk properly is also an issue that nodes highlighted. Although the issue of resources and their impact on nodes' ability to govern is the central focus of Chapter Eight in this thesis, an important point to note here is how a lack of resources can exacerbate the perception of flood risk being an overwhelming problem, as well as cause additional frustration with regard to nodes' actual (and perceived) roles and responsibilities. During interviews with senior DRMC officials, they identified housing delivery as one of the key solutions for addressing flood risk. The delivery of proper housing in planned/serviced areas that are not flood-prone is argued by many CCT nodes to be the ideal (and often only) alternative to residents living in flood-prone informal settlements. Although DRMC see the need for housing delivery, their hands are tied in this regard because it is not their mandated role to provide housing[65], and they lack the resources (*e.g.*, land, housing material, and human resources) for housing delivery. DRMC therefore recognise that their responses to flood risk will always be insufficient in the current

[65] At the time of the interviews with DRMC officials in 2012 and 2013, housing delivery was constitutionally a national government competency, through the national Department of Human Settlements. Local government (*i.e.*, the local municipal department of Human Settlements) was only mandated to provide the services for housing (*e.g.*, roads, electricity, and stormwater). In 2013, the CCT was in the process of applying to national government to become a housing provider; if this was successful, which it was (2013/2014), the CCT could then provide housing on local government land. However, a lot of the land in Cape Town is owned by different levels of government, which complicates any process of identifying/procuring land to build houses on.

context because for them, the underlying causes of flooding are low-quality housing (*i.e.*, shacks) on inappropriate land (*i.e.*, flood zones, wetlands, and retention/detention ponds).

CCT nodes often explained how residents had the 'wrong' perception of what the CCT nodes' individual roles were. When residents were asked who should be responsible for responding to flooding, for example, their responses were either 'the ward councillor' or 'the CCT'. This widely held perception that the CCT is responsible for flood mitigation/risk reduction reflects not only a lack of communication/awareness from the CCT to residents about the structure of the CCT and each department's specific roles/responsibilities, but also reflects the CCT's very opaque planning and implementation processes. Although information about the CCT's structure and specific departments are available on the internet (*e.g.*, the CCT's official website) and in policies/documents made publicly available at local libraries, most of the residents living in flood-prone informal settlements are unable to access this information: they are far away from a local library, they cannot read (or read English or another 'official' South African language), and/or they do not have access to electricity and/or the internet. The 'opaqueness' of local government processes is also an issue that results in field officers from different CCT nodes, who have very specific functions and roles in informal settlements, being seen as the 'face' of the CCT, and therefore in the firing line of any discontent, misunderstandings, or conflict that residents bring (*i.e.*, as discussed earlier with regard to Environmental Health).

The matrix in Figure 21 on page 154 illustrates how nodes in Cape Town position themselves in terms of whether they see flood risk as the responsibility of local government or civil society, and the degree to which civil society should be involved in developing flood risk reduction strategies. From this matrix, it is clear that none of the nodes see flood risk as civil society's responsibility to address, with the Mustadafin Foundation and Environmental Health department as the only two nodes who perceive the responsibility of flood risk as needing to be shared, to some degree, with residents. Nodes disagreed on the extent to which residents (civil society) should be involved in decision-making and the implementation of flood risk reduction activities. Although Roads and Stormwater lean more towards seeing flood risk as the state's responsibility, the need for residents to 'share the responsibility of flood risk' was articulated in interviews with one of the senior officials from the department:

> Roads and Stormwater (08/09/2010): *"How do we convey the information and then how do we engage the communities in a way that they will* [know how to….] *share risk with us… there's some things that* [residents] *can do* [to share risk]. […] *We recognise that the* [CCT] *can only protect and only offers to protect up to a certain*

storm event. And beyond that, it is generally accepted that the communities are on their own and we [the CCT] *have to manage the consequences through the disaster management processes.* […] *How do we share this risk? And how do we* [the CCT and residents] *work together on minimising it?"*

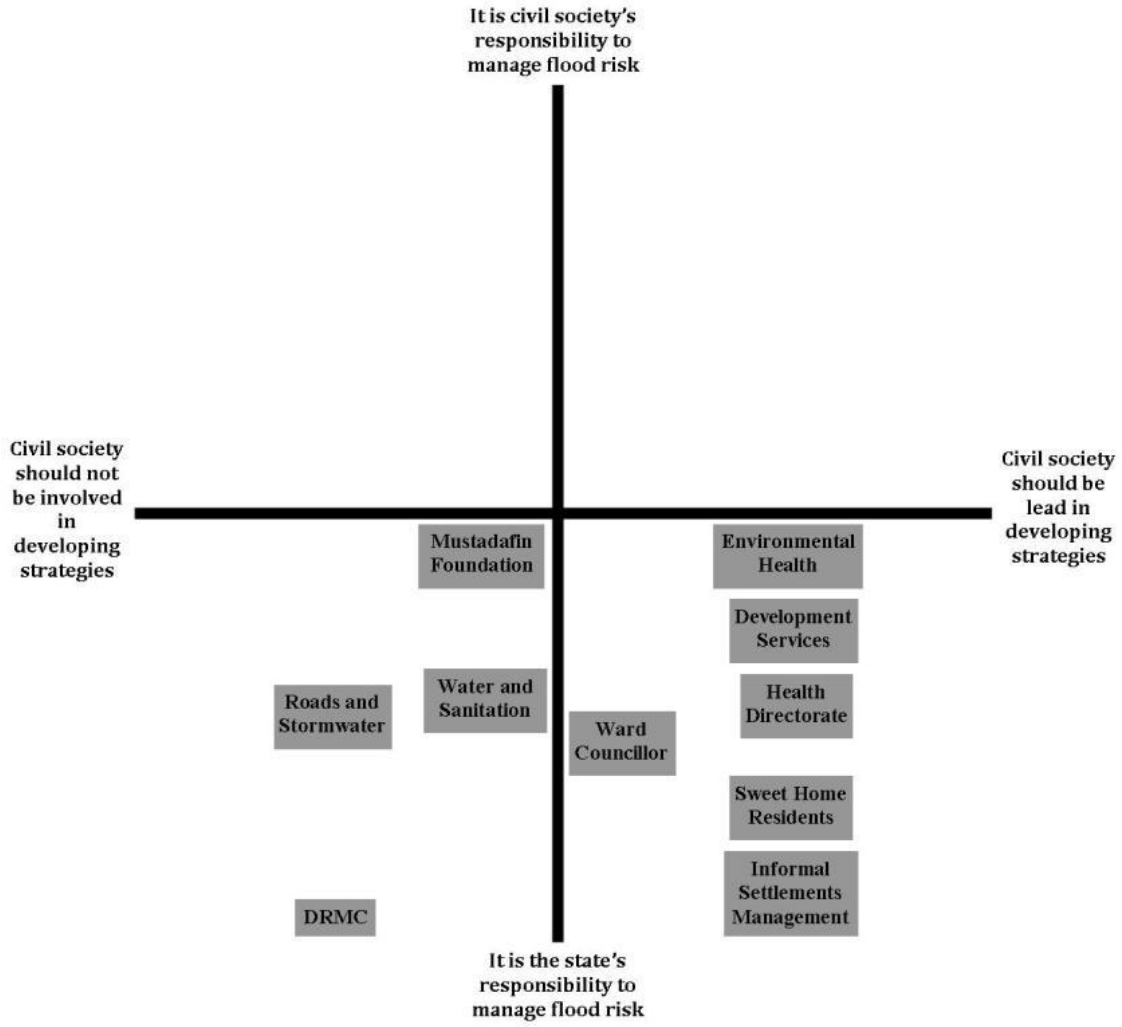


Figure 21: Matrix highlighting how nodes position themselves with regard to who should be responsible for managing flood risk and developing flood risk reduction strategies[66]
(Source: Joy Waddell)

DRMC indicated that although it is the state that is currently responsible for tackling food risks according to legislation, residents are also seen to help on the ground. The DRMC valued, for example, the input and advice from residents living in flood-prone areas because residents

[66] This matrix was made using feedback from Flood Task Team representatives during FliCCR's workshop in November 2011 (see Appendix 6 and 12) and from responses during interviews with these actors.

know the local context best. This is in contrast to evidence from the interviews with various DRMC officials that highlighted how the DRAs were not informed by residents and communities, but driven only by input from other CCT departments and external experts (*e.g.*, Aurecon, an engineering-focused consultancy company). The Health Directorate expressed how, although it is the responsibility of the state to manage flooding, it is the residents who manage (and often fail to manage, in their view) the flood risks currently; this node is referring here to the reactive 'coping' activities that residents carry out before/during flooding. Development Services felt strongly that it was the state's responsibility, both at the policy and the implementation level. This disagreement between nodes in terms of their understandings and perception of who currently manages risk and who should manage what level of risk, impacts on the extent to which residents are allowed (or encouraged) to actively participate in current flood risk reduction activities. There is still a very state-centric, top-down approach to disaster governance in Cape Town, despite what some CCT nodes say in terms of the extent to which they engage with residents.

There are many contradictions in the responsibilities that nodes perceive each other as having in terms of managing different issues and types (and levels) of flood risk. Public discourse and statements from most of the nodes interviewed indicate that flood management is the CCT's problem and that residents do not take responsibility for protecting themselves from flooding. Many residents see flooding as the CCT's problem and expect the CCT to manage all types (and levels) of flood risk: localised flooding in a communal space or directly in front of an individual's house are both seen as the CCT's responsibility to address. Residents seeing DRM as the 'government's' responsibility is not uncommon in other case studies; for example, Taş *et al.* (2013) find this same perception in Turkey. This perception by residents often results in residents not taking the initiative to protect their houses from flooding; although some residents expressed how this 'lack of proactive action' is the result of not having the right resources (financial and physical) and/or lacking the know-how to protect themselves. Roads and Stormwater (08/09/2010) argue that residents do not 'share' the risk with them (*i.e.*, do not take some responsibility for reducing their flood risk) partly because they lack the knowledge on flooding and on how to 'share' this risk.

> Roads and Stormwater (08/09/2010): *"People* [residents] *don't want to take their own responsibility for their own drainage issues and they try and pass problems to neighbours.* […] *And even the basic preparation* [for floods]*…* […] *the basics like 'clean your roof gutters. Make sure your roofs are sealed.'* […] *'Dig channels around your houses'* […]*. Those messages go out* [from the CCT]*, but I wonder who actually does*

> *anything?* […] *How do we share this risk* [flooding]*? And how do we work together on minimising it?"*

> Roads and Stormwater (08/09/2010): *"I think that the whole communities' understanding of* [flood] *risk is a huge gap.* […] *How do we* [the CCT] *convey the information and then how do we engage the communities in a way that they will* […] *share risk with us."*

CCT nodes argued that residents should 'change their behaviour' and take responsibility for localised, minor flooding that is a direct result of their perceived inaction (*e.g.*, houses leaking because they were not waterproofed before winter). CCT nodes expressed how they would like communities to share the management of flood risk, by undertaking their own interventions at a household level; for example, ensuring water can drain away from buildings, not dumping solid waste in drainage systems, reporting any blockages/broken taps, and 'waterproofing' their shacks. A Health department official (09/11/2011) explained how this idea of making residents 'responsible' for certain risks is very difficult to explain and implement; residents living in formalised areas own their house and are therefore responsible for any flooding that happens in the house (*e.g.*, blocked drains and leaking roofs are repaired at their expense), but residents in informal settlements do not own the land that they live on (*i.e.*, it is often the public or private land), and they cannot afford or do not have the incentive (*e.g.*, tenure) to 'fix' issues.

> The Mustadafin Foundation (01/03/2013): *"We must get community involvement* [in flood risk management]*. That they* [residents] *should take responsibility for their own areas. They* [residents] *should take responsibility of keeping the catchment areas of the rivers* […] *clean. They* [residents] *shouldn't dump* […] *their waste in drainage.* […] *The CCT also plays a big role in collecting this* [waste dumped in drainage]*. But as an NGO, we need to educate these people how to take care of their areas* […]*."*

> The Mustadafin Foundation (01/03/2013): *"People* [residents in informal settlements] *will come and say, 'I need relief because my roof is leaking'. But that is not the problem of the CCT. Because they* [residents] *need to fix their roof before the rain comes."*

DRMC described a situation where a blocked stormwater drainage channel (in an informal settlement) had flooded the surrounding area, including a resident's house. When the DRMC official asked the resident why they had not dug a trench to divert the water away from their

house and into another unblocked channel, the resident said that the CCT should dig the trench for them, or pay them to dig the trench. The often fatalistic mentality that residents have, in combination with an entitlement attitude (whether real or perceived by other nodes), makes it challenging for CCT nodes to engage with and invite residents to participate in decision-making and implementation. On the other hand, there is recognition by some CCT nodes that once residents are included in decision-making and are actively participating in risk reduction activities, their fatalistic and entitlement mentality might change. In response to the question "how have you or your neighbours tried to stop flooding", one Sweet Home resident (04/12/2012) said:

> *"How!? To stop flooding!? Eish… it's not easy to stop flooding. As I mentioned, concrete* [as a way to raise your floor level]*: not everyone is able to afford to buy concrete.* […] *First, you must be a very clever man.* […] *Not everyone can do it.* […] *Sometimes you can just protect your house around* [with concrete]*, but when it's raining… you just get some holes in your house and water comes in. So there's no way whereby you can stop to flooding. There's nobody knows how to stop the flooding. Because when it happens, it happens.* […] *You can walk around and* […] *you see that person was trying to control… to stop flooding. But it doesn't."*

The contested roles and responsibilities of nodes impacts on their capacity to carry out their tasks and ultimately impacts on the ability of nodes to reduce flood risk. An example of this is the very contested, unclear, and overlapping responsibility related to the cleaning of solid waste from stormwater channels. CCT nodes and residents are unclear as to who is responsible for unblocking stormwater channels that are blocked with solid waste. Solid Waste Management argue that the responsibility belongs to Roads and Stormwater because the blockage is in their stormwater systems, while Roads and Stormwater argue that the responsibility is Solid Waste Management's because it is an issue of their solid waste not being cleared properly from surrounding areas and thus falling into their drainage systems. Related to these contested responsibilities is the issue of who is responsible for clearing the waste that is removed from the stormwater drainage channels and dumped on the roads, alongside the channels. Again, nodes are unclear as to who should take responsibility for this, which results in nothing being done:

Discussion between four DRMC officials (31/01/2013):

DRMC #1: *"In some instances, there's a lot of grey area. Typical example is solid waste. What's the story where the roads* [department]*... they put the debris outside? And then someone else must come and pick it up and collect it?* […] *There's always the big question about why Solid Waste Management can't just take it away? "*

DRMC #2: *"The guy who removes it from the river, he can't cart it away."*

DRMC #3: *"He just leaves it there. Someone else can come fetch it."*

DRMC #4: [Departments are] *"working in silos* […] *each department just does what he thinks is his portfolio."*

Complaints related to this issue are difficult to log on the CCT's C3 system because residents and CCT nodes are unclear about which department to call. This often results in prolonged, unnecessary delays in addressing the issue, no assistance at all, or more often than not, nodes being blamed for the failures. Roads and Stormwater blame Solid Waste Management, for example, for not providing sufficient blue refuse bags to residents, thus resulting in residents dumping waste rather than sending the blue refuse bags to the appropriate collection points. Solid Waste Management blame residents for not disposing of their waste appropriately in the waste collection skips or containers, and also blame their EPWP workers for failing to unlock the waste containers or cleaning the communal areas properly. These examples of 'finger-pointing' and blame complicate the issue and create a mentality of distrust and fatalism, instead of constructively trying to address the underlying issues.

Stoker (1998) summarises 'governance' as being the new set of managerial tools and techniques that actors use for collective decision-making and action. Since an essential part of governance is to blur the boundaries (and thus responsibilities) between state and non-state actors, Stoker (1998) argues that governance can often create ambiguity and uncertainty; particularly in the minds of policy-makers and the public, with regard to who is responsible. This blurring is also seen by policy-makers and the public as creating the space for government actors to "[pass] off responsibility to privatised providers when things go wrong" (Stoker, 1998:22] and for 'scape-goating' and 'blame avoidance' to take place. Stoker (1998:22) argues that although blame avoidance and scape-goating are "not new political phenomena", governance structures can "extend the capacity" for this to take place, with actors blaming others for failures and challenges. As shown in this previous section, this type of scape-goating and blame avoidance is very evident in Cape Town, with city officials and residents pointing fingers at 'the other' for various reasons. This scape-goating is arguably the result of unclear roles and responsibilities of

each node, as well as a lack of accountability and transparency in service delivery and DRM planning and decision-making.

5. THE TECHNOLOGIES ADOPTED BY NODES TO GOVERN

Technologies refer not only to the structural and non-structural interventions that nodes use to reduce flood risk, but also to the set of methods and tools that nodes rely on to exert influence over and manage the world and events that they govern. Figure 22 places the nodes along a spectrum in terms of the flood risk reduction measures that they prioritise currently. The preferred measures by nodes are a reflection of their mentalities, in terms of their understanding of the nature of flooding, their disciplinary background, and the types of technologies and resources that they possess.

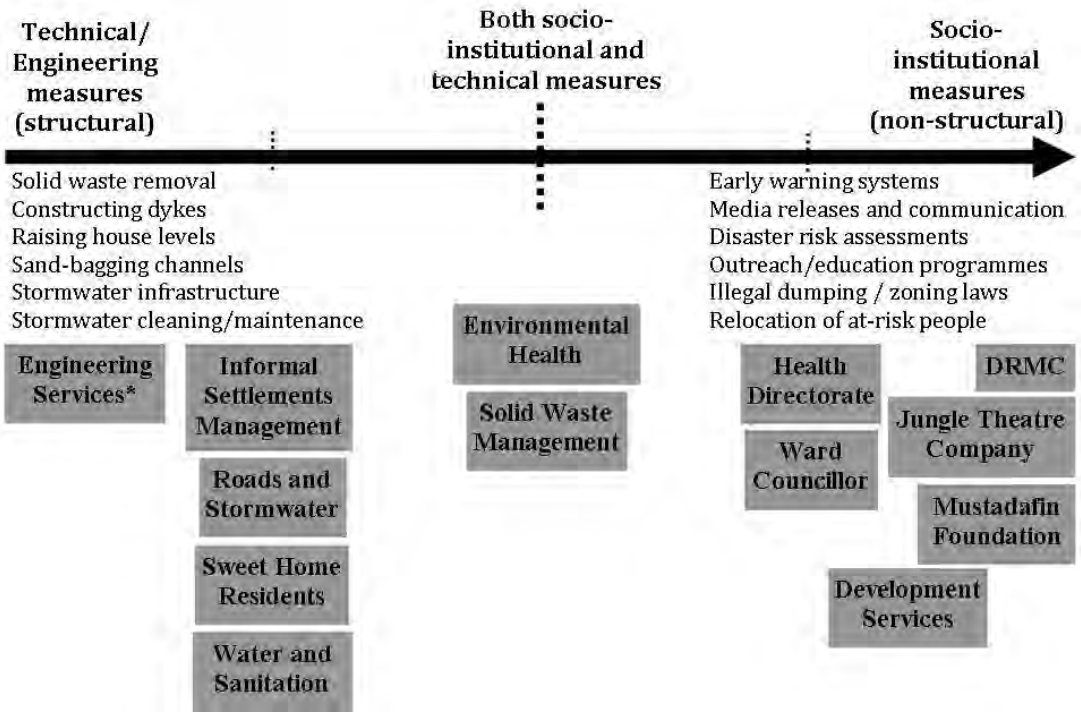


Figure 22: Types of measures currently prioritised by nodes[67]

(Source: Joy Waddell)

*Falls under the Human Settlements Directorate

[67] See Appendix 12 for the original list of questions and responses by nodes represented on the Flood Task Team.

Roads and Stormwater, Informal Settlements Management, and Water and Sanitation are all involved in the delivery of key services and infrastructure, which is why they indicated that their current prioritisation was with technical, engineered, structural measures. Residents in Sweet Home value and prioritise technical measures because they are tangible solutions. Despite the recurrent failures of many technical measures in Sweet Home (*i.e.*, the blocked open stormwater channels, broken pumps to divert water, and water entering shacks despite plastic covers and sloping roofs), residents still demanded that the CCT provide them with technical solutions to flood risk (*i.e.*, better housing, raised ground levels, *etc.*). Residents argued that non-structural measures, such as awareness-raising, temporary relocation, and media releases about potential flooding, did not help their situation at all because despite these efforts, they were still flooded or at risk of flooding every year. Several nodes argue that structural interventions are necessary in informal settlements because

1. they are something tangible that CCT nodes can implement (*i.e.*, politicians can be photographed next to the 'successful' project); and
2. residents can see the difference that these solutions make in terms of physically diverting runoff and reducing the levels of floodwaters:

> DRMC (08/04/2013) referring to tangible, structural flood risk solutions: *"That's what people can see. They* [Residents] *say, 'Yeah! The CCT's coming and they're doing! ...especially if it's a big engineering intervention where they can see the difference in terms of flood."*

When asked where on the spectrum nodes would like to prioritise their future actions (in the next 10-15 years), DRMC and the Health Directorate felt that they would stay where they are currently, whereas Development Services and Informal Settlements Management felt that they needed to move towards more socio-institutional measures. Roads and Stormwater was the only department that felt that more investment was needed in developing more innovative technical measures, although some mid-level officials recognised that the lack of community engagement (a non-structural measure) was also impacting negatively on the success of their current technical measures. One senior Roads and Stormwater official (2010) also argued that implementing by-laws and tariffs (a non-structural measure) related to stormwater runoff, would help to ensure that businesses and residents would take measures to reduce the amount of runoff into existing water systems. The two viewpoints by Roads and Stormwater officials (*i.e.*, we need more technical versus more non-structural measures) reflects the divergence in opinion by higher-level officials and field-based officials: officials based in the field argued that

technical measures are sufficient for reducing flood risk, while more senior officials recognised that these technical measures need to be supported by non-structural measures.

Implementing technical measures without the support of non-structural measures is an issue that Taing *et al.* (2011) explore in their case study of the innovative vacuum sewer system built in informal settlements in Cape Town. These authors found that this innovative technical solution failed because it was not supported by non-structural measures such as community engagement, education and information-sharing, monitoring of installation processes and the system afterwards, and adequate maintenance schedules.

All of the nodes tended to cite structural interventions rather than non-structural interventions when asked which interventions allowed nodes to address flood risk. Although structural interventions seemed to be cited first by nodes, they did not identify any major preference for either structural or non-structural initiatives when asked which 'type' was more effective in reducing flood risk. However, it is interesting to note that nodes with engineering backgrounds (*e.g.*, Water and Sanitation, and Roads and Stormwater) tended to argue that their structural interventions were more effective than non-structural interventions. This reflects the often biased perception that nodes have of their own abilities and technologies, as well as a bias towards tangible solutions such as engineered structures. Most of the senior officials/representatives of the various nodes recognised the need for better policies and by-laws that dealt with the issue of informal settlements being built in unsuitable, flood-prone land, as well as the need for education and awareness programmes that educated residents on issues related to flood risk and the underlying causes of flood risk. Although Holloway (2003) and IFRC (2012) argue that DRR interventions in South Africa tend to be largely relief and response-oriented, the number of proactive flood risk reduction interventions that the Flood Task Team implements currently were seen to outweigh the number of reactive interventions[68].

Several nodes argued that there is still the need for more proactive and innovative interventions. These nodes argued that despite the current proactive interventions that the Flood Task Team and various CCT nodes implement, there is still a great demand for relief and response activities every year. These relief activities cost the CCT millions of South African rands[69] each year and are not seen as 'solving' the problem or meeting the actual needs of residents living in informal settlements. Residents similarly expressed their frustration at the

[68] This conclusion is based on the number of proactive interventions recorded in Tables 15 and 16, which were presented in Chapter 6 of this thesis.
[69] For example, according to a statement released by Cape Town's mayor, De Lille, in 2013, the CCT spent over ZAR 2.6 million on social relief in response to flooding during that year's winter rains/storms.

reactive responses by the CCT and how this does not solve the problem. Perceptions of what would solve the problem do vary from node to node, as discussed earlier; this is another reflection of nodes' differing mentalities and understandings of the nature of the problem. Residents and the Mustadafin Foundation, for example, see the only viable solutions as the provision of housing from the CCT. Informal Settlements Management and Roads and Stormwater see relocation (permanent) and in-situ upgrade (where possible) as the only viable solutions, whereas DRMC argue that an urbanisation policy that controls in-migration and urban growth would be the best (and only) solution to a much deeper and highly political problem. Many residents have explained how the CCT's relief responses after a flood do not solve the problem (of flooding); a view that was shared by some CCT nodes and NGOs. Some residents have expressed instead their desire for the CCT to work with them to show them how to protect themselves against flooding.

> Sweet Home resident (21/05/2013): *"You* [The CCT] *give me blankets because you said I'm affected by the floods. But again, after you give me those blankets… where I am going to sleep? I am going back to that shack that is flooded. So it's not a… a problem solved. It's not solved!"*

> The Mustadafin Foundation (01/03/2013): *"The problem of the people is not having relief. They don't want relief. Obviously there is a need for the relief. But their main concern is proper housing.* […] *The* [CCT] *spends billions of rands* [South African currency] *every year* [on relief]*. That* [money] *could have bought how many houses!? So if it's going to be ongoing that they have to supply relief every year instead of having a budget, building them proper housing… and they not going to have that problem* [of flooding]*."*

Nodes also highlighted the importance of relocation, both temporary and permanent. Although relocation is the responsibility of Human Settlements, all the CCT nodes indicated that they provide assistance in assessing potential areas and earmarking informal settlements or residents who need to be relocated. As mentioned in Chapter Six, some informal settlements are identified as areas where relocation is the only long-term, flood risk reduction solution. Since finding suitable land is often challenging, the following approaches are undertaken by CCT nodes in the interim (DMAF, 2012):

1. Conduct awareness campaigns;

2. Provide relief such as emergency shelter, blankets, meals, and emergency flood kits; and
3. Relocate structures (*i.e.*, shacks) where possible.

Development Services argue that there is land available for relocation, but because it has become a very political issue, this land is not available for relocating at-risk informal settlements. This official went on to say that although relocation is the wish-list, it is not always practical because of financial reasons and the CCT having to negotiate to buy land. For the CCT to buy private land, which people have built informal settlements on, for example, (*i.e.*, in order to service the land, as in Sweet Home's case), private land owners try to sell the land to the CCT at a very inflated price: they "want to sell bronze for gold price" (Development Services, 12/06/2012); this results in the process becoming very time-consuming and drawn out, and sometimes even landowners block the whole process for political reasons.

Education and awareness campaigns were cited by many CCT nodes and NGOs as an effective technology for communicating with and informing residents of how to protect themselves from floods and how to respond during flood events. However, the perception of the effectiveness of current awareness campaigns varied greatly between nodes. Many of the CCT nodes distribute pamphlets and posters on relevant issues[70], in the various official languages; several nodes explained that these pamphlets were ineffective for a number of reasons: residents cannot read, residents are not interested and just throw the pamphlets/posters away, and some of these posters are kept in storage somewhere and not distributed properly.

In response to this, DRMC approached the Jungle Theatre Company in 2010 to develop a play that is based on their "Protect yourself against floods" pamphlet[71]. The public theatre shows, which the Jungle Theatre Company is sponsored by DRMC to conduct in 20 at-risk informal settlements, are also seen by some residents as ineffective. These shows, which are supposed to take place right at the start of the flood/fire seasons, but are sometimes delayed for various reasons (*i.e.*, often political), are seen by various nodes (except DRMC) as a technology that is ineffective because they are implemented too late. The Jungle Theatre Company explained how often the DRMC come to them very late and ask them to put on the fire or flood performances. In 2012, for example, the flood performances were done as late as June, when the informal settlements were already flooded. Feedback from residents about the performance indicated

[70] See Appendix 11 for examples of these educational pamphlets.
[71] See Appendix 11 for examples of these educational pamphlets.

that the residents only wanted blankets and relief from DRMC because they were already flooded.

A ward councillor argued that although the pamphlets are an effective tool for educating people ("a big change", 07/06/2013), the distribution of these pamphlets needs to be accompanied by people who are able to help them understand and interpret the information on the pamphlets. Nodes also argued that even though people are made aware of particular activities or issues (*e.g.*, do not throw solid waste on the ground, but use the blue refuse bags and take those bags to the containers), the resources required for residents to carry out the activities are missing; the solid waste contractor does not provide enough blue refuse bags, or does not unlock the container on the correct day (or at the correct times), so residents lack the resources (and incentives) to dispose of their solid waste properly.

6. SUMMARY

In this chapter, I unpacked how bringing multiple nodes together, who each draw on diverse knowledge and skills, can be both a strength and weakness when governing disaster risk. I explored how different nodes, who are either central to or impacted by disaster governance processes, have multiple and often contested perceptions of the nature of the problem and its solutions (mentalities). I also argued that these multiple perceptions impact on the types of decisions made and activities conducted and can translate into different types of tools and methods that are chosen by nodes to address those issues (technologies). In this chapter, I explored the contested roles and responsibility by different nodes in Cape Town and how there is often a mismatch in perceptions from other nodes of what these roles/responsibilities entail. For flood governance to be more comprehensive, integrated, and holistic, nodes need to be on the same page in terms of definitions, especially in this case where nodes come from very different disciplinary backgrounds and therefore have very different understandings of the nature of the problem. Standardised definitions would allow nodes to decide how best to use the diverse expertise and resources that they bring to flood governance, and provide nodes with a more unified, collaborative platform to tackle flood issues from. This issue is also reflected in the diverse roles and responsibilities of nodes; without transparent and clearly defined roles and responsibilities for each node, there is unlikely to be clear expectations, priorities, and tasks, which will ultimately strengthen the collaborative flood governance decisions and actions of the various nodes.

CHAPTER EIGHT:

NODES (ILL)EQUIPPED TO GOVERN: THE RESOURCES AND INSTITUTIONAL STRUCTURES THAT ENABLE NODES TO GOVERN

1. INTRODUCTION

As identified in Chapter Seven, a salient theme that emerged from the discussions with actors governing flood risk in Cape Town was that of 'who' should be responsible for responding to and addressing flood risk across the city. Residents from Sweet Home informal settlement and some representatives from NGOs (*e.g.*, the Mustadafin Foundation) argued that this responsibility lies with the CCT and its elected ward councillors, while CCT officials and ward councillors emphasised the need for residents to share in this responsibility. This disagreement and divergence of opinion is also reflected in the literature on whether government (national and/or local) or civil society should be the ones taking responsibility for and driving DRM. While some authors see DRM as the government's responsibility (Roberts, 2008, Satterthwaite, 2011, Van Riet and Van Niekerk, 2012, Roberts and O'Donoghue, 2013), many highlight how local government, especially in cities of the global South, lack the capacity and governance structures to manage disasters in these cities (Ziervogel and Smit, 2009, Satterthwaite, 2011, IFRC, 2012, Ziervogel *et al.*, 2014b).

In response, the disaster community has advocated for the empowerment and capacity-building of local communities so that they can build their resilience to disasters and climate change, and drive local DRR and CCA projects (*e.g.*, Allen, 2006, Uitto and Shaw, 2006, CBDRR, 2007, Reid *et al.*, 2009, Shaw, 2012, Van Niekerk and Coetzee, 2012). Community-based DRM and CCA approaches have been heavily critiqued, however, with authors arguing that community-based approaches cannot have long-term, sustainable benefits without adequate support from and partnerships with local government (*i.e.*, receive top-down guidance) and other actors (*e.g.*, top-down and bottom-up support from CBOs and NGOs), both in terms of resources, policy, and institutional mechanisms (Allen, 2006, Uitto and Shaw, 2006, Reid *et al.*, 2009, Dodman and

Mitlin, 2013, Twigg, 2015). Authors speaking from governance literature argue that no single node has enough resources to govern (Stoker, 1998, Tierney, 2012); instead, governing complex events needs to be an interactive process with multiple nodes, including both state and non-state actors, negotiating for and mobilising resources (Stoker, 1998, Tierney, 2012).

In this chapter, I present some of the arguments from the literature that highlight this disagreement on whether local government or local communities are best equipped to drive the planning and implementation of DRR activities. I explore what these arguments mean from a nodal governance approach, for the case study in Cape Town; in terms of the resources that nodes have (and need) to address flood risk (*i.e.*, to govern), and the institutional structures that create barriers or enable nodes to access and mobilise critical resources. I highlight in this chapter how the process of identifying the available resources and those that are lacking can help to strengthen disaster governance because it allows one to take a critical look at what resources each actor has and needs to govern, and thus which actors need to be included in disaster governance processes to provide and mobilise any critical but lacking resources. Based on these findings, I argue that a networked, disaster governance approach is necessary to better mobilise diverse resources and strengthen the resilience of communities.

In this chapter, I take the discussion about resources further by highlighting how disaster governance is not just about the availability of diverse resources, but also about the institutional structures that enable nodes to access, mobilise, and channel these resources. Using a nodal governance approach, I identify examples of problematic institutional structures in the Cape Town case study that act as barriers in collaborative disaster governance processes. I argue that in order to strengthen collaborative disaster governance and ensure that sets of actors are able to access, channel, and mobilise the necessary resources to govern, these institutional structures need to also be strengthened.

2. RESILIENCE TO DISASTERS: LOOKING BEYOND A SINGLE ACTOR

Arguments on whether a single entity (state vs. civil society) or multiple actors should govern complex events (*i.e.*, disasters) are usually based on whether different actors have the resources, expertise, and/or institutional structures to manage events effectively. From a nodal governance approach, nodes are understood to use certain resources to support their activities and influence the events that they govern (Burris *et al.*, 2005, Tefre, 2010). I argue that in order

to evaluate whether local government or another set of actors is better 'equipped' to manage disaster risk, the types of resources that particular actors or sets of actors have access to and can mobilise need to be identified. This process can provide an understanding of where the gaps and overlaps in resources might be and which actors need to be included in the governance network (*i.e.*, because they have resources that other actors need/lack). When describing some of the sets resources that nodes need and/or have access to, I refer to them as capitals (Table 20), which various authors have conceptualised within a sustainable livelihoods framework (Chambers and Conway, 1991, Scoones, 1998, DFID, 1999, Rakodi, 2002) and more recently within an adaptive capacity framework (Jones *et al.*, 2010a,b).

Table 20: Description of the five types of capitals

Type of Asset/Capital	Description
Economic capital	Available stocks (*e.g.*, savings, cash, bank deposits, liquid assets, credit) and regular inflows of money (*e.g.*, pensions, remittances – excludes income).
Human capital	Can be quantitative (*e.g.*, number of family members in a household and time available to engage in income-earning activities) and qualitative (*e.g.*, skills, knowledge, ability to labour, food, health, physical capability, level of education).
Natural capital	Natural resources stocks (*e.g.*, soil, water, air, genetic, trees, land) and environmental services (hydrological cycle, pollution sinks). Includes intangible public goods (*e.g.*, atmosphere and biodiversity), especially common-pool resources.
Physical capital	Basic infrastructure (*e.g.*, transport, shelter, water and sanitation supply, stormwater drainage, energy, communications) and producer goods (*e.g.*, the tools and equipment people use).
Social and political capital	Networks and connectedness (either vertical, *i.e.*, between state and resident; or horizontal, *i.e.*, between individuals with shared interests), memberships of groups, and relationships of trust, reciprocity, and exchanges. Includes social claims, social relations, affiliations, and associations, access to wider institutions.

In the sub-sections that follow, I unpack some of the literature that relates to arguments on whether local government or communities should take responsibility for and drive DRM and resilience-building processes. I explore what these arguments mean from a nodal governance approach, with a focus on the resources available to and accessed by local government and communities. First, I explore what these arguments mean for local government (Section 2.1.), and then I explore what these arguments mean for community resilience (Section 2.2.). Finally, I present my conceptualisation of community resilience from a disaster governance approach (Section 2.3.), where I argue that community resilience does not take place in a vacuum from broader socio-political and economic processes, but requires networks with and resources from multiple actors, from multiple levels of governance.

2.1. DRM as local government's responsibility

DRM, climate change, development, and urban sustainability issues are often argued to be the responsibility of local government because local government:

1. has access to external resources (*e.g.*, funding and technology);
2. already has the mandates and legislative requirements for service delivery and development-related priorities in place; and
3. has the political/legislative authority to implement related policies and activities at the city level (Bulkeley and Betsill, 2003, Roberts, 2008, Bulkeley *et al.*, 2011, Van Riet and Van Niekerk, 2012, Roberts and O'Donoghue, 2013).

In South Africa, Roberts (2008) and Roberts and O'Donoghue (2013) argue that because local government is responsible, legislatively, for the delivery of utilities and other development-related agendas, any priority issues (*e.g.*, climate change and DRM) need to be linked with and driven by local government's agendas if cities want to ensure that these issues are adopted and addressed. Van Riet and Van Niekerk (2012) argue similarly that since DRM and DRAs are supported by South African DRM legislation, the local government needs to play a central role and 'drive' those processes. For Van Riet and Van Niekerk (2012), the outsourcing of DRAs to external, non-state actors, for example, is viewed as counterproductive to building resilient municipal DRM centres because they argue that municipalities need to develop their own capacities and expertise in this area.

In the case study on flood governance in Cape Town, most nodes argue that local government should be responsible for the management of flood risk because they are better equipped than residents to do so. From interviews with the various nodes in Cape Town, CCT nodes (including NGOs 'activated' by the CCT during disaster events) were argued to have access to a diversity of resources (as summarised in Table 21 on page 169). CCT nodes recognised that the multiple CCT departments represented on the Flood Task Team bring, for example, unique human capital and expertise to the team. The diverse expertise and knowledge of multiple nodes on the Task Team helps them to address flood risk holistically. For example, engineers from Water and Sanitation, Roads and Stormwater, and the Engineering Services department of the Human Settlements directorate, are professionals in the field of civil engineering. Without their unique knowledge, the technical side of reducing flood risk and diverting surface runoff would be missing. In addition, nodes from other sectors and disciplines also have critical human capital to

contribute; this can be in the form of conflict management and facilitation skills, DRM and DRA skills and expertise, an understanding of the complex social issues that underpin life in informal settlements, an understanding of the interconnected causal factors of risk and vulnerability, or simply the available staff (and time) who can physically implement DRR activities and/or respond to disaster events.

Table 21: The resources that CCT nodes use to govern flood risk in Cape Town's informal settlements

Node	Available Resources
DRMC	During emergency response, coordinate and manage equipment provided by other CCT nodes. Provide some equipment (*e.g.*, large lights to temporarily light up communal areas) when other nodes cannot cope. State-of-the-art disaster control centre and training facility. Pamphlets/posters for education/awareness. Strong social capital with affiliated NGOs to provide relief and support their education campaign.
Environmental Health Dept.	Strong social capital in Sweet Home between residents and field officers who are regularly in Sweet Home. Pamphlets/posters for education/awareness. Low social capital with NGOs/CBOs/CSOs also working in informal settlements.
Informal Settlements Management Dept.	Sandbags provided to residents who request them. Emergency Flood Kits[72] issued to residents affected by flooding. Partnerships with some NGOs/CBOs/CSOs to carry out re-blocking and/or housing upgrades (*e.g.*, Ikhayalami, UBU[73]).
Jungle Theatre Company	Fire/flood awareness programmes are run in informal settlement and sponsored by the CCT.
The Mustadafin Foundation	Relief (*e.g.*, clothes, food parcels, sanitary packs, baby packs, and blankets) provided from donations and CCT funding is distributed to communities after a flood/fire event. Pamphlets/posters for education/awareness.
Roads and Stormwater Dept.	High levels of expertise and technical know-how with regard to engineering designs and infrastructure. Data from various hydrology and storm models. Pumps and pump trucks to remove localised flooding/ponding. EPWP workers to unblock and clean open stormwater channels. Sand for the Sand Protocol. Pamphlets/posters for education/awareness.
SA Red Cross	Very strong social capital with residents in their selected communities (*i.e.*, Sweet Home was not one at the time of this research). Community-based volunteers. Settlement-specific DRAs. Relief (*e.g.*, clothes, food parcels, sanitary packs, baby packs, and blankets) provided from donations and CCT funding is distributed to communities after a flood/fire event. Pamphlets/posters for education/awareness.
Solid Waste Management Dept.	Blue refuse bags; skips and containers to collect solid waste; EPWP workers to clean communal areas and skips/containers in informal settlements. Pamphlets/posters for education/awareness.
Ward Councillor	Social capital with residents dependent on ward councillor and the informal settlement. Sweet Home's ward councillor has no social capital in Sweet Home, but other ward councillors have stronger social capital in their informal settlements. Call centre managed by local ward council offices. Ability to channel finances to their ward.

[72] These kits contain some materials that enable residents in informal settlements to fix their shacks during/after a flood event. The kits contain mostly nails and plastic sheeting. Similar kits are distributed to households affected by fires.

[73] UBU is a community-based project based in Sweet Home, which is run by a former employee of the Warehouse (an NGO/FBO) who has a strong relationship with residents in Sweet Home. This project is run in collaboration with Sweet Home residents, with the aim of re-blocking sections of Sweet Home into clustered housing that is built from sand-bags. See http://ubu.bz/ [Accessed: 30/10/2014).

As seen from Table 21, some of the CCT nodes have access to and mobilise very similar sets of resources:

- Flood relief items: NGOs activated by the DRMC to provide relief such as food, blankets, sanitary kits, and mattresses; Informal Settlements Management who provide the Emergency Flood Kits;
- Educational pamphlets, posters, and other materials on flood awareness: DRMC and the Jungle Theatre Company, the Mustadafin Foundation and SA Red Cross Society; Environmental Health, *etc.* all produce educational materials related to flooding; despite overlaps in the content[74], these materials are produced separately by each department/NGO;
- Social capital: all of the nodes have social capital with other nodes, to a certain degree, although it is recognised here that NGOs tend to have a much stronger social capital with residents than the CCT and its officials. Some CCT officials have social capital with residents, in particular Environmental Health officials and field officers (not senior officials) from a few CCT departments (*e.g.*, DRMC, Water and Sanitation), who have regular contact with residents, and some ward councillors who are responsive to residents and their needs (*i.e.*, this excludes the ward councillor for Sweet Home who has a very problematic relationship with these residents).

Despite some similarities in the types of resources available to nodes, there is very little 'sharing' of these resources across nodes and the method for channelling these resources is very node-specific and guided by individual legal and financial frameworks. Nodes on the Flood Task Team highlighted during one of FliCCR's workshops (31/01/2013) how there is often an overlap and duplication of services, and thus a wastage of resources because nodes do not interact, communicate, or define (and agree on) roles and responsibilities. For example, nodes argued that educational resources, which are produced and channelled in silos by the various nodes, are wasted because there is a large amount of very similar materials being produced separately and then distributed to a very small section of the population (*i.e.*, many actors work in the same communities and with the same families).

[74] See Appendix 11 for examples of the various materials that CCT nodes distribute on flood/health awareness.

> Environmental Health (10/04/2013): *"I have requested that* [DRMC] *provide us with some education material… because they are doing education* [on flooding/flood risks]*, we are doing education* [on flooding/flood risks]*, so why couldn't we… do it together…* [so we can] *spread the message further."*

Solid Waste Management, Water and Sanitation, and Roads and Stormwater produce their own pamphlets and run separate education campaigns about the dangers of throwing waste into stormwater drainage systems[75]. Similarly, the Mustadafin Foundation, the SA Red Cross, Environmental Health, Roads and Stormwater, DRMC, the National Disaster Management Centre, and Informal Settlements Management produce their own education materials on the health risks of flooding, the factors that cause flooding, and how residents can protect themselves from flooding. The lack of consolidation between actors carrying out very similar activities results not only in wastage of critical resources, but limits the potential for reaching more residents with limited resources. DRMC, for example, showed no willingness to recognise other nodes who also produce educational materials on flood risk reduction (*e.g.*, the Mustadafin Foundation); DRMC only partner with the Jungle Theatre Company, who are paid by DRMC to run DRMC-approved plays about flooding/fire awareness in communities and schools selected by DRMC[76]. Other nodes (*i.e.*, the Jungle Theatre Company, the Mustadafin Foundation, and Environmental Health) recognised that this type of resource (education) could be mobilised better, for example, if the multiple actors producing these materials partnered to produce a more comprehensive set of information that could then be distributed systematically across a wider audience.

Reflecting on the capacity of local governments in high-income countries, Satterthwaite (2011) argues that these local governments play an integral role in providing the framework for planning, providing, and financing key services (*e.g.*, infrastructure, risk reduction measures, *etc.*). In high-income countries, external actors (*e.g.*, private companies and non-profit institutions) also provide some of the key services needed by cities to run efficiently, and citizens engage very little in the overall management of these services; although it is recognised that citizens are less engaged only because their expectations are met to a higher degree and there are adequate channels for complaints (*e.g.*, local politicians, lawyers, ombudsmen, consumer groups, and watchdogs) (Satterthwaite, 2011). In contrast, Satterthwaite (2011) argues that local governments in low-income and some middle-income countries lack the

[75] See Appendix 11 for examples of these educational pamphlets.
[76] In this case, The Jungle Theatre Company is a tool used by DRMC to educate communities that DRMC select and prioritise, using material approved/requested by DRMC; DRMC make sure that they are prominent during these shows, as a PR strategy.

institutional capacity to take on the same degree of responsibility (and present the same level of 'success') as in high-income nations. Reflecting on why this is the case, Satterthwaite (2011) argues that cities of global South lack, for example, the institutional capacity to even fulfil their responsibility in terms of infrastructure and service provision, land-use management, *etc.* Ziervogel and Smit's (2009) analysis of flood governance in Cape Town and the IFRC's (2012) report on DRR legislation in South Africa support Satterthwaite's (2011) view; they highlight how South Africa lacks critical governance structures and key resources to effectively govern and manage urban risk (Ziervogel and Smit, 2009, Satterthwaite, 2011).

In light of Satterthwaite's (2011) arguments, it is therefore critical to question whether local governments in cities of the global South are equipped to drive and be responsible for disaster governance processes. From their research in the Ekurhuleni municipality in the Gauteng Province of South Africa, Fatti and Patel (2013) describe how a lack of financial resources and information often resulted in municipal managers feeling disempowered when trying to address flood risk. Nodes in Cape Town felt similar disempowerment because of a lack of financial and human resources, insufficient staff capacity and skills to manage conflicts and carry out participatory DRAs, and the lack of (suitable) land in situations where relocation is the only viable solution for communities living in risk-prone areas.

CCT nodes describe how their departments are under-staffed and under-resourced, resulting in nodes spreading themselves too thin and/or not being able to address all the relevant issues. A DRMC official (10/04/2013) explained that as the disaster manager of one designated geographical area (out of four), he is responsible for carrying out DRR activities in 118 informal settlements. Both Environmental Health officials and DRMC officials highlighted how this lack of human resources means that certain officials have to take on additional portfolios and roles that they are not equipped (*e.g.*, not enough hours in a day, stretched finances, and lack of experience) to handle. Informal Settlements Management (03/12/2012) described how they lack the human resources to address effectively all the issues that their node is required to address. DRMC officials (26/03/2012, 31/01/2013, 08/04/2013) and Informal Settlements Management officials (03/12/2012) explained how they would often start their working day on one side of Cape Town and end up on the other side of the city (often more than 50 kms away and several hours drive in traffic). These comments reflect a lack of capacity in terms of human resources, and thus the need for limited numbers of staff to spread themselves very thin each day. This lack of human capacity impacts on the CCT's ability to collect accurate data on flood risk, to conduct DRAs in all areas of Cape Town, and to understand the priorities and needs of all communities, especially those living in high-risk informal settlements.

> Roads and Stormwater (08/09/2010): *"*[There are] *high and growing numbers of informal settlements and people living in informal settlements, and the CCT does not have enough staff to collect accurate data."*

DRMC officials recognise that CCT departments on the Flood Task Team also lack the human capital (skills and staff numbers) to carry out detailed community-based DRAs in all high-risk communities (10/04/2013). CCT nodes are well aware of the negative impact that this has on their ability to understand and respond to disaster risk in Cape Town's informal settlements. One DRMC official (26/03/2012) stated that if there is no participation or contributions from communities when planning DRR (or other) activities, then these activities are likely to fail because they are not decided upon with the community and are not owned by the community. Taing *et al.* (2011) illustrate similarly from their case study on sanitation drainage systems in Cape Town how engineered solutions implemented in an informal settlement context often fail because these solutions are planned and implemented without input from local communities. Nodes also expressed how they are ill-equipped to engage with residents and manage many of the conflicts and problems that arise in informal settlements; they lacked facilitation skills, conflict management skills, leadership skills, and even language skills.

> Engineering Services (2010): *"You can be the best project manager in the world, but if you don't have experience of working in informal settlements… it counts for nothing. Because you cannot use the same methods that you use to build a stadium* […] *to go and provide services in the informal settlement.* […] [To work in an informal settlement] *you need someone who can listen to the community.* […] *It's this view that project managers have got qualifications. Yes, but* [it's also about] *people skills and how to get people to work with you."*

The issue of a lack of capacity was highlighted by Development Services as a key concern, especially in terms of experience, professionals, expertise, and know-how with regard to how to manage disasters effectively. A Development Services official (12/06/2012) argued that as a department, DRMC is still very small and young, and therefore lacked the capacity and expertise to address disasters (such as flooding) properly. The official explained further that there is a lack of professionals in DRMC (*i.e.*, researchers or staff with more than 10-15 years of experience in DRM) because DRMC had only officially been around for six years (in 2012), and that the Flood Task Team had only been around for about four years (in 2012); therefore the department and Task Team are still needing to grow and develop their capacity.

Most CCT nodes argued that the CCT lacked the funding to address flood risk across the city effectively. In contrast, another DRMC official (26/03/2012) argued that the CCT has enough financial resources, but it is "spending too much money on the wrong things". A more senior DRMC official stated in response that because the CCT lacks sufficient financial resources, the DRAs are critical for identifying priority areas:

> DRMC (19/11/2010): *"That's why we have commissioned this comprehensive, scientific-based disaster risk assessment* […] [This DRA] *has highlighted what the major hazards are facing the city of Cape Town* […] *We can bring this to the attention of decision-makers* […] *to get them to make decisions on resource* […] *We've got limited resources, and the needs always outstrip the resources. So one of our key roles* [as DRMC] *is to bring to the fore what the major hazards are facing the city of Cape Town so that funding can be sourced."*

Roads and Stormwater (17/04/2013) argued that they lack the resources (human, physical, and social) to conduct education programmes in informal settlements. This node argues that Health and Environmental Health are better equipped to conduct education programmes; they have the social capital, and are already conducting educational programmes in informal settlements (therefore they have the physical, financial, and human resources already). In this case, Roads and Stormwater argue that Environmental Health should be completely responsible for conducting educational programmes, rather than seeing the opportunity for both nodes to collaborate and develop an educational programme that meets both their needs.

Environmental Health explained that because they fall under the Health directorate, they have to share their resources with the other departments under this directorate (*e.g.*, Primary Health). They find that they have limited resources (human and financial resources, and authority) to address issues in informal settlements, but if they draw on their social capital with other officials in other CCT nodes, they can make sure that their priority issues are addressed.

> Environmental Health (10/04/2013): *"It is sometimes quite amazing what we get out of the limited resources we have…* [official laughs] *and sometimes we have to be very creative.* […] *It is how you work with the departments and who you know* […] *We've got a good relationship with Water and Sanitation and they could see that health* [is an important issue]*. They've come for whatever we've reported… so… they give priority to address the problems."*

In summary, the following resources were identified from interviews as key resources that CCT nodes lack in the context of flood governance:

- Economic capital
  - sufficient funding.
- Human capital
  - staff (*e.g.*, not enough staff to collect accurate data from informal settlements and address issues (*i.e.*, large geographical area and high number of informal settlements to cover));
  - staff training in conflict management, facilitation, and community engagement;
  - lack of a toolkit for conducting participatory flood risk management and lack of training in how to conduct participatory assessments; and
  - lack of accurate statistics on number of houses and services (and backlogs), and lack of actual numbers of people living in informal settlements (and numbers of at-risk and affected people).
- Physical capital
  - limited land for permanent/temporary relocation.
- Social capital
  - CCT nodes lack social capital with residents.

From the findings in Cape Town, it is clear that although local government have a range of resources at their disposal, the high numbers of informal settlements and communities at risk from flooding, amongst other more pressing needs and development priorities, is stretching these resources to the point that they become insufficient. Stretched resources, especially in terms of human capital, has meant that local government officials are not sufficiently equipped to address all areas of disaster risk; from risk assessments, to community engagement, and implementing long-term, ongoing DRR plans and activities.

2.2. Communities as central to building community resilience

As shown in Section 2.1., nodes in Cape Town recognise that local government does not have all the necessary resources (human and physical) to address flood risk and assume responsibility for all levels of risk, particularly in the context of growing informal settlements and high

numbers of at-risk communities and informal settlements. DRMC therefore wants residents to be more involved in DRR activities; this was exemplified in the Flood Task Team's priority activities for 2013 with 'increased engagement with residents' highlighted as one of their top priorities. In the literature on community resilience, Edwards (2009) argues that in order for communities to build resilience, they should not rely on the government or government institutions. Edwards (2009) states in his UK-based report that community resilience starts with individuals and communities and thus the specific plans/activities that can build and/or strengthen community resilience should be developed and driven by these individuals and communities. In this understanding of community resilience, Edwards (2009:80) argues that governments, institutions, and organisations need to 'let go'; they should play a very limited, 'behind the scenes' role, and be invisible. However, this understanding of community resilience, which comes from and is aimed at the global North, assumes that communities have the capacities to build their own resilience and not rely on external help.

In Cape Town, all nodes recognised that residents, as well as CBOs that support residents, have access to certain resources that they rely on to cope with and reduce flood risk (presented in Table 22). DRMC officials also recognise the valuable local knowledge that residents living in at-risk informal settlements have of localised risks and issues (26/03/2012 and 10/04/2013). This local insight is seen by some DRMC officials as critical for understanding local priorities and needs, as well as developing more context-specific and informative DRAs.

Table 22: The resources that residents and CBOs rely on to govern flood risk in Cape Town's informal settlements

Node Name	Node Type	Available Resources
Sweet Home Residents	Residents	Plastic sheets to waterproof roofs, Sand, and sandbags: provided by CCT. Connections with building contractors who dump rubble/bricks in Sweet Home. Local knowledge of at-risk households and affected people.
Sweet Home Street Committee	Residents	Community hall (keys/access owned by community, but built by local ward councillor) for temporary shelter and/or central distribution of relief. Very strong capital with residents and local knowledge of at-risk households and affected people.
Ubuhle Bakha Ubuhle (UBU)	NGO	Very strong social capital with residents and knowledge of residents' unique needs and priorities. Access to resources (*e.g.*, sandbags) via external funding. Specialised skills and capacities that are being taught to residents and developed together with residents. Strong social capital with CCT and other NGOs partnering on the project.
The Warehouse	NGO	Very strong social capital in Sweet Home. Relief (*e.g.*, clothes, food parcels) provided from donations is distributed throughout the year to Sweet Home.

Although it is recognised by nodes in Cape Town that residents also have access to resources, such as social capital and local knowledge, the dominant perception by residents and nodes is that residents only have access to a small amount of physical/material resources because of financial constraints. For example, residents cited material resources that help them to 'cope' in the short-term with flood impacts, which include wheelbarrows, buckets and 240 litre refuse bins, corrugated iron sheeting, canvas and plastic sheets, and small amounts of rubble, stones, bricks, and concrete[77]. Residents discussed (19/03/2013) how limited financial resources means that they have to sell, for example, sweets, chips, and chicken feet during the summer months, in order to save up and buy a raincoat, wellington boots, plastic sheeting, *etc.*, in preparation for winter.

A resident in Sweet Home, who is more economically well-off compared to her neighbours, said that it was difficult to ask other residents to follow her example and take preventative measures in terms of flood risk; other residents would argue with her and say that just because she can afford to take those measures, it does not mean that they can also afford it:

> Sweet Home Resident (14/02/2013): *"It's not easy to tell the others [to protect their houses from flooding] because they are going to say, 'where am I going to get the money, because I'm not working.* […] *If I tell them* [other residents]*, 'you can put the concrete in your shack, and maybe you can do the tiling, and having the stoep*[78] […] *then they are going to ask me 'where am I going to get that money to do that?'"*

Residents argued that they lack the knowledge and the resources (financial and physical) to protect themselves properly from flood risk, and CCT nodes concur that residents lack the skills and resources to protect themselves from flooding. One DRMC official (10/04/2013) explains how residents lack the skills and access to materials that will enable them to build appropriate houses/structures, and to raise their house's floor levels, as well as the walkways between the houses. This official argued that even he, as someone who is educated, has access to finances and the right materials, and has theoretical and practical knowledge of DRR, does not have the right skills and expertise to raise floor levels, for example. In response, this official argues that the private sector needs to be involved as a way to meet their corporate responsibility targets; for example, construction companies and hardware stores could provide the necessary expertise and cheaper/free materials to help residents build flood-proof houses, in return for

[77] For a more detailed description of the types of assets that residents from Sweet Home access and rely on to cope with flood risk, see Desportes (2014).
[78] South African term for a small porch/veranda that wraps around the front of a house; normally surrounding the front door.

tax incentives by local government. This DRMC official also stated that because residents living in RDP houses lack financial resources, they are unable to take out insurance against flooding or fires; therefore, he argues that insurance companies should also be involved.

As a result of a lack of financial resources, Sweet Home residents (19/03/2013) describe how they increasingly rely on social capital to cope with and reduce flood risk. This social capital is in the form of neighbours who help them, free of charge, to dig trenches around their house to divert stormwater runoff. Many residents (19/03/2013) also describe how they 'know someone' who drives rubble trucks and can drop off the rubble they require to raise their house's floor levels or the levels of community paths.

In contrast to Edwards' understanding of how to build resilient communities, Davoudi (2012:305) argues that rolling back state support in order to build community resilience is a "misguided translation of self-organisation in ecological systems into self-reliance in social systems". I argue that Edwards' (2009) approach is particularly detrimental in cities of the global South where a large number of at-risk communities live in areas that lack critical resources such as infrastructure, tenure, and economic capital, and therefore need the support that governments and external institutions can offer. Therefore, any support from government within these contexts should not be seen as a negative process that might erode community resilience, but as an essential part of building community resilience.

Berkes and Ross (2013) argue that an important component of community resilience is the individual's or community's strengths: individual/community resilience is seen as a continual, non-linear personal development process of developing individual or community strengths. These strengths include social networks, social inclusion and social support (*i.e.*, social capital), learning, readiness to accept change and their outlook on life (mentalities), and leadership (Berkes and Ross, 2013). Jones *et al.* (2010b) takes this further, arguing that increasing a community or individual's adaptive capacity should be central to any local-level adaptation interventions (*i.e.*, building a community's resilience). In the context of building the resilience of communities to disaster risk, strengthening the capacity of communities and individuals to 'self-organise' means not only including residents and communities in disaster governance processes, but developing the adaptive capacities of communities so that they are able to organise themselves when there is a crisis or a potential crisis. In this thesis, self-organising refers to communities' capacity to access and mobilise particular resources and technologies, as well as government's support (*i.e.*, in terms of policies, resources, networks, *etc.*). Pelling (1999:250), for example, argues that the capacity of individuals and groups to adapt to hazard

stress is rooted in these actors' ability to "compete for access to rights, resources, and assets". Cutter *et al.* (2003) support this, seeing the lack of access to resources, which include information, knowledge, and technology, as one of the major factors influencing social vulnerability.

2.3. Multi-actor networks as central to building community resilience

Berkes and Ross's (2013) interpretation of community resilience places a lot of the responsibility of building resilience on the community and individuals. Although this approach recognises that communities do not control all of the conditions that might affect them and that communities can change many (but not all) of the conditions that can impact on their resilience, this interpretation does not place enough emphasis on the embedded nature of communities in broader socio-political, economic, and environmental contexts. In an informal settlement context, for example, the ability of communities to strengthen their resilience is highly dependent on these broader processes. Informal settlement residents' ability to voice their concerns/needs and access resources is often limited, silenced, or denied because of broader socio-political and economic processes. Davidson (2013) argues that discussions on resilience need to take into consideration the broader global issues and trends that, for example, heighten uncertainty levels and reduce the availability of key physical resources. Davidson (2013) also argues for more serious contemplation of system complexity and the over-complex interconnectedness of systems (*i.e.*, community-level to system-level); for example, when selecting a unit of analysis (*e.g.*, community level), researchers should be cognisant of the fact that these units are connected and not independent.

Figure 23 presents how I conceptualise community resilience from a disaster governance approach. In this figure, emphasis is placed on the equal role that multiple actors (including residents but not limited to the community only) play in building resilience. The networks formed between local and national government, the community, NGOs, and other external actors are agued to all be equally important in terms of their roles in contributing, accessing, and mobilising resources amongst themselves and to the community. In the literature on community resilience, the emphasis is often on the role of individuals and communities (top left corner of Figure 23), with some authors placing the community and their needs in the centre (see: Berkes and Ross, 2013, Desportes, 2014), or others arguing that communities can only be truly resilient if they are able to remove any reliance on other actors (Edwards, 2009). I argue

that in the context of informal settlements, the broader responsibilities and capacities of actors beyond just the community and local government are critical to address the multi-faceted, complex, and interconnected issues. Not one actor is equipped fully to address disaster risk; resources and adaptive capacities (physical, human, financial, *etc.*), expertise and knowledge, social capital, and policy (institutional structures) are all needed and these cannot all be contributed by a single or even a small number of actors.

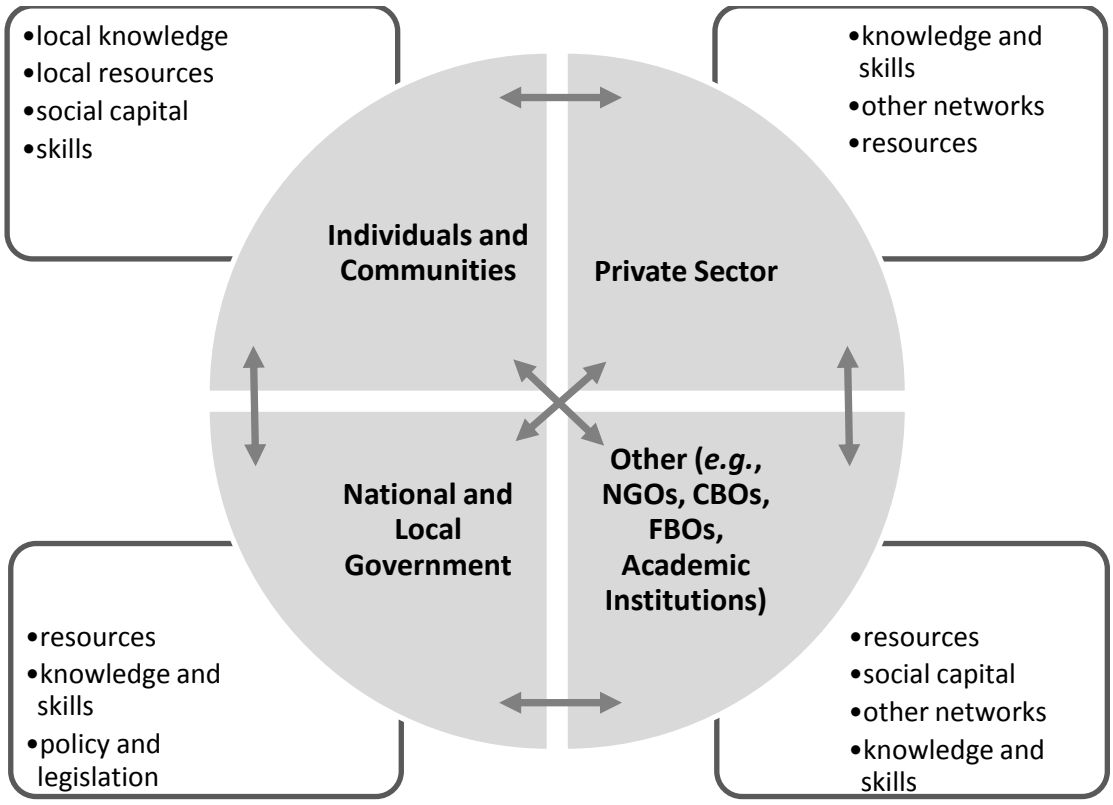


Figure 23: Conceptualisation of community resilience from a disaster governance perspective
(Source: Joy Waddell)

As explored in Desportes' (2014) thesis on community resilience of Sweet Home informal settlement in Cape Town, and our more recent but related paper (Desportes *et al.*, 2015), the ability of Sweet Home to withstand and recover from floods is:

1. constrained by broader socio-political and economic processes; and
2. strengthened when community members are able to interact with and access resources from external actors: *e.g.*, CCT departments and politicians (*e.g.*, ward councillor), residents and community groups within the community (*e.g.*,

savings or church groups), CSOs/CBOs/NGOs, and actors from the private sector (*e.g.*, the Media, service providers, retailers, and academic institutions).

Networks with actors outside of Sweet Home therefore enable the community to access and mobilise resources that their community lacks otherwise (*e.g.*, pump trucks from Roads and Stormwater to unblock stormwater drainage systems). These networks also enable residents to benefit from external support (*e.g.*, awareness-raising and health-related activities provided by CCT departments and NGOs). Although residents often argued that they lack the resources and know-how to reduce their risk to annual flooding, some residents were seen to be more 'resourceful' in terms of using their social capital and savings to address flood risk.

In my conceptualisation of community resilience, which goes beyond looking at communities in isolation, external actors such as NGOs, researchers, and the private sector, play a two-fold role in mobilising diverse resources. On the one hand, these external actors have access to and can therefore mobilise resources that are unavailable to the local government and residents: *e.g.*, access to people skilled in facilitation, conflict resolution, DRAs, innovative ideas (*e.g.*, sandbag housing by UBU in Cape Town), *etc.* On the other hand, external actors, particularly NGOs and community-based researchers, have social capital, which is an important resource for building linkages and maintaining rapport with and trust between actors. These networks, particularly with external NGOs and actors outside of the local context, all play a critical role in accessing scarce resources that might not be otherwise accessible to local actors.

Stoker (1998) argues that no single node has enough resources to govern; therefore, in any governance process, nodes need to exchange or share resources and negotiate their common purposes (common goals) in order to achieve the desired outcome. One of the central arguments in this thesis is that disaster governance, which is defined as a multi-actor networked approach to managing disaster risk, is a better alternative to managing disasters than traditional, hierarchical, and state-centric approaches. This argument draws on the organisational sociologist Powell (1990), who argues that networks enable multiple actors with unique resources to mobilise diverse resources through reciprocal, mutual exchanges. Viewed as a network of actors shaping events, I argue that disaster governance is a process that enables multiple actors to access and channel diverse resources in a way that helps to address complex socio-ecological problems. In governance theory, networks between actors are seen as the preferred approach for addressing complex issues because they bring together different actors who have access to diverse resources that can then be shared and channelled to actors who do not have the same capacities or access (Tierney, 2012). Pieterse (2008:5) packages this idea

well, arguing that governance "boils down to questions of control over decision-making about how resources are used in a sea of competing and different interests". Tierney (2012:343) argues that networks are best-suited to tackling complex socio-environmental problems such as disasters and climate change because they are "flexible, adaptable, and capable of mobilising diverse resources".

In Berkes' (2007) discussion on the conditions necessary for making a system resilient, he emphasises the need for actors to access particular resources. The resources that Berkes (2007) argues are critical for building resilience include social and ecological memory from experiences of past events (*i.e.*, knowledge and information), a diversity of partnerships (*i.e.*, social capital), and scientific and indigenous/local knowledge. Berkes (2007) argues that a resilient system is one that creates opportunities for self-organisation and re-organisation, which can be achieved by strengthening the capacity of communities (and cities) to socially and politically organise themselves in the face of a disaster. This implies that the community (or city) has access to physical and financial resources, which will allow them to protect themselves from disasters, survive during a disaster event, and eventually recover (to a certain extent) from the disaster.

This understanding of what makes a system resilient also implies that communities (and cities) have social and political capital, which allows them to connect with external actors and institutions and access and channel external/diverse resources. Case studies at the household level in El Salvador (Wamsler, 2007), India (Chatterjee, 2010), and Bangladesh (Jabeen *et al.*, 2010) highlight how social support networks are critical for these households to increase their household resilience. Communities that are part of a network with external actors are argued to be more resilient because these networks allow them to access critical resources in the form of physical, social, political, economic, natural, and human capital. Access to these resources enables communities and households to self-organise and re-organise in the face of a disaster event, and strengthen their adaptive capacities, which essentially helps them to prepare for, cope with, and recover from disaster events (Berkes and Ross, 2013, Desportes, 2014).

The arguments for whether local government or communities should drive DRR is often based on whether either entity has the capacity (in terms of resources) to manage DRR activities or whether the reliance on one entity or another erodes their capacity (in terms of resilience). This view that it should be one actor's responsibility to plan and carry out DRR activities, whether the community only or the government only, is problematic for several reasons:

1. the very definition of a disaster is "a serious disruption of the functioning of a community or a society involving widespread human, material, economic, or environmental losses and impacts, which *exceeds the ability of the affected community or society to cope using its own resources*" (UNISDR, 2009a). A disaster therefore impacts on a community or system to the extent that the community/system *needs* external support;
2. the complexity and multi-faceted nature of urban disaster risk requires a diversity of technologies and resources, which include knowledge, information, and expertise, to tackle the problem effectively; and
3. not one actor has all of the necessary resources (Stoker, 1998), and therefore actors need to collaborate in order to pool diverse resources and channel them to where they are needed most.

Therefore, a critical shift in thinking and practice needs to take place, particularly in the context of Cape Town and cities of the global South, where the government and communities are no longer placed on either end of the spectrum (*i.e.*, top-down vs. bottom-up DRR, state vs. community's responsibility, *etc.*) with an either-or approach to DRM. A disaster governance approach, which is polycentric in nature, places the emphasis on the collaborative roles that multiple actors should play, equally, in contributing towards decision-making and allocating resources. The underlying assumption here is that each actor has a role to play, with access to unique resources, and by bringing these multiple actors together, they are able to play the role that they are strongest in, and contribute those resources that they have access to: scientific and engineering experts, for example, can provide the engineering and scientific know-how and technology, while government institutions can provide critical planning, policies, and finances, and particular NGOs and private sector actors can provide necessary skills and services.

The ability of communities to self-organise and re-organise should not be seen as a process that is removed from the political dimension; since their ability to self-organise is embedded in socio-political processes, it is itself a very political process. Welsh (2014:20) argues that the reports and campaigns by the UNISDR's 'Making Cities Resilient' and ICLEI's 'Resilient Cities' programme based their understanding of resilience on the "normative assumption that communities can and should self-organise to deal with uncertainty, that uncertainty is a given [and] not something with a political dimension, and the role of government is limited to enabling, shaping and supporting, but specifically not to direct or to fund those processes". I argue instead that the role of the government in informal settlements is critical for helping to support (through financial and physical resources) communities to build their resilience. This is

particularly critical in cities of the global South and in informal settlement contexts because of the lack of adequate planning and policies to manage these informal settlements and the lack of sufficient critical infrastructure to reduce recurrent risks (*e.g.*, stormwater infrastructure and high runoff levels).

3. THE (IN)FORMAL STRUCTURES AND POLICIES THAT ENABLE NODES TO GOVERN

In the Cape Town case study, majority of the nodes felt very strongly that flood management in Cape Town was constrained not only because of resource constraints, but because of institutional challenges (*e.g.*, lack of capacity, coordination, and public engagement). Figure 24 illustrates what CCT nodes perceive the most salient constraints to be in terms of addressing flood risk in Cape Town. Although Roads and Stormwater felt that flood management in Cape Town was constrained due to both resource constraints and institutional challenges, most nodes identified institutional challenges as a key barrier to addressing flood risk across the city.

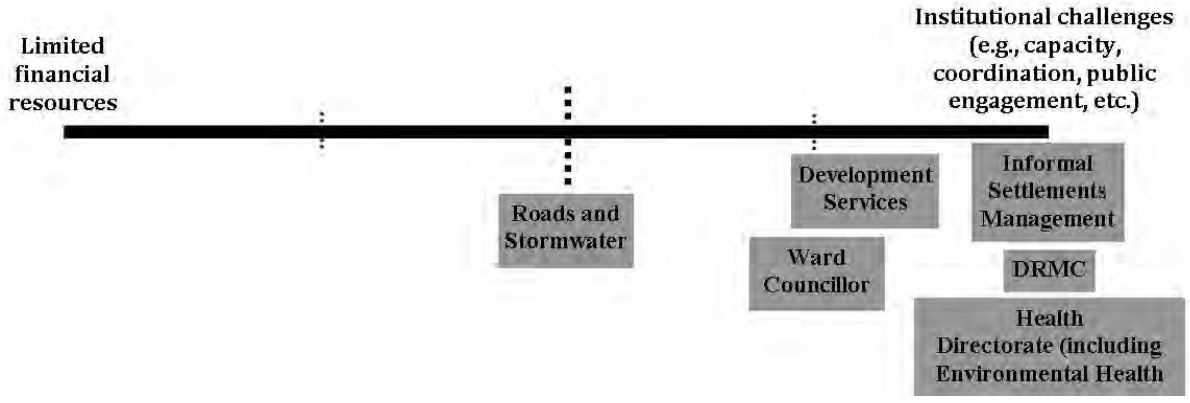


Figure 24: Nodes' perceptions of the current constraints to addressing flood risk in Cape Town[79]

The above findings highlight that there are institutions, which are often political or influenced by socio-political agendas, that impact on the ability of nodes to govern. Even if the particular resources that nodes have or lack are understood, it is also critical to understand which institutional structures are available, missing, or not functioning effectively. Added to this is also

[79] See Appendix 12 for the original list of questions and responses by nodes represented on the Flood Task Team.

the need to understand the socio-political and institutional structures that might enable or prevent these actors from mobilising resources and engaging in reciprocal and mutually supportive actions. These answers are not simple, especially in the highly politicised and complex context of informal settlements, because questions of who should be involved are closely related to the types of resources needed, who has access to these resources (which is embedded in power relations and politics), and what institutional frameworks exist and/or are needed to channel those resources (which are also highly politicised). A discussion on the capacities of nodes to govern is therefore not just about the availability of resources, but the methods for accessing, mobilising, and channelling resources (*i.e.*, the institutions). From a nodal governance approach, I argue that the institutional structures are key to 'why' nodes do not have access to certain resources, 'how' they are able to access resources in particular ways, and therefore understanding the conditions needed to enable nodes to share and pool resources.

From a nodal governance approach, nodes are understood to draw on particular institutions. As discussed in Chapter Four, institutions include the formal and/or informal structures in place that shape a node's mandate (mentality) and enable them to direct resources and technologies over time. These institutions include a variety of organisational forms, including legislation and policies, and other types of 'organised' groups, whether formal or informally recognised by the government, and/or temporary or permanent (*e.g.*, the CCT and its overall structure, the Flood Task Team, the subcouncil/ward council structure, and the structure of the street committee in communities). The concept of institutions in this thesis is extended to include regulatory and legislative frameworks (*e.g.*, policies, by-laws, contracts, and acts) because it is recognised that these frameworks structure how nodes can direct resources and technologies.

The following subsections highlight examples of institutions from the Cape Town case study that I argue are often problematic and impact on the ability of nodes, whether local government, communities, or external nodes, to access and channel resources.

3.1. Formal versus informal institutions: Problematic forms of public participation

Drawing on organisational theory, Lipson (2005) argues that there are both formal and informal types of coordination: formal types represent any explicit, formalised assignment of authority

and responsibility, and specification (and standardisation) of standards and procedures, whereas informal coordination is more spontaneous, developing through ad hoc responses and social networks. Formal and informal networks can complement each other, with each network depending on the other to function effectively. Lipson (2005) recognises that formal and informal networks can be in conflict, as informal networks can disrupt formal measures and dysfunctional formal arrangements can inhibit the useful outcomes of informal networks. In the case of Cape Town, the formal and informal institutions that nodes rely on to exert influence and channel resources are in conflict, with nodes choosing to either bypass the 'contested' institutions, or create alternative structures to address the problematic ones.

In Cape Town there is much contestation by the various nodes with regard to the recognition of some of the institutions that certain nodes invoke. In particular, there is contestation about the mechanism through which the CCT should engage with communities, and how communities should engage with residents. The most salient example of this is the street committees and local, self-elected leaders in informal settlements and how residents recognise this informal institution as a viable mode for channelling complaints/demands and resources. While some CCT nodes see this institution as a vital and viable channel through which to engage with residents, most CCT nodes do not recognise this institution and try to bypass or undermine it. Not all officials/individuals in each CCT department agree on how to approach the institution of the street committees; there seems to be a general agreement amongst more senior personnel (*i.e.*, those that do not necessarily work 'in the field' and are placed in a more removed, strategic/planning role) that this institution should be avoided, bypassed, or ignored completely. On the other hand, CCT officials 'on the ground' (*i.e.*, field officers who work at the community level to implement and monitor activities/issues) see this institution as critical to effective engagement and positive outcomes of activities.

> DRMC (01/03/2013) senior official: *"*[Residents have] *got a political structure within their environment,* […] *most of the times… that structure constrains us* [CCT officials]. *You can't have a structure that'll bypass my structure as a politically elected person of this particular area.* […] *the* [street] *committee was elected by community. But* [at] *the end of the day, the committee is not presenting the community as they supposed to be."*

> DRMC (29/11/2011) field officer: *"What the community do… they will inform the community leader on the ground. The community leader will inform the ward councillor.* […] *the community leader or the ward councillor* [… will] *phone the toll-*

> *free number* [107] *or the disaster operations centre.* […] *We would contact the community leader or the ward councillor when an official goes out to deal with the right person.* […] *Whatever decision gets taken there, we would do it through the ward councillor and community leaders."*

Some CCT officials do not liaise with the local leaders/street committees, but engage directly with residents, whether it is to assess risk in particular settlements, implement solutions, carry out educational campaigns, or hand out relief. This often leads to conflict between nodes, officials or NGO representatives being kicked out of the informal settlements, project delays, vandalism of infrastructure, and/or stalemates. On the one hand, committees and community leaders are recognised as a mechanism for engaging with communities and solving disputes, but on the other hand, they are seen as the source of the challenges, delayed/vandalised services, and political interference.

CCT nodes expressed their frustration with the seemingly non-transparent, confusing/complex, and/or transient (informal) leadership structures and processes at the community level. This is an issue that Drivdal (2014, 2015) explores at length in her research. Although formal institutions and the state might seem to have very little or no administrative control within informal settlements, Pieterse (2008) argues that informal settlement communities should not be seen as 'ungoverned'. Informal settlements have informal and multiple layers of governing that are socially constructed and highly political[80] (Pieterse, 2008, Drivdal, 2014, Drivdal, 2015). Drivdal (2014, 2015) finds that government officials in Cape Town are confounded by the often blurred and internally contested roles of community leaders, which in turn impacts on their ability to implement, maintain, and/or collaborate on proposed plans/activities. These transient and blurred leadership structures at the community level often result in conflict and misunderstandings between residents and within communities, and with CCT nodes and external nodes (*e.g.*, NGOs). This conflict is a result of the 'correct' local leadership (*i.e.*, as perceived by residents) not being consulted or engaged with, or the local leadership being avoided completely and bypassed by CCT and external nodes.

CCT nodes prefer to use the ward committee and subcouncils as the formal institution for public engagement; the ward committee and subcouncils are recognised by CCT nodes as local government's (and the CCT's) interface with communities. The ward committees, which are made up of rate-payers' associations and other community organisations, have various

[80] See Pieterse (2008:33-34) for examples of these informal types of governing. Also see Drivdal's (2014) doctoral thesis on the governance structures that exist in informal settlements.

'portfolios' that are managed by individuals who are elected from the community (*i.e.*, not involved in the CCT). These subcouncils meet regularly and the ward committees are represented at these meetings. In formal, higher-income areas of Cape Town, this institution for public engagement is functioning adequately, but nodes recognise that the opposite is true in informal settlement contexts.

> DRMC (01/03/2013): *"My understanding is that it* [the ward committee/subcouncil structure for public engagement] *is not functioning the way it should.* […] *…in the informal settlement environment, where* […] *the hazards and threats are much higher* […] *those* [public engagement] *structures don't exist. And there's a frustration for the community, that they do not have a voice. And the conversation* [that we need to have about this] *is… how do you actually get their voice heard? And how do you address issues of broad representation? How do you address issues of logistics and costs? And how do people* [from informal settlements] *get to the* [meeting] *when you haven't got bus fares and train fares, etc., etc.?"*

Despite legal requirements that ward councillors and ward committees remain non-partisan (Piper and Deacon, 2008), the ward councillor and ward committee are highly politicised institutions, which one ward councillor saw as the key problem with the current structure. Each ward is made up of multiple Voting Districts (VDs); depending on the tally of votes from each voting district, a particular political party will 'win' the entire ward, even if a minority of VDs had majority votes for a competing political party. In the case of Ward 80, where Sweet Home is located, majority of the VDs within Ward 80 had voted for the ruling ANC political party and an ANC ward councillor. In the case of Sweet Home, the ward councillor knows that he (and the ANC political party he belongs to) did not get a majority vote from the Sweet Home VD. Sweet Home residents argue that as a result, this ward councillor penalises them for not supporting him with their votes; this ward councillor allegedly does not engage with them, does not channel critical resources to them, and does not respond to their complaints/issues[81]. Despite FliCCR's invitations to participate in its workshops and engagement with residents in Sweet Home, for example, this ward councillor did not attend/participate.

As Sacks (2014) argues in his report on this issue, the frustrations that Sweet Home residents have felt with regard to their ward councillor, which are compounded by the lack of adequate service delivery and regular maintenance of infrastructure (*e.g.*, blocked stormwater drainage), have resulted in some community members seeing protest action and marches as their only

[81] For a report on this situation, see Sacks (2014).

means of 'being heard' and demanding resources and services from the CCT. Smit (2004) and Graham (2006) find that high levels of contestation, as seen in Cape Town with regard to service delivery, result in lots of interruptions, delays, and essentially obstructs any attempts to implement long-term strategies.

The above findings highlight the problematic and contested nature of the available formal and informal institutions for public participation in Cape Town. In response to these problematic institutional structures, nodes often bypass formally recognised institutional structures or create alternative, informal institutions that exacerbate instead of solve the underlying problems. These contested institutions for public participation impact on the ability of CCT nodes to assess and understand the needs and priorities of residents, and prevent CCT nodes from channelling critical resources to residents and communities in need. These problematic institutions also prevent residents from communicating with local government and from accessing the necessary support from government, which I have argued is essential for building community resilience.

Closely related to the contested institutions for public participation is the lack of monitoring and accountability mechanisms of these problematic institutions. Nodes argued that there is a lack of monitoring structures of ward councillors, of contractors providing services on behalf of the CCT, as well as the local leadership in the informal settlements. This lack of monitoring creates problems of accountability and transparency, as well as nurturing a culture of distrust, disillusionment, and blame. On one level, there are no monitoring structures in place to ensure that ward councillors, the formal representatives of and interface between the CCT and residents, which often results in ward councillors not carrying out their duties and supporting the needs of all the residents.

3.2. Institutions that undermine collaborative processes

Botha and Van Niekerk (2013:7) highlight from their research in South Africa how "there does not seem to be any form of cooperation between the government departments with regard to disaster prevention". This issue of collaborative versus silo-based approaches was raised by all of the nodes; with some nodes seeing the Flood Task Team as a great example of how departments have managed to work together and cooperate, whilst other nodes still express concerns of silo-based approaches despite this multi-actor platform. Some nodes expressed how

there might be a certain level of collaboration between CCT departments, but with regards to CCT nodes working with external nodes such as NGOs, CBOs, and residents, there is very little cooperation:

> SA Red Cross (01/03/2013): *"There's a lot that's been done by various organisations, by various practitioners, universities and entities such like that. But I think we not talking to each other… I think everyone's working in silos, and… we are overlapping… instead of getting together and finding what the best practices* [are]*."*

CCT nodes highlighted that although they see collaboration between nodes as critical for accessing and mobilising diverse resources from multiple actors, there are many institutional challenges to overcoming silo-based approaches. Roads and Stormwater (31/01/2013) explained how each CCT department has to work with specific objectives (mandates), which do not always match other departments' objectives. Therefore, an issue or activity that might be a priority for one department might not be for another, which makes cooperation between CCT departments very challenging. DRMC (31/01/2013) explains how this lack of cooperation because of mandates is also reinforced by a lack of cooperation and sharing of budgets. Individual departments have separate budget allocations and budgetary priorities; even though a department might concur with another department on a particular issue (*i.e.*, educating communities about flood risk), the department might not be able to prioritise that issue in their budget (*i.e.*, Roads and Stormwater's budget might be dedicated to stormwater system upgrades in a particular year, leaving very little budget for education).

The CCT's legal and institutional framework for guiding procurement processes, such as tender processes for new and existing services (*e.g.*, installation of chemical toilets) and projects (*e.g.*, EPWP), dictate which external actors CCT departments can establish relationships with, and how (De Visser, 2012, Ziervogel *et al.*, 2014b). De Visser (2012) argues that this formal, institutional structure can be a barrier to more innovative forms of collaboration between the CCT and external actors, especially with external actors not recognised by the CCT.

Another challenging issue highlighted by various CCT nodes is the misalignment of political and administrative boundaries across Cape Town; the different CCT departments have divided the city into different administrative/operational boundaries or areas, which do not align with one another or with the wards and/or voting districts (political boundaries). A senior DRMC official (31/01/2013) explains how these boundaries, which were inherited, creates unnecessary confusion.

> DRMC (31/01/2013): *"There's a complete mismatch* [between political and departmental boundaries]*. The subcouncils has got wards and the subcouncils are responsible for monitoring and promoting projects and programmes to eliminate risk.* […] [But] *the different departments within the CCT have different boundaries. For example, DRMC has got four boundaries, four major areas. Health has got eight. You guys?* [talking to another CCT department] *8? It's all different?* [person nods]. *It's actually ridiculous! And the subcouncils' boundaries misaligned to that, layered on top of that!"*

> DRMC (31/01/2013): *"When there was re-organisation of the CCT, it was one of the issues that was left open. The individual departments were given the opportunity to restructure* [the city] *to their own needs and suggestions. We find in hindsight now* […] *one shouldn't have been given that choice. The individual boundaries of the area districts should have been pre-decided and enforced on everybody. In our instance, two Health districts is equal to one DRMC boundary. The deficiency is that your counterparts on that particular service is not always the same. Or you get confused on who it should actually be."*

DRMC officials also argued that their placement within the CCT structure as a line function (grey box in Figure 25) impacts on their ability to make decisions and implement actions and better integrate DRR plans across all sectors and departments. This placement also impacts on the nodes' ability to access particular resources, distribute these resources across departments who are attempting to collaboratively address flood risk via the Flood Task Team, and make decisions across departments about these resources and day-to-day activities. Although the Flood Task Team is a formalised institutional structure for bringing CCT nodes together to address flood risk collaboratively, this Task Team is made up of individual departments who all have their own reporting and financial structures. Therefore, any decisions or activities made by the Flood Task need to be allocated to individual departments who then have to take these decisions back to their own department and directorate before they can be actioned. DRMC argue that in order for their department to raise their decision-making power and to be able to better integrate DRR plans across all sectors, they need to be placed in the City Manager's office.

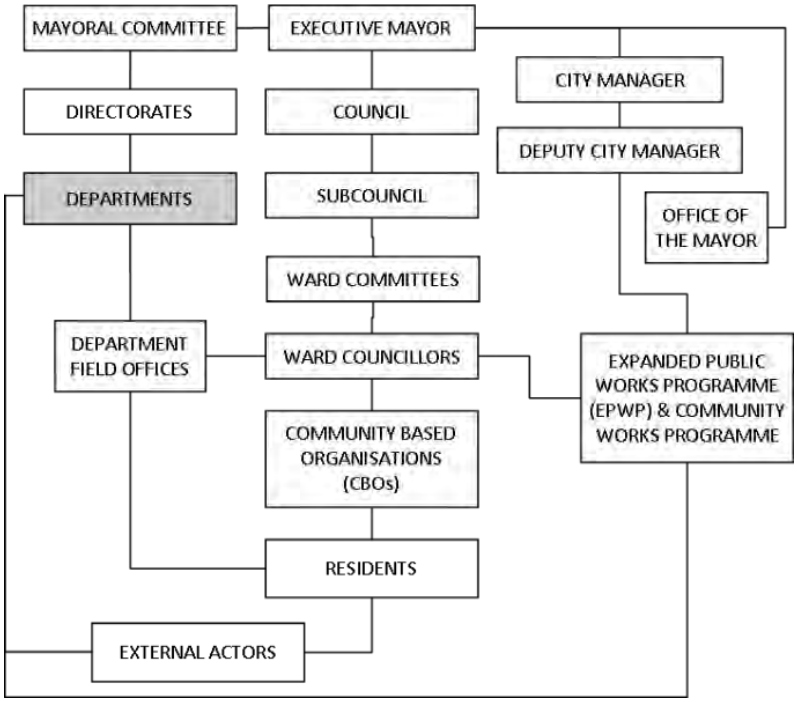


Figure 25: Formal structure of the CCT[82] ('line functions', such as DRMC, fall within the grey box labelled 'departments')
(Source: Joy Waddell)

The above findings highlight how node-specific and non-aligned institutions within the CCT create and exacerbate silo-based, non-collaborative approaches. DRMC's placement within local government structures, for example, is an institutional mechanism that limits their capacity to coordinate interdepartmental activities, and therefore access and mobilise resources from and to multiple actors outside of their department. Although the Flood Task Team is a type of collaborative institution that the CCT has created to enable multiple departments to collaborate, the department/directorate-specific reporting, financial, and administrative structures undermine their ability to collaborate. These findings highlight how even though nodes might have access to particular resources and might pool and share resources with multiple nodes through networks and a collaborative governance approach, institutional structures play a key role in determining the access to and mobilisation of these resources. For example, without formalised, recognised communication and public participation channels at the local level, or transparency, monitoring, and accountability of existing institutions, problems related to sharing critical resources will arise. Therefore, in order to ensure that multiple nodes can access and mobilise resources, problematic and contested institutions need to be addressed, and institutions that enable nodes to access and mobilise resources need to be strengthened.

[82] For a more detailed organogram of the CCT and the various departments (line functions) that fall under separate directorates, see Appendix 7 and 8.

4. SUMMARY

In this chapter, I explored the disagreement that exists in the literature and in Cape Town on whether local government or local communities are best equipped to drive the planning and implementation of DRR activities. I explored how governance theory recognises that different actors have access to different resources and by bringing these multiple actors together via networks, a diversity of resources can be pooled, shared, and mobilised more effectively. I argued that in the context of informal settlements, the broader responsibilities and capacities of actors beyond just the community and local government are critical to address the multi-faceted, complex, and interconnected issues related to disaster governance. Not one actor is equipped fully to address the issue; the resources and adaptive capacities (physical, human, financial, *etc.*), expertise and knowledge, social capital, and policy (institutional structures) are all needed and these cannot all be contributed by a single or even a small number of actors. I emphasised that communities who are part of a network with external actors are more resilient because these networks allow them to access critical resources, which enable them to self-organise and re-organise in the face of a disaster event, and strengthen their capacity to prepare for, cope with, and recover from disaster events.

I demonstrated that no single node has all the required capacities to address flood risk in Cape Town; thus, in order to strengthen flood governance, one needs to identify what the constraints are in terms of nodes' resources and capacities, and the institutional structures available (or lacking) for accessing particular resources. I claimed that the process of identifying the available and missing resources, through a nodal governance approach, can help to strengthen disaster governance because it allows one to take a critical look at what resources each actor has and needs, and thus which actors need to be included in governance processes to provide and share any critical, missing resources.

Finally, I also considered the formal and informal institutional structures that actors work within to access and channel resources, and the impact that these structures have on the ability of actors to mobilise resources and coordinate activities. I explored how the institutional structures that currently exist in Cape Town for nodes to access and channel resources are problematic and often contested. In response to these problematic institutional structures, nodes were seen to either bypass formally recognised institutional structure or create alternative, informal institutions that exacerbate instead of solve the underlying problems. I claimed that these contested institutions for public participation impact on the ability of CCT

nodes to assess and understand the needs and priorities of residents, prevent CCT nodes from channelling critical resources to residents and communities in need, and prevent residents from communicating with local government and from accessing the necessary support from government. I argued how node-specific and non-aligned institutions within the CCT create and exacerbate silo-based, non-collaborative approaches.

PART FIVE:

SYNTHESIS

CHAPTER NINE:

STRENGTHENING COLLABORATION: THE ROLE OF MULTI-ACTOR PLATFORMS, INTERMEDIARIES, AND SOCIAL CAPITAL

1. INTRODUCTION

In Chapter eight, I highlighted how neither local government nor communities in informal settlements are fully equipped to drive DRM, but both groups of actors have access to some of the key sets of resources. Not only does this mean that both sets of actors need to be brought to the table in order to manage disaster risk effectively, but other external actors who have access to unique resources that local government and communities cannot access on their own also need to be brought in. In this chapter, I argue that bringing multiple actors together does not necessarily mean that they will be able to collaborate or share resources because of various obstacles that challenge collaboration. Drawing on Ekstrom *et al.*'s (2011) barriers to adaptation framework, I highlight what some of the obstacles to collaborative disaster governance are in the Cape Town case study, from a nodal governance approach. I argue that understanding the barriers to collaborative governance in the Cape Town case study can advance an understanding of the types of barriers that cities in the global South can and do face in their disaster governance context.

In this chapter, I consider the role that multi-actor platforms, inclusive partnerships, and intermediaries can play in addressing the barriers to collaborative disaster governance that were found in Cape Town. I argue that multi-actor platforms can bring multiple actors together into spaces that enable dialogue, knowledge-co-production, and collective action. I consider the role of multi-actor platforms in connecting multiple actors, and enabling them to articulate their diverse needs and capacities and more effectively access and channel resources. The discussion is framed using the concept of 'spaces of participation' and how inclusive spaces need to be created that allow actors, with varying degrees of power, to come together to frame and address

disaster governance issues. Insights from the FliCCR project[83] are included to reflect on the process of bringing multiple actors together into spaces that enabled dialogue on issues of flood governance specifically and collaborative governance more broadly. The chapter ends with a brief discussion on the need for partnerships with external actors (*e.g.*, NGOs, CBOs, and FBOs), who bring with them critical resources such as social capital, and can thus help to play a key intermediary role between local government and communities. Finally, the chapter highlights the importance of social capital that intermediaries can provide, which I argue is critical for enabling collaborative processes to take place.

2. ADDRESSING THE BARRIERS TO DISASTER GOVERNANCE

In this thesis, the concept of disaster governance emphasises the diversity of actors working collectively towards a common goal (*i.e.*, managing disasters). Although I have argued that multi-actor collaboration and networks are essential for strengthening the resilience of at-risk communities, my research in Cape Town highlighted that there are many obstacles that inhibit these actors' ability to collaboratively manage risk. Well documented in the literature are the challenges of bringing multiple actors together onto common decision-making platforms because of ideological differences between these actors, actors not seeing eye-to-eye on complex issues, and actors not always having the same priorities (Stoker, 2004, Warner *et al.*, 2006, Isandla Institute, 2011, Fatti and Patel, 2013). Chapters Seven and Eight of this thesis highlighted how actors' mentalities, non-standardised definitions of the nature of the problem, unclear roles and responsibilities, a lack of resources, and problematic institutional structures can impact on the ability of nodes to collaborate and engage in ongoing consensus-building processes.

In order to understand what these obstacles are and how they can hinder collaborative processes, I draw on Ekstrom *et al.*'s (2011) 'barriers to adaptation framework' (as explored in Chapter Four of this thesis). Barriers are defined by Ekstrom *et al.* (2011:1) as "obstacles that delay, divert, or temporarily block the… [given] process, but which can be overcome with concerted effort, creative management, change of thinking, prioritisation, and any related shifts

[83] A reminder that this research formed part of the broader *Flooding in Cape Town under Climate Risk* (FliCCR) project. This three-and-a-half-year project (2010-2013) aimed to identify actors involved in inland flood management and sea-level rise, and to explore the potential for collaborative mechanisms of flood and sea-level rise management, at both municipal and local community levels. How my research fitted within the broader FliCCR project is summarised in Chapter Five and details of the workshops conducted as part of the FliCCR project are presented in Appendix 6.

in resources, land uses, or institutions." In order to understand what barriers there might be to disaster governance, I re-frame an understanding of these barriers from a nodal governance approach, as barriers emerging from a node's mentalities, resources, technologies, and institutions. Table 23 presents the barriers to collaborative disaster governance that were identified from the Cape Town case study, using the nodal governance framework.

Table 23: Barriers to disaster governance in Cape Town from a nodal governance approach

Barrier Type	Details
Mentalities	- Multiple, unclear definitions of the nature of the risk or the disaster/problem by all nodes - Insufficient understanding by nodes of each other's actual needs or priorities; often these needs/priorities change, and nodes do not re-assess or keep up-to-date on changing needs/priorities - Unclear/contested roles, mandates and responsibility within/between nodes - Distrust and negative perception of plans/activities implemented by other nodes - Unrealistic expectations by residents (*i.e.*, all levels of risk are the government's responsibility) - Perception from all nodes that the issue is too complex/overwhelming to address - Local government's fear of vitriolic attacks prevents them from engaging with residents
Resources	- Nodes lack capacity in terms of appropriate skills for engagement, conflict management, facilitation, and leadership skills - Nodes lack the human and financial resources for on-going, long-term engagement processes - Local government lacks the social capital to engage with and partner with communities
Technologies	- Lack of transparency with regard to processes (*e.g.*, local government not informed about who local community leaders are; residents not informed about DRR plans or DRAs) - Lack of adequate advertising of important meetings and workshops, resulting in many residents missing out on important opportunities to be heard by and to learn from local government - Participation and engagement is a lengthy, time-consuming process that requires commitment and resources from all nodes - Local government tries to bypass community-based leadership during planning and implementation phases, which results in conflict, delays, vandalism, and stalemates. - Residents excluded from problem framing and not consulted during risk assessments; residents not allowed to participate on the Flood Task Team - DRAs not communicated to residents once finalised - Lack of appropriate communication channels between residents and local government; channels that do exist are not monitored and requests do not always reach those they should - Flood Task Team meetings and higher-level meetings by local government (*i.e.*, especially DRMC) are located in places and at times that make it difficult for the urban poor to participate and attend; these meetings are also held in English and are very technical, which makes it challenging for residents from informal settlements to access this space

Institutions	- Political short-termism and lack of cross-over, which disrupts DRR planning and implementation; Mismatch between officials/politicians' time in office and a lack of commitment to follow through the whole process because it's too resource- and time-heavy - Weak monitoring and accountability of participatory and engagement structures - No legal recognition of local leadership structures in informal settlements and the role that they play in mobilising communities; these channels of communication are informal/ transient and often ignored/bypassed by local government, or fail to meet the needs of all residents (often they are partisan and corrupt); Local leadership in communities act as gate-keepers, which can result in miscommunication, delays, nepotism, and corruption - Spatially-segregated offices and directorate-based financial and reporting structures make it difficult for departments to work collaboratively and overcome silo-based approaches - DRMC not ideally placed within the overall government structure to make decisions or have authority over other departments with regard to overarching DRR issues - Top-down, technocratic approach to managing flood risk, with local government making policy decisions and excluding residents' need, priorities, and local knowledge - Ward councillors, who are responsible for channelling resources and communicating with residents do not always communicate with, engage with, or request resources for their communities

Cowan and Arsenault (2008) explain how collaboration might fail or the collaborative process might derail because of conflict between different actors, actors disagreeing or changing their minds about the goals of the project/process's goals, or a particular actor or group of actors feeling disenfranchised from/during the process. Despite theoretical understandings of how beneficial and necessary collaborative disaster governance is for building resilience, the previous chapters have highlighted how disaster governance is also very difficult to achieve in practice. In practise, these collaborative, decentralised, and inclusive governance approaches, which involve actors often outside of taken-for-granted networks, are harder to design, implement, and maintain. From my research in Cape Town, it was evident that there were five key, overarching barriers that CCT nodes identified as preventing an inclusive and collaborative disaster governance approach:

1. It is a lengthy and time-consuming process and often there are more immediate and urgent needs;
2. Local government lacks the resources (financial and human) to engage properly with the relevant nodes (especially disgruntled residents and highly-political and sensitive situations); and
3. Local government lacks the necessary skills for facilitation, conflict management, and communication;
4. Individual, node-specific mandates, priorities, and reporting/financing mechanisms make it challenging for nodes to collaborate and overcome silo-based activities; and

5. Political agendas, political interference, and political 'short-termism' delay, divert, or prevent local government officials from planning and implementing long-term, on-going engagement processes.

Although identifying and recognising the barriers to disaster governance is one step in the process of building resilience, it is also important to think about approaches to overcoming these barriers. In order to overcome institutional shortcomings of local government, Satterthwaite (2011) argues that there needs to be buy-in and coordination amongst many sectoral agencies (within government), and local government needs to support and enhance the capacities of households and local organisations through public-private partnerships; this is especially important, Satterthwaite (2011:772) argues, for those local governments with "limited capacities and finances where a high proportion of housing is within informal settlements". As found in the Cape Town case study, not one entity has sufficient resources and capacities to address flood risk; therefore, the institutional structures in place, both formal and informal, need to be strengthened to enable nodes to pool critical resources, to channel resources effectively, and to ensure that those nodes who need the resources, receive them.

When considering the conditions necessary to address the barriers to collaborative disaster governance in cities of the global South, it is also critical to consider what this means for building the resilience of cities and systems to respond to and recover from disasters. From literature on and definitions of resilience, a recurrent theme is that of 'bouncing back' to a previous state (Bahadur *et al.*, 2010). Roberts and O'Donoghue (2013) argue that 'bouncing back', however, is not a useful concept for cities of the global South where the current 'form' is not one that 'resilient' cities should settle with. Instead, the terms 'bouncing forward' and 'transformation' are ones that should be applied and integrated into any resilience-building processes (Roberts and O'Donoghue, 2013). Disasters in cities of the global South should therefore not simply be 'resisted', but seen as opportunities to change and learn (Folke, 2006, Folke *et al.*, 2010, Roberts and O'Donoghue, 2013).

As Folke (2006) and the IPCC's (2012) report highlight in their understandings of 'transformation', resilience processes should provide the opportunity for systems to build adaptive capacities and develop new trajectories, which include altering fundamental attributes of the system, such as legislative, regulatory, and financial structures. In the case study of Cape Town and the barriers to collaborative disaster governance that were highlighted, this need to 'transform' is particularly pertinent for altering and strengthening problematic monitoring and accountability mechanisms, silo-based reporting and financial structures, insufficient capacities

of departments and government officials, and problematic and non-inclusive communication and participation channels. All of these elements were either lacking or not functioning as Cape Town's local government intended; therefore, I argue that for there to be any real 'transformation' in the sense of building resilience to disasters, cities of the global South need to also identify and then address problematic institutional structures and capacities that create barriers to collaborative disaster governance.

Some of the barriers to flood governance in Cape Town highlighted the need for better monitoring of personnel, resources, and various processes (*i.e.*, communication, engagement, and participation processes), the implementation of policies targeted at ensuring equitable participation of civil society and external actors in governance systems, and the need to build trust and social capital between residents and local government. There also needs to be a transparency of these processes and better monitoring and accountability structures put into place for local government, external actors (*i.e.*, contractors and service providers), leaders in communities, and residents.

From a nodal governance approach, the following conditions therefore need to be taken into consideration when thinking about how a city of the global South, such as Cape Town, can address barriers to collaborative disaster governance:

1. **Mentalities:** There needs to be a shift in understanding the nature of the problem and in thinking about solutions; this includes diversifying the types of knowledge considered in decision-making and DRAs;
2. **Resources and technologies:** Bringing diverse range of actors together to better access and mobilise resources and technologies; this includes NGOs and other external actors who provide critical social capital and different knowledge;
3. **Technologies:** Ensuring that information is available to and communicated appropriately to multiple actors; this includes the formation of inclusive, multi-actor platforms that enable multiple actors to reach consensus on issues, share resources (including knowledge), and enable collaborative decision-making and activities; and
4. **Institutions:** Addressing problematic institutional structures (including monitoring and accountability, silo-based reporting, and resource allocation structures (*i.e.*, funding)); this includes strengthening existing collaborative

structures and partnerships between multiple actors, and establishing inclusive channels of participation and engagement.

3. ENABLING COLLABORATION: ROLE OF MULTI-ACTOR PLATFORMS AND INCLUSIVE PARTNERSHIPS

The concepts of resilience and adaptive capacity are particularly important when considering the questions of 'why' collaboration and partnerships between multiple actors are important, as well as 'how' collaboration and partnerships should be formulated. In order to discuss how collaboration and partnerships can strengthen the resilience of cities and communities to disaster risk, I refer again to the key characteristics of a resilient system that Berkes (2007) suggests. According to Berkes (2007), a resilient system is able to live with change and uncertainty by building social and ecological memory from past experiences. A resilient system also nurtures diversity in partnerships between multiple actors and scales, which increases the potential for knowledge-sharing, bringing new knowledge, and combining different forms of knowledge, including knowledge gained from social and ecological memory (Berkes, 2007). This helps to stimulate learning and innovation, bridge gaps in cross-sale and cross-sector understanding, and increase the number of available options before, during, and after an event. Berkes (2007) also argues that a resilient system creates opportunities for self-organisation and re-organisation; this means that communities have the adaptive capacity to organise themselves socially and politically in the face of disasters, as well as build networks across scales of governance, through multi-level partnerships. Therefore, I argue that collaborative mechanisms and partnerships are central to the process of building resilient communities and cities.

Within collaborative governance discourse, collaboration implies the agency for multiple actors to communicate and influence decision-making through deliberate, multilateral processes (Ansell and Gash, 2007). Implicit in this idea is that multiple actors are brought into the same political and decision-making space because they all have the responsibility for deliberating on and producing solutions for addressing a common problem. While collaboration was identified by nodes in Cape Town as a key component of designing and implementing DRR activities, many nodes recognised that collaboration was often lacking in current DRM practice. From a nodal governance approach, I see collaboration as a technology that enables nodes to pool and channel resources (human, physical, and financial), reach common ground in terms of definitions of key terms and understandings of the nature of the problem (mentalities), and

ultimately work towards a common goal. Various nodes represented on the Flood Task Team identified several key outcomes of collaboration, in terms of strengthening their ability to carry out flood-related activities (Table 24). Residents also expressed the need for local government to work with them because they have valuable local knowledge that local government could use; in addition, if local government collaborates with residents, they could strengthen the adaptive capacities of communities.

Table 24: Benefits of collaboration as perceived by nodes on the Flood Task Team[84]

Theme	Quotes from Flood Task Team officials
Pool resources (human, financial, physical)	• "Scarce resources can be utilised optimally." • "It allows you to pull different resources together." • "More people to assist [you], when you partner with stakeholders." • "Different experiences and skills can be merged together for better results."
Share knowledge and information	• "Different departments and NGOs can learn more from each other and how the CCT services and operates." • "An opportunity to know more things that you would not have known." • "It will enhance effectiveness of communication about flooding."
Social capital	• "Build relationships." • "It will build confidence [about the CCT] in the community."
More holistic approach to a complex/multi-faceted problem	• "Managing any specific hazard requires intense collaboration between the different sectors of society, as there are links pertaining to the underlying causes and why people are forced to settle in flood risk areas." • "Prevent departments from working in silos." • "You can do more working as a team."
Achieve buy-in from multiple nodes	• "Collaboration needs to take place between government (at all levels), the private business sector (for funding), NGOs, CBOs, and the general community in order to achieve buy-in to the interventions." • "Raises awareness with residents; if residents are more aware, they can assist in mitigating some of the flood risk."
Avoid duplication or gaps, and delays	• "To eliminate duplication of certain interventions (over/under-response)." • "Less wasteful expenditure, as we avoid duplication of services." • "There may be lots of NGOs/service providers that do the same thing or provide the same service, without you knowing. So coming together will allow you to be able to bridge the gaps and make sure services are given where it is due." • "Save time and money which could be spent on new interventions, when working interventions are already in place."
Collective image, voice, understanding, and approach	• "We can all speak with one voice." • "You can project a good image [of unity]." • You will know what the next department is doing." • "You will know what residents think in terms of their responsibilities in the process." • "You can determine a definition of flooding in order to have a fair/balanced approach." • "You will know how residents perceive flooding." • "Between departments, you can have a joint approach." • "With external stakeholders, you can share the same goals." • "So all stakeholders (*e.g.*, departments, NGOs, residents) can work in synergy." • "To work to a common goal and objectives."

[84] Responses were provided by nodes during FliCCR's workshop on the 21st January 2013 (see Appendix 1).

GNDR's (2013) *Views from the Frontline* report highlights the importance of partnerships and interactions between multiple actors within a disaster governance context because these multiple actors bring multiple bodies of knowledge with them. These bodies of knowledge can complement one another, which increases the potential for solutions and positive disaster governance outcomes, or they can contradict, which could also lead to better awareness, changed mindsets, and stronger solutions and outcomes (GNDR, 2013). Armitage *et al.* (2011) argue similarly that networks and interactions between multiple actors allow actors to contribute and combine a plurality of knowledge sources and types, in order to address a defined problem. This type of collaborative, knowledge co-production enables learning, which can strengthen an individual or group's adaptive capacity to cope with the variability and uncertainty inherent in complex environmental problems (Armitage *et al.*, 2011).

As found in Cape Town and as argued in the literature, bringing multiple actors together, who often have different ideologies and knowledge, is not an easy process (Stoker, 2004, Cowan and Arsenault, 2008, GNDR, 2013); especially in countries that have a long history of conflict between government and civil society. This is a pertinent issue in South Africa, where the legacy of Apartheid has resulted in informal settlement residents who are isolated geographically and economically from accessing particular resources and networks, and politically excluded from actively participating in local government decisions and plans in terms of DRM. This marginalisation highlights the importance of considering power (in)balances between residents and state actors, especially when considering how to bring these actors together into mutual, consensus-building spaces that aim to collaboratively address disaster risk. As stated in GNDR's (2013:24) report, creating spaces for dialogue on DRR issues should therefore be seen as a long-term political process, where multiple actors can "debate, negotiate, resist, and decide on DRR policies, regulations, and practices".

In disaster scholarship, multi-actor platforms are seen as an alternative for governing complex problems because they are a flexible and participatory method that brings together a diversity of actors from different scales of governance to work collectively towards more coordinated and integrated DRR activities (UNISDR, 2007, UNISDR, 2010, Djalante, 2012, Tierney, 2012, Tierney, 2014, Twigg, 2015). These different actors, who perceive the same management problems, are brought together voluntarily or statutorily, to interdependently yet collectively agree on strategies for solving problems (Steins and Edwards, 1999, Djalante, 2012). Multi-actor dialogue, via a multi-actor platform, is not simply a 'conversation', but an 'interactive approach' to achieve a particular aim and/or solve a problem (Warner, 2006). I argue that implementing multi-actor platforms is one way to strenghten local DRR and resilience because they can help

nurture diversity through partnerships, bring different sources and forms of knowledge together, build broader and deeper social and ecological memory, increase capacities for information sharing, and empower a broader range of actors to self-organise and re-organise.

The CCT's Flood Task Team is one example of a multi-actor platform; it brings together multiple local government departments and NGOs with the aim of collectively reaching consensus on flood risk reduction activities and priorities. The Flood Task Team is recognised by many CCT and external nodes as an institutional structure that enables collaboration between CCT nodes. Flood Task Team nodes highlighted during FliCCR's 2013 workshop[85] that collaboration through the Task Team is important for the following reasons:

1. helps to pool resources;
2. allows departments from diverse backgrounds to share expertise and their experiences;
3. helps to build a holistic approach to addressing flood risk;
4. helps to projecting an image of unity (of the CCT and their activities);
5. helps to improve communication between departments; and
6. helps to ensure and strengthen buy-in from multiple departments.

CCT nodes represented on the Flood Task Team recognise that they all have different sets of resources and that if they partner with one another, they could share those resources and ultimately strengthen their capacity to reduce flood risk.

> Development Services (31/01/2013): *"I could say it* [collaboration] *improves resource capabilities.* […] *In a sense that, if you collaborate with your NGOS, external stakeholders, and other line people, you have more resources. You get more exposed to resources that you can use than when you do it yourself. You branch out when you have more external people."*

By collaborating, it was recognised that the CCT departments can work towards the same goals and responsibilities and are better able to project an image that the various departments have the same vision and are united in reducing flood risk and improving services across Cape Town.

[85] Referring to the workshop held with Flood Task team representatives on the 21st January 2013 (see Appendix 6 for a list of FliCCR's workshops).

> DRMC (31/01/2013): *"When you're* [CCT officials] *out there in the community and we collaboration and sharing the same goals and same responsibilities, you also projecting an image that we* [CCT departments] *got the same vision and we're creating unity. Departments working in silos don't know what the other one is doing. And it* [departments collaborating] *just projects a better image out there with the communities. We are able to say, when I'm out there doing education and awareness… I am able to say what Water Works are doing, what Housing is doing, what Solid Waste is doing…"*

Despite the benefits of this Flood Task Team, which nodes in Cape Town identified, I argue that as an institutionalised mechanism for ensuring multi-actor collaboration, the Flood Task Team has many shortcomings that instead impact negatively on the resilience of at-risk communities. The Flood Task Team is a great example of how departments have managed to work together and cooperate on flood-related issues; this is in contrast to other municipalities in South Africa, which indicate very little cooperation between departments in terms of DRR interventions (Botha and Van Niekerk, 2013). The departments represented on the Flood Task team still operate within very silo-based and department-specific financial and reporting structures and with very department-specific mandates. In addition, although there might be a certain level of collaboration between CCT departments, there is very little collaboration with NGOs, communities, and other external actors beyond the select group of NGOs that are 'activated' during flood events[86]. Despite the Flood Task Team being a mechanism for communication, engagement, and cross-sector participation, this multi-actor platform excludes any non-state actors from the meetings, except for those they invite specially (*e.g.*, I was invited to present my research during one of their meetings).

In order to understand and theorise the types of spaces available for participation and collaborative processes, I refer to the concept of 'spaces of participation' (Cornwall, 2002, Miraftab, 2004, Gaventa, 2006, Winkler, 2011). These spaces, which are on a continuum from 'closed' spaces on the one end, to 'invited' in the middle and 'claimed' spaces on the other end, are defined as follows (Cornwall, 2002, Miraftab, 2004, Gaventa, 2006, Winkler, 2011):

- **Closed spaces:** decisions are made behind 'closed doors' by a specific set of actors; anyone outside of that group is 'excluded' from the decision-making.
- **Invited spaces:** facilitated/created/legitimised by government and often backed by constitutional or legal requirements/guarantees. Civil society (seen as users or

[86] For details on these NGOs, see Chapter Six, Section 3.3.1.

beneficiaries) is seen as 'invited' to participate in these spaces by authorities, be they government, NGOs, or international agencies. The space is essentially regarded by the authority as being their 'domain'. These types of spaces are often regularised, and can be transient or once-off.

- **Claimed, created, or invented spaces:** used collectively by civil society to confront authorities and challenge the status quo, with the hope for resisting and overthrowing dominant power relations. These spaces are more organic, emerging from a set of common concerns and like-minded people mobilising. This is the space where people who are 'excluded' find a voice and a place; it is a space that is made *by* participants, rather than *for* participants, as in the case of invited spaces.

In South Africa, engagement and public participation has become institutionalised via the various municipal councils, ward committees, and Integrated Development Forums (Isandla Institute, 2012). This approach to public participation, in the form of invited spaces, can be problematic because it shows little tolerance for other forms of community engagement and social mobilisation (*i.e.*, claimed spaces) (Isandla Institute, 2011, 2012). In the South African context, and as evident from my research in Cape Town, these institutionalised structures for public participation are dysfunctional and susceptible to patronage, factionalism, and fragmentation (Bénit-Gbaffou, 2008, Sinwell, 2010, Isandla Institute, 2012). It is with this in mind that I argue that invited spaces, although the preferred mechanism for public participation by local government in South Africa, are not conducive to fair and transparent public participation processes that address the needs of the urban poor. Although the government is constantly trying to fix the ward committee system, what is really needed is for the wider systematic factors inhibiting public participation to be addressed first (Isandla Institute, 2012).

Thompson (2007) argues that in order for participatory governance processes to be effective, governments need to view the participatory processes as a vehicle to bring about change. Unfortunately, governments usually view participatory processes as a vehicle for legitimacy in policy- and decision-making (Thompson, 2007). In addition, although invited spaces enable those with enough 'expertise' and 'knowledge' to challenge government's decisions and policies, these spaces are less open to poor, marginalised groups (Thompson, 2007). Winkler (2011) is also wary of 'invited' spaces, arguing that although participatory democracy is enshrined in South Africa's constitution and other legislation, state-led participation, via 'invited spaces' at the local level and 'closed' spaces at national level, results in there being no real transformation in deliberative democracy. I argue that the same is true in the context of South Africa's DRM legislation, where there has been little progress in terms of enabling public participation in DRM

processes, despite legislation that calls for participation. For example, the Flood Task Team is actually a 'closed space', or on rare occasions, an 'invited space' to specific people (and usually not poor community residents).

Although multi-actor platforms are argued to be an ideal vehicle for bringing multiple actors together to manage conflict, settle disputes, and empower civil society, Warner (2006) cautions us about these platforms, arguing that it is also important that these potential 'outcomes' are not taken for granted. Multi-actor platforms can instead create conflict and marginalise further particular groups/actors because they are 'excluded' physically from the multi-actor platform or they are not given equal status as a result of socio-political differences (Warner, 2006). For example, a particular actor or group of actors might not understand the language used or might not have the 'expert' knowledge or persuasion skills that other actors on the platform have. From my research, FliCCR's March 2013 workshop[87] provides an example of people being excluded from a multi-actor platform because of socio-political and economic differences. This workshop, which was facilitated by an experienced facilitator, aimed to bring multiple actors together (into an invited space) to enter into dialogue on issues raised during FliCCR's research on flood governance in Cape Town. One of the informal settlement residents was repeatedly silenced by the workshop facilitator because her concerns/issues raised at particular points during the workshop did not match the 'topic' that was being discussed according to the agenda of the workshop, and were therefore 'interrupting' the proceedings. This action further marginalised this person's voice as a result of her not following the assumed 'etiquette' of the workshop and not speaking with the same technical language that dominated the workshop (*i.e.*, the workshop was in English, which was not this person's first language, and academics versed in technical language presented the findings).

Logistically, not just politically, multi-actor platforms are challenging. As experienced from FliCCR's March 2013 workshop, only two residents participated; the other thirty invited residents failed to secure transport[88] to attend the workshop near the centre of Cape Town, which geographically and socio-economically speaking, was very far removed from their community. On the other hand, CCT officials refused to attend a workshop proposed prior to FliCCR's March 2013 one, which would have been held in/near the informal settlements; geographically and socio-economically, but also politically, this was seen as not ideal by CCT

[87] For details of this workshop and for a list of FliCCR's workshops, see Appendix 6.

[88] FLiCCR's plan was to financially compensate any residents from informal settlements for their travel to the venue. Despite this, selected residents failed to use available public transport and some residents, who had 'hired' a taxi minibus for the day, failed to show up at the venue. In hindsight, FliCCR realised that they should have hired a vehicle and driver to personally fetch residents from Philippi.

officials. The CCT officials refused to take part in these dialogues hosted in Philippi because of safety concerns and their fear of being targeted and victimised by residents on service delivery issues during a time in Cape Town when service delivery protests were increasing violent and volatile. When FliCCR's May 2013 workshop was hosted in Sweet Home[89], with specific CCT officials and politicians invited, the turnout of CCT officials was fairly poor and the workshop was seen by CCT officials as a platform for propaganda and for them to 'assure' residents that they were doing everything in their capacity. The power was therefore seen to stay with the CCT officials who talked 'at' rather than 'with' residents.

The two examples highlight a very important issue when thinking about collaborative processes, particularly in cities of the global South. Steins and Edwards (1999) argue that simply bringing people together onto common platforms does not automatically make them equal. Both Warner (2006) and Tseng and Penning-Rowsell (2012) highlight how engagement is about politics and power sharing. From collaborative governance discourse, authors argue that although collaborative processes are about enabling all actors (*i.e.*, non-state actors included) to be directly involved, leadership roles and the ultimate authority on decisions often remain with the state and their agencies (Leach *et al.*, 2002, Ansell and Gash, 2007). Warner (2006) argues that government is often reluctant to relinquish control and cede power, and in some cases, civil society is reluctant to take it. When reflecting on the issue of power sharing in engagement processes, Tseng and Penning-Rowsell (2012) argue that often this 'power' lies with the government, and that during engagement processes, they should 'devolve' this power to other actors. Tarlock (1999) disputes this however, arguing that collaborative governance should not be seen as devolution of power, but rather as ensuring that there is shared responsibility for the management of resources. In light of this, I argue that disaster governance should not be seen as a way for the state to relinquish ('devolve') their responsibility and pass it on to non-state actors, which state actors would be reluctant to do anyway, but instead to ensure that all actors, at all levels, are given the capacity to actively participate in consensus-oriented decision-making and assume shared responsibility for reducing disaster risk.

In the case of South Africa, local government is very reluctant to relinquish control to residents, but residents are determined to take some of this control; this is evident in the various service delivery protests common across South Africa[90], and interviewees (residents) describing how they always call CCT officials and the ward councillor (through various channels, including personal phone numbers) for information, services, and action. This 'tug of war' creates conflict

[89] This May 2013 workshop was in response to the poor turnout of residents at the March 2013 workshop, as well as an opportunity to encourage multi-actor dialogue based on my findings/involvement in Sweet Home.
[90] See Sacks (2012, 2014) for a report and discussion on the protests in Sweet Home.

in itself, but I argue that this willingness of residents to take some control (*i.e.*, via claimed spaces) is a positive factor; residents holding local government accountable for service delivery, requesting support from DRR and DRA activities shows that not all residents are passive recipients of DRM, but want to be active actors in disaster governance processes. Part of the issue here is that the CCT needs to be empowered to share some of the responsibility; CCT officials indicated that they lack conflict management and facilitation skills, and I argue that if they had these skills, they might feel more confident relinquishing control and building the capacities of residents to take responsibility.

Faysse (2006) identifies circumstances under which multi-actor platforms have unfavourable outcomes: high social inequities; a state that is too strong or weak to support the process and decisions resulting from the process; disorganised actors/groups; and a lack of financial and technical capacities to implement these platforms. Wesselink *et al.* (2011) argue that practitioners need to be realistic when considering participatory processes; instead of seeing participation as a way to achieve deliberative democracy ideals, practitioners need to recognise the difficulties inherent in policy-making and decision-making processes. Wesselink *et al.* (2011) highlight how the challenges that environmental policy-makers face usually stem from political power struggles and not from a lack of participation.

Tseng and Penning-Rowsell (2012) argue that people's expectations and the reality of what can be accomplished can lead to further distrust, conflict, frustrations, and blame. This was evident in the Cape Town case study, especially during the May 2013 workshop when residents expected to find solutions from the workshop, but CCT officials could not make any promises without first consulting senior management. These findings link closely to issues of capacities and capacity-building. For example, Matsuoka *et al.* (2012) argue that a decentralisation of DRR activities does not immediately lead to participatory DRR because of constraints in terms of capacities at local levels. In the Cape Town context, residents lack the resources (time, financial, and education) to participate properly in engagement processes, and local government sometimes lacks the capacity and resources to facilitate ongoing, long-term engagement processes. Engagement processes mean that poorer participants have to take time off from work, which could be a barrier to their ongoing, long-term participation. This highlights the need for local government and residents to be supported in terms of capacities, including financial and human resources, as well as authority and decision-making powers.

I argue that collaborative governance is a process that requires engagement across various social and institutional boundaries, with inclusive partnerships and multi-actor platforms

recognised as one way to overcome traditional, silo-based approaches. However, these inclusive partnerships and multi-actor platforms will only address barriers to collaborative processes as long as they are complemented by better monitoring and accountability of these processes and more deliberate, systematic approaches to fostering collaboration between multiple actors. This highlights the importance of creating/strengthening institutional structures that enable and build collaboration; for example, strengthening monitoring and accountability mechanisms, and creating inclusive communication channels and participatory approaches. A 'multi-actor' platform is not sufficient and will not necessarily result in collaboration; there also needs to be these other participatory/inclusive structures to support the process. Winkler (2011) argues that for any real transformation to take place, such as in the South African context, we need an approach that recognises the tension that exists between claimed and invited spaces. Citizens need to be able to claim a space that challenges public policy, and state actors need to respond to these claimed spaces by changing current institutional structures to ones that are more inclusive, responsive, and effective (Winkler, 2011).

4. THE ROLE OF INTERMEDIARIES: BUILDING PARTNERSHIPS WITH SOCIAL CAPITAL

I have highlighted the role that multi-actor platforms can play in building and supporting collaborative processes. The role of external actors, such as NGOs, researchers and scientists, and the private sector, is also important because they can mobilise diverse and scarce resources, provide social capital, and provide information and knowledge that can help to inform decision-making. I argue further that external actors are particularly important in sensitive contexts where issues are highly contested and some of the actors are socio-politically marginalised, as is the case in many of South Africa's informal settlements.

Social capital, in the form of trust, accountability, and networks, is argued to be necessary for ensuring high levels of coordination and cooperation between multiple actors (Mayunga, 2007, Bahadur *et al.*, 2010). I argue similarly that social capital is critical for there to be collaboration between actors and effective disaster governance processes. In addition, over time, collaboration between multiple actors also helps to build social capital because this collaboration builds trust and fosters reciprocity (Cowan and Arsenault, 2008). Therefore, not only is social capital critical for there *to be* collaboration, but social capital is also a key outcome and benefit *of* collaboration (Cowan and Arsenault, 2008).

In the literature, external actors who play a role in enabling/supporting collaborative processes have many names, such as 'bridging organisations' (Folke *et al.*, 2005), 'intermediaries', and 'intermediary organisations' (Nambisan, 2009, Hodson and Marvin, 2010, Hamann and April, 2013). Folke *et al.* (2005) emphasise the role of 'bridging organisations' in ecosystem management, arguing that these organisations, which can include NGOs and CBOs, or even scientists, are necessary for providing a 'bridge' between local actors and communities, with other scales of organisations. These types of organisations are able to bring resources, knowledge, and other incentives to the table, as well as provide arenas for building trust, sense-making, learning, conflict resolution, and vertical/horizontal collaboration (Folke *et al.*, 2005:461). Furthermore, Folke *et al.* (2005) describe how bridging organisations can also use their networks of actors to "mobilise knowledge and social memory in turbulent times".

Intermediaries, much like bridging organisations, are understood to be those organisations, individuals, departments, or groups of individuals who strive to broker relationships between actors, with the aim of helping those actors to engage and enter into dialogue on particular issues (Folke *et al.*, 2005, Nambisan, 2009, Hodson and Marvin, 2010, Hamann and April, 2013). Hamann and April (2013) highlight how a wide variety of organisation, which range from government agencies to lobbyists, may fulfil the role of a collaborative intermediary organisation. Intermediaries are described by Howells (2006) to be a type of broker or agent that facilitates the process of knowledge transfer across people, organisations, and industries. This role is not just about linking people, organisations, and industries, but about being a knowledge repository, in terms of having expertise and access to particular knowledge, as well as being able to access other actors who possess particular knowledge; other actors can therefore use this knowledge and potential networks to help provide solutions that are a combination of existing ideas by other actors.

Chatterjee (2010) argues that in order for the urban poor to build their resilience to environmental change, these communities need to incorporate innovative networks of support. I argue here that an example of an innovative network is the type of networks that communities can form with and through intermediaries and bridging organisations; these individuals/organisations bring important social capital and connections with multiple actors, as well as enable communities to access particular resources that they would not be able to access otherwise. Leonhardt (2012) argues that networks contribute towards a community's resilience by:

1. helping to break the isolation of low-income communities;
2. providing communities with access to resources, such as financial resources;
3. helping to legitimise communities and catalyse effective action (*i.e.*, by demonstrating social mobilisation, enhancing their reputation in negotiations, and promoting shared aspiration and solidarity in the face of problems); and
4. helping to capacitate communities in terms of increasing horizontal learning and providing opportunities for skills and knowledge exchange.

Although the Flood Task Team was identified by CCT nodes as a key mechanism through which CCT departments are able to collaborate inter-departmentally, the Flood Task Team still lacked the capacity (especially in terms of human resources) to engage with communities and nodes outside of the Flood Task Team. It was highlighted during FliCCR's March 2013 workshop that if the CCT partnered with NGOs like Ikhayalami[91] and the Mustadafin Foundation[92], they would be able to collaboratively strengthen the resilience of communities to disasters. These NGOs and CBOs were recognised as having the know-how (*e.g.*, expert knowledge in particular developmental issue), social capital (*e.g.*, strong ties and rapport with communities), and were seen as being well placed to support disaster governance processes because they are already involved in pro-poor, development- and disaster-related activities.

From my research in Cape Town, there were two examples of innovative, polycentric partnerships that aimed to build the capacity of residents, but also recognised that support from local government is critical: the re-blocking activities by Ikhayalami, and the sand-bag houses by UBU[93]. The difference between these partnerships and the multi-actor platform provided by the Flood Task Team is that these NGOs have strong, established relationships and a history with particular communities, and have community-centred approaches. These NGOs essentially have social capital with community members, which I argue is critical for engagement processes.

When thinking about the role of intermediaries in collaborative processes, it is also important to consider the role of researchers, especially in terms of influencing decision-makers and how they define their interests (Bulkeley and Betsill, 2003). Researchers can help to fill any communication gaps between communities, local government, and scientists (Innocenti and Albrito, 2011, Shannon *et al.*, 2014, Baudoin and Wolde-Georgis, 2015). As a research-based project, FliCCR's findings were influential in shaping the dialogue between the multiple actors

[91] Ikhayalami is an NGO active in Philippi, Cape Town. For more information on this NGO, see Chapter Six, Section 3.3.2.
[92] The Mustadafin Foundation is an NGO active in Philippi, Cape Town. For more information on this NGO, see Chapter Six, Section 3.3.1.
[93] UBU is an NGO active in Sweet Home. For more information on this NGO, see Chapter Six, Section 3.3.2.

involved in flood risk management activities in Cape Town. The FliCCR project helped to shape the agenda and actively bring multiple actors together into a common space, to enter into dialogue and begin discussing the more pertinent issues highlighted by FliCCR's research. The FliCCR project tried to bring multiple actors together into common spaces; essentially transforming negative claimed spaces where community actors confronted/disputed with local government, into positive claimed spaces that enabled multiple actors to engage and deliberate with local government.

As a result of FliCCR's multi-actor workshops, actors were able to make networks and connections that went beyond the scope of the project. From networks and contacts made by UBU during the multi-actor workshop and my involvement/research in Sweet Home, UBU was able to meet and then partner with CCT departments on their community-based housing project in Sweet Home. FliCCR's research also showed how actors in Cape Town from different levels of governance were not talking to one another and that there was very little overlap and sharing of best practices. Researchers can play a critical role in collecting, analysing, and disseminating information, such as best practices. I argue that researchers and the types of dialogues we enabled through our research can be instrumental for building the capacities of communities to mobilise, in the form of claimed and even invited spaces.

Based on the discussion presented in this chapter, I argue that inclusive partnerships and multi-actor platforms are a good mechanism for enabling collaborative governance, as long as they are complemented by better monitoring and accountability of inherent processes, and more deliberate, systematic approaches to fostering collaboration between multiple actors. As seen from the Cape Town case study, simply having multi-actor platforms or inclusive partnerships does not automatically result in collaboration between multiple actors, especially across vertical scales (*i.e.*, state and communities). As a result of the various challenges I highlighted with regard to multi-actor platforms, it is critical that broader institutional structures are also implemented and strengthened, which support rather than undermine collaborative, inclusive approaches to disaster governance. This is particularly pertinent for informal settlement contexts where often the local actors are marginalised geographically, socio-economically, and politically. This is particularly relevant to cities of the global South where local governance is characterised by a lack of monitoring and accountability mechanisms, silo-based reporting and financial structures, a lack of capacities and resources, and problematic communication and participation channels (Satterthwaite, 2011). Systematic approaches are therefore needed enable these actors to have a voice and to ensure that processes and actors are monitored and held accountable, especially when such processes might be more 'informal' and transient. In

addition, intermediaries and bridging organisations are necessary to provide the social capital, knowledge, and communication channels that can help multiple actors, despite their ideological and socio-political differences, to claim spaces for productive dialogue.

5. SUMMARY

In this chapter, I highlighted how although multi-actor collaboration and networks are essential for strengthening the resilience of at-risk communities, there are many obstacles that inhibit actors' ability to collaboratively manage risk. In order to understand what barriers there might be to disaster governance, I re-framed an understanding of these barriers from a nodal governance approach, as barriers emerging as a result of nodes' mentalities, resources, technologies, and institutions. I emphasised further how addressing the barriers to collaborative disaster governance in cities of the global South should be seen as an opportunity for systems to build adaptive capacities and develop new trajectories, which include altering fundamental attributes of the system, such as legislative, regulatory, and financial structures.

In this chapter, I argued that disaster governance is a process that requires engagement across various social and institutional boundaries, with inclusive partnerships and multi-actor platforms recognised as one way to overcome traditional, silo-based approaches. Although multi-actor platforms and inclusive partnerships can enable and strengthen collaborative governance, they need to be complemented by better monitoring and accountability of inherent processes, and more deliberate, systematic approaches to fostering collaboration between multiple actors. I discussed how the Flood Task Team is an example of a multi-actor platform with potential for bringing multiple actors together into invited spaces, but it is failing because it excludes residents and non-state actors and fails to move beyond a 'closed' space. UBU's sand-bag houses and Ikhayalami's re-blocking activities, on the other hand, were argued to be examples of partnerships between communities, NGOs, and local government that successfully used social capital to build the adaptive capacity of residents through community-driven approaches. This chapter also highlighted the importance of external actors, such as intermediaries and bridging organisations. The example presented in this chapter was the FliCCR project, which facilitated dialogue between multiple actors and enabled these actors to form networks and partnerships that went beyond the limited scope of the project.

CHAPTER TEN:

CONCLUSIONS

1. BRIEF OVERVIEW OF THE STUDY

The premise of my thesis was that socio-environmental problems, such as those associated with urban disaster risk and climate change, have become too complex to be managed by traditional, centralised approaches, or individual organisations and hierarchical forms of organisation. Addressing complex socio-environmental problems requires not only a range of approaches to reduce risk, but the involvement of multiple actors and sets of actors beyond the confines of individual organisations and institutions, who bring with them various skills-sets, tools, knowledge, and understandings of the problem. My understanding of what this type of multi-actor, collaborative disaster management looks like in theory was informed by governance literature and Tierney's (2012) concept of 'disaster governance'. Governance, which is defined broadly as the intentional shaping or management of the flow of events within a social system (Burris *et al.*, 2005, Ansell and Gash, 2007, Wood and Shearing, 2007), considers the plurality of actors and how they can collaboratively manage events. Disaster governance, however, applies the concept of governance to DRM; it emphasises the decentralisation of DRM activities and that DRM is no longer limited to state-oriented hierarchies, but also belongs together networks and actors outside of the state sphere who have become increasingly involved in providing services and managing disaster risk and events (Tierney, 2012). This theoretical shift in DRM from state-centred management to multi-actor governance also reflects broader societal changes, such as the rise of contracting and outsourcing, new forms of collaboration, and the replacement of hierarchical, bureaucratic systems of control with more decentralised, networked forms of organisation.

Collaborative governance recognises the importance of a diversity of actors working collectively towards a common goal, as well as the reality that a diversity of actors brings a wider range of mentalities and resources to decision-making. I argued in this thesis that collaborative disaster governance is particularly pertinent for managing urban risk with multiple underlying risk

factors, particularly in cities of the global South, which have high levels of inequality and informality. By shifting focus from the activities and outcomes of DRM processes, to the governance of disaster risk by multiple actors, this research sought to understand the unique characteristics of the diverse sets of actors governing disaster risk in the case study city of Cape Town, questioning whose actions have a bearing on DRM outcomes, and how.

In order to map the diversity of actors who are (and should be) involved in disaster governance, and to explore their capacities for managing disaster risk, I adopted a nodal governance approach. Nodal governance recognises that actors (called 'nodes') differ in their ability to shape and govern events, as a result of their different mentalities, access to resources and technologies, and institutional structures enabling them to govern (Burris *et al.*, 2005). By analysing these four 'characteristics', I was able to better understand how nodes govern, what constrains or enables them to make decisions and implement interventions, and what influence they exert on the world and the social system they are governing. By exploring the nodes and their various capacities or lacking capacities, I argued that decision-makers could understand where to combine unique strengths and capacities, what resources to mobilise more efficiently, and which problematic institutional structures to address in order to strengthen inclusive, collaborative outcomes. Therefore, the aim of this research was to explore how a nodal governance approach can be used to identify and understand the potential barriers and opportunities to disaster governance. In this thesis, the conceptual re-framing of disaster governance through a nodal governance framework encouraged a fresh look at the unique characteristics and capacities of the multiple actors involved in disaster governance and how these capacities could be opportunities for, or barriers to, collaborative processes.

In order to achieve the overall aim of this thesis, the following objectives were presented and addressed:

1. I identified and understood the actors integral to, and the nature of, the disaster governance system investigated (*i.e.*, the case study of flood governance in Cape Town.
2. I drew on the nodal governance approach to help identify the unique mentalities, resources, technologies, and institutions that shape the perceptions and actions of the multiple actors identified as governing disaster risk in the Cape Town case study.

3. I analysed these four nodal governance characteristics and how they interact, in order to determine the barriers and opportunities for collaborative disaster governance.
4. I identified some of the conditions required to address the potential barriers in a way that would help inform a more inclusive and collaborative approach to disaster governance in the case of Cape Town.
5. I contributed towards the emergent discourse on disaster governance by fundamentally enhancing the debate to include issues of nodal governance and barriers to governance.

2. KEY FINDINGS AND CONTRIBUTION TO KNOWLEDGE

One of the contentions in this thesis was that although disaster discourse and rhetoric highlight the need for bringing multiple actors together to collaboratively address disaster risk, simply bringing multiple actors together to govern risk will not automatically result in these actors working collaboratively. I demonstrated that in practice, a collaborative, decentralised, and inclusive disaster governance approach, which often involves a range of actors outside of taken-for-granted networks, is harder to design, implement, and maintain, especially in cities of the global South. As Stoker (2004) argues, although collaborative governance can help solve conflicts about the distribution of resources, it cannot resolve the often deeply-entrenched ideological differences between actors, which often lead to conflicts and barriers in collaborative processes. Although public participation and multi-actor collaboration are recognised in the literature as essential for strengthening resilience of at-risk communities, I argued that there are a number of barriers that can inhibit society's ability to collaboratively govern risk. Recognising that there are barriers constraining nodes from governing, I drew on Ekstrom *et al.*'s (2011) barriers to adaptation framework to inform my understanding of the types of barriers that can impede or prevent collaborative governance processes from taking place in the Cape Town case study. I argued that the process of identifying and understanding the barriers in and to collaborative processes could enable decision-makers to begin addressing and overcoming identified barriers; thereby potentially strengthening the collaborative disaster governance process itself.

With current rhetoric and theory arguing that disaster governance needs to move beyond the confines of local government to including local communities and non-state actors, my research

aimed to question what this means in practice, in cities of the global South, which are often characterised by development backlogs, lack of critical services and infrastructure, weak governance, and marginalised (politically and physically) poor and informal communities. Cities of the global South are currently stifled by top-down, hierarchical, and technocratic approaches to DRM, with solutions sought without the participation of local communities, who often have a better understanding of localised hazards and local politics. By considering instead the benefits of networked, multi-actor, and collaborative disaster governance, I questioned the traditional hierarchical and centralised approach of DRM by the state. I explored the disagreement that exists in the literature and in Cape Town on whether local government or local communities are best equipped to drive the planning and implementation of DRR activities. On the one hand, the responsibility of DRM was argued to be local government's because of their influence on local policies, access to resources, and existing mandates for service delivery and maintenance. On the other hand, I showed that some authors see a community's reliance on government and external actors as something that would erode their resilience and capacity. I argued that local governments in cities of the global South lack the necessary governance structures and resources to effectively govern and manage urban risk. In the Cape Town case study, for example, there is a lack of formally recognised structures that enable residents and CCT nodes to channel and access resources effectively, as well as provide residents with opportunities to contribute local knowledge and access other knowledge (*e.g.*, from technical experts); those structures that are in place, are informal, political, and often problematic.

I explored how governance theory recognises that different actors have access to different resources and by bringing these multiple actors together via networks, a diversity of resources can be pooled, shared, and mobilised more effectively. I argued that bringing multiple actors together and diversifying partnerships within a disaster governance framework will in turn enable actors to build, diversify, and share knowledge in a way that will strengthen the capacity of communities and cities to self-organise and re-organise in the face of disasters; essentially strengthening their adaptive capacity to manage and respond to disasters and climate change. I argued that in the context of informal settlements, the broader responsibilities and capacities of actors beyond just the community and local government are critical to address the multi-faceted, complex, and interconnected issues related to disaster governance. Not one actor is equipped fully to address the issue of urban disaster risk; resources and adaptive capacities (physical, human, financial, *etc.*), expertise and knowledge, social capital, and policy (institutional structures) are all needed and these cannot all be contributed by a single or even a small/restricted number of actors. I emphasised that communities who are part of a network with external actors, including state and non-state actors (*e.g.*, NGOs and CBOs), are more

resilient because these networks allow them to access critical resources, which enable them to self-organise and re-organise in the face of a disaster event, and strengthen their capacity to prepare for, cope with, and recover from disaster events.

I also considered the formal and informal institutional structures that actors work within to access and channel resources, and the impact that these structures have on the ability of actors to mobilise resources and coordinate activities. I explored how the institutional structures that currently exist in Cape Town for nodes to access and channel resources are problematic and often contested. In response to these problematic institutional structures, nodes were seen to either bypass formally recognised institutional structure or create alternative, informal institutions that exacerbate instead of solve the underlying problems. These contested institutions for public participation impact on the ability of CCT nodes to assess and understand the needs and priorities of residents, prevent CCT nodes from channelling critical resources to residents and communities in need, and prevent residents from communicating with local government and from accessing the necessary support from government. I argued how node-specific and non-aligned institutions within the CCT create and exacerbate silo-based, non-collaborative approaches. DRMC's placement within local government structures, for example, is an institutional mechanism that limits DRMC's capacity and potential to coordinate interdepartmental activities, and therefore access and mobilise resources from and to multiple actors outside of their department. I argued that any discussion on the capacities of actors to govern needs to also consider the institutional structures that inform, guide, and constrain the ability of actors to access and channel resources. These institutional structures are key to why particular actors or sets of actors do not have access to certain resources and why they cannot access them in a particular way.

I demonstrated through the Cape Town case study that collaborative governance is challenging in practice because of the multiple mentalities, ideologies, and priorities that multiple actors bring with them. My findings suggested that a lack of clearly defined roles and responsibilities, unclear and non-standardised definitions of flooding, a lack of human resources, and problematic institutional structures are significant barriers to collaborative flood governance in Cape Town. I argued that addressing these barriers, through multi-actor platforms and inclusive partnership, is one approach to creating a more inclusive environment for local disaster risk reduction in Cape Town's informal settlements.

Multi-actor platforms were argued to be a more flexible and participatory governance method, whereby different actors perceiving the same management problems are brought together

voluntarily or statutorily, to collectively explore strategies for solving problems (Steins and Edwards, 1999, Djalante, 2012). Although bringing together multiple actors with divergent priorities, mentalities, and knowledge might create conflict and contradictions, this diversity and contradiction can also enable learning, change mindsets, produce knowledge, and lead to stronger and more diverse solutions and outcomes (Armitage *et al.*, 2011, GNDR, 2013). Multi-actor platforms can strengthen local DRM because they can help nurture diversity through partnerships, bring different sources and forms of knowledge together, build broader and deeper social and ecological memory, increase capacities for sharing information and co-producing knowledge, and empower a broader range of actors to self-organise and re-organise. I highlighted the key role that intermediaries, bridging organisations, and the science community can play in bringing multiple actors together into dialogue and helping to coproduce knowledge. I demonstrated, however, that in Cape Town there is limited involvement of these intermediaries in providing social capital and resources that can enable local government and communities to collaborate on disaster governance processes. I concluded that in order to strengthen collaborative disaster governance in the context of cities of the global South, inclusive partnerships and multi-actor platforms need to be complemented by strengthened institutional mechanisms and more deliberate, systematic approaches to fostering collaboration between multiple actors. If the institutional structures that create barriers to and/or undermine collaborative governance are not addressed, then establishing multi-actor platforms and inclusive partnerships will not be sufficient to build and strengthen collaborative governance; these institutional deficits will limit the potential for multi-actor platforms and inclusive partnerships.

3. TOWARDS A DISASTER GOVERNANCE APPROACH IN CITIES OF THE GLOBAL SOUTH

My research contributes towards the emerging scholarship around the concept of disaster governance: what it means in theory and practice, what the challenges and barriers are to adopting a disaster governance approach in cities of the global South, and how to strengthen disaster governance in these cities. I contribute towards this scholarship by providing a theoretically informed research approach to analyse the capacities of a case study city in terms of its actors' ability to manage a particular disaster risk. I argued that a deeper understanding of the city's actors and their capacities to manage disaster risk can be achieved using nodal governance. This is an important step towards understanding the potential gaps in capacities

and barriers to collaborative disaster governance; by understanding the barriers, decision-makers can then begin to explore the conditions necessary for strengthening collaborative DRM approaches and thus how to strengthen the city's ability to manage complex disaster risk. Since my research only looked at a single case study city, similar research could be conducted in other cities of the global South in order to compare and contrast the findings from Cape Town, and ultimately expand an understanding of the barriers to collaborative governance that cities of the global South face, and the conditions necessary to address these barriers and strengthen collaborative disaster governance. It is hoped that the empirical research presented in this thesis will also contribute to developing a methodology for exploring disaster governance and contribute more broadly towards the emerging theoretical understanding of disaster governance.

This research is relevant at the local context in Cape Town because it provides insight into and deeper understanding of how flood risk is governed by Cape Town's municipality and by communities living in informal settlements that experience flooding; therefore, this research contributes towards a new and theoretically-informed understanding of an issue that affects Cape Town and its urban poor on an annual basis. The findings from this research can also inform DRM policy and practice in Cape Town and South Africa; the findings highlighted the need for decision-makers to implement skills development processes at the municipal and local level, in order to ensure that actors in key decision-making and operational positions are able to manage conflict in informal settlements, facilitate participatory and inclusive DRM processes, and assess the needs of local communities on a more long-term, ongoing basis. This research highlighted the need for implementing policy that will enable government departments to collaborate better with at-risk communities and local NGOs and actors already conducting DRR and education activities in informal settlements; this can ensure that resources are used and shared more efficiently and that capacities are used more effectively. The case study and related findings presented in this thesis are also useful on a broader scale to other South African cities and cities of the global South because it provides an understanding of how the process of mapping actors within a governance process, understanding actors' capacities, and identifying the potential barriers to collaborative processes can help inform a country's DRM policy and practice and potentially strengthen their collaborative disaster governance.

In this thesis, I demonstrated that actors' ability to access and mobilise resources is crucial for determining whether they are equipped to govern. From the case study, I argued that neither local government nor local communities are fully equipped to govern flood risk. Although each set of actors has access to important, but different resources, such as financial, physical, human,

and social, neither set of actors has access to the whole range of resources needed. For example, although local government has access to finances, expertise, and human capital, they lack the social capital, local knowledge, and particular human resources (*i.e.*, in terms of number of staff and facilitation and engagement skills) to assess and address risk and priorities across all communities; this is especially challenging in highly contested and sensitive informal settlements, which are constantly growing and expanding, and are spread across a large geographical area, as in the case of most cities of the global South. I also highlighted how communities cannot build and strengthen their own adaptive capacities without external support from and networks with local government and other actors (*e.g.*, NGOs, CBOs, *etc*.). The empirical research presented in this thesis highlighted how DRM policy and practice needs to go beyond the state and communities, and include actors such as NGOs, researchers, and other intermediaries because they can contribute key resources that local government and communities might lack: social capital, expert knowledge, and facilitation, engagement, and conflict management skills. Further research needs to be conducted in the Cape Town context, as well as other cities of the global South, to explore the capacity of these external actors for supporting both local government and communities, and their role as intermediaries and bridging organisations in collaborative governance processes.

Proposing disaster governance as a way to improve and strengthen DRM in cities of the global South is a sensitive and complex process that needs to recognise the conflicting ideologies, agendas, priorities, and capacities of the multiple actors involved. Better understanding of the actors who are and should be involved, as well as their unique characteristics can highlight those areas that create opportunities and challenges to disaster governance. In understanding those opportunities and challenges, I have argued that cities of the global South can move towards finding options and solutions for strengthening collaboration and disaster governance outcomes. Although my research has suggested potential approaches to address the barriers to collaborative governance identified in Cape Town, more research should be conducted on identifying the conditions necessary for enabling and strengthening multi-actor engagement across various social and institutional boundaries. More research also needs to be conducted on the types of systematic approaches needed for strengthening and addressing problematic institutional structures in cities of the global South and for fostering collaboration and engagement between multiple actors.

REFERENCES

ACTION AID 2006. Unjust waters: Climate change, flooding and the protection of poor urban communities: experiences from six African cities.

ADGER, W. N., DESSAI, S., GOULDEN, M., HULME, M., LORENZONI, I., NELSON, D. R., NÆSS, L. O., WOLF, J. & WREFORD, A. 2009. Are there social limits to adaptation to climate change? *Climate Change,* 93**,** 335-354.

ADPC 2006. Mainstreaming disaster risk reduction into development policy, planning and implementation in Asia. Bangkok, Thailand: Asian Disaster Preparedness Centre (ADPC) Regional Consultative Committee on Disaster Management.

AERTS, J. C. J. H., BOTZEN, W., VAN DER VEEN, A., KRYWKOW, J. & WERNERS, S. 2008. Dealing with uncertainty in flood management through diversification. *Ecology and Society,* 13**,** 41.

AHAMMAD, R. 2011. Constraints of pro-poor climate change adaptation in Chittagong City. *Environment and Urbanization,* 23**,** 503-515.

AKTER, S. & MALLICK, B. 2013. The poverty-vulnerability-resilience nexus: Evidence from Bangladesh. *Ecological Economics,* 96**,** 114-124.

ALEXANDER, D. E. 2013. Resilience and disaster risk reduction: An etymological journey. *Natural Hazards Earth System Science,* 13**,** 2707-2716.

ALLEN, K. M. 2006. Community-based disaster preparedness and climate adaptation: Local capacity-building in the Philippines. *Disasters,* 30**,** 81-101.

ANDERSON, K. 2010. *Managing disasters in the context of climate change: Towards sustainable urban flood management in Cape Town.* Honours Thesis. South Africa: University of Cape Town.

ANSELL, C. & GASH, A. 2007. Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory,* 18**,** 543-571.

ARMITAGE, D. 2005. Adaptive capacity and community-based natural resource management. *Environmental Management,* 35**,** 703-715.

ARMITAGE, D., BERKES, F., DALE, A., KOCHO-SCHELLENBERG, E. & PATTON, E. 2011. Co-management and the co-production of knowledge: Learning to adapt in Canada's Arctic. *Global Environmental Change,* 21**,** 995-1004.

ARMITAGE, N. & ROOSEBOOM, A. 2000. The removal of urban litter from stormwater conduits and streams: Paper 1 - The quantities involved and catchment litter management options. *Water SA,* 26**,** 181-188.

ARTHERN, P. J. 2011. *A comparative study of participatory and household risk assessments and an investigation into the impact of a participatory risk assessment to effect change. Case study: Section D, Sweet Home Farm, Cape Town.* Master of Philosophy Thesis. South Africa: University of Cape Town.

ASHLEY, R., BLANKSBY, J. D., CHAPMAN, J. & ZHOU, J. 2007. Towards integrated approaches to reduce flood risk in urban areas. *In:* ASHLEY, R., GARVIN, S., PASCHE, E., VASSILOPOULOS, A. & ZEVENBERGEN, C. (eds.) *Advances in urban flood management.* London, UK: Taylor and Francis Group.

BABBIE, E. & MOUTON, J. 2007. *The practice of social research: South African edition,* Cape Town, Oxford University Press.

BAHADUR, A. V., M., I. & TANNER, T. 2010. The resilience renaissance? Unpacking of resilience for tackling climate change and disasters. *Strengthening Climate Resilience Discussion Paper 1.* Brighton: Institute of Development Studies.

BALLARD, D., BOND, C., PYATT, N., LONSDALE, K., WHITMAN, G. P., DESSAI, S., EVANS, M. & TWEED, J. H. 2013. PREPARE - Barriers and enablers to organisational and sectoral adaptive capacity - Qualitative study. PREPARE Programme of Research on Preparedness, Adaptation and Risk: Report for Department for Environment, Food and Rural Affairs (DEFRA), UK.

BALLARD, D., REASON, P. & COLEMAN, G. 2010. Using the AQAL framework to accelerate responses to climate change. *Journal of Integral Theory and Practice,* 5**,** 1-18.

BALLARD, R., HABIB, A., VALODIA, I. & ZUERN, E. 2005. Globalization, marginalization and contemporary social movements in South Africa. *African Affairs,* 104/417**,** 615-634.

BANG, H. N. 2013. Governance of disaster risk reduction in Cameroon: The need to empower local government. *Jàmbá: Journal of Disaster Risk Studies,* 5.

BANG, H. N. 2014. General overview of the disaster management framework in Cameroon. *Disasters,* 38**,** 562-586.

BAUDOIN, M.-A. & WOLDE-GEORGIS, T. 2015. Disaster risk reduction efforts in the Greater Horn of Africa. *International Journal of Disaster Risk Science,* 6**,** 49-61.

BAXTER, P. & JACK, S. 2008. Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report,* 13**,** 544-599.

BÉNIT-GBAFFOU, C. 2008. Are practices of local participation sidelining the institutional participatory channels? Reflections from Johannesburg. *Transformation,* 66/67**,** 1-33.

BÉNIT-GBAFFOU, C. & KATSAURA, O. 2014. Community leadership and the construction of political legitimacy: Unpacking Bourdieu's 'political capital' in post-Apartheid Johannesburg. *International Journal of Urban and Regional Research,* 38**,** 1807-1832.

BENJAMIN, M. A. 2008. *Analysing urban flood risk in low-cost settlements of George, Western Cape, South Africa: Investigating physical and social dimensions.* Master of Science Thesis. South Africa: University of Cape Town.

BENSON, C., TWIGG, J. & MYERS, M. 2001. NGO initiatives in risk reduction: An overview. *Disasters,* 25**,** 199-215.

BERKES, F. 2007. Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Natural Hazards,* 41**,** 283-295.

BERKES, F. & ROSS, H. 2013. Community resilience: Toward an integrated approach. *Society & Natural Resources: An International Journal,* 26**,** 5-20.

BERKHOUT, F. 2012. Adaptation to climate change by organizations. *WIREs Climate Change,* 3**,** 91-106.

BERMAN, R., QUINN, C. & PAAVOLA, J. 2012. The role of institutions in the transformation of coping capacity to sustainable adaptive capacity. *Environmental Development,* 2**,** 86-100.

BEVC, C. 2010. *Working on the edge: Examining covariates in multi-organizational networks on September 11th attacks on the World Trade Center.* Doctoral Thesis, University of Colorado.

BLACK, J. 2003. Enrolling actors in regulatory systems: Examples from UK financial services regulation. *Public Law***,** 63-91.

BLAIKIE, P., CANNON, T., DAVIS, I. & WISNER, B. 1994. *At risk: Natural hazards, people's vulnerability, and disasters,* London, Routledge.

BOIN, A. & RHINARD, M. 2008. Managing transboundary crises: What role for the European Union? *International Stud. Rev.,* 10**,** 1-26.

BONGO, P. P., CHIPANGURA, P., SITHOLE, M. & MOYO, F. 2013. A rights-based analysis of disaster risk reduction framework in Zimbabwe and its implications for policy and practice. *Jàmbá: Journal of Disaster Risk Studies,* 5.

BOONYABANCHA, S., CARCELLAR, N. & KERR, T. 2012. How poor communities are paving their own pathways to freedom. *Environment and Urbanization,* 24**,** 441-462.

BOSHER, L., DAINTY, A., CARRILLO, P., GLASS, J. & PRICE, A. 2007. Integrating disaster risk management into construction: A UK perspective. *Building Research and Information,* 35**,** 163-177.

BOTHA, D. & VAN NIEKERK, D. 2013. Views from the frontline: A critical assessment of local risk governance in South Africa. *Jàmbá: Journal of Disaster Risk Studies,* 5.

BOTHA, D., VAN NIEKERK, D., WENTINK, G., COETZEE, C., FORBES, K., MAARTENS, Y., ANNANDALE, E., TSHONA, T. & RAJU, E. 2011. Disaster risk management status assessment at municipalities in South Africa. The South African Local Government Association (SALGA).

BOUCHARD, B., GONCALO, A., SUSIENKA, M. & WILSON, K. 2007. Improving flood risk management in informal settlements of Cape Town: An interactive qualifying project. Worcester Polytechnic Institute (Project submitted for a Degree of Bachelor of Science).

BRAITHWAITE, J. 2004. Methods of power for development: Weapons of the weak, weapons of the strong. *Michigan Journal of International Law,* 26**,** 297-330.

BRYMAN, A. 1984. The debate about quantitative and qualitative research: A question of method or epistemology? *The British Journal of Sociology,* 35**,** 75-92.

BULKELEY, H. & BETSILL, M. M. 2003. *Cities and climate change: Urban sustainability and global environmental governance,* New York, Routledge.

BULKELEY, H., SCHROEDER, H., JANDA, K., ZHAO, J., ARMSTRONG, A., CHU, S. Y. & GHOSH, S. 2011. Chapter 5: The role of institutions, governance, and urban planning for mitigation and adaptation. *In:* HOORNWEG, D., FREIRE, M., LEE, M. J., BHADA-TATA, P. & YUEN, B. (eds.) *Cities and climate change: Responding to an urgent agenda.* Washington, D.C.: The International Bank for Reconstruction and Development / The World Bank.

BURGESS, R. G. 2002. *In the field: An introduction to field research,* New York, Routledge.

BURRIS, S., DRAHOS, P. & SHEARING, C. 2005. Nodal governance. *Australian Journal of Legal Philosophy,* 30**,** 30-58.

BURRIS, S., KEMPA, M. & SHEARING, C. 2008. Changes in governance: A cross-disciplinary review of current scholarship. *Akron Law Review,* 4**,** 1-66.

BUTLER, D. & DAVIES, J. W. 2004. *Urban drainage,* 3rd Edition, Oxon, UK, Spon Press.

CANNON, T. 2008. Reducing people's vulnerability to natural hazards: Communities and resilience. *WIDER Research Paper 34.* Helsinki.

CANNON, T. & MÜLLER-MAHN, D. 2010. Vulnerability, resilience and development discourses in context of climate change. *Natural Hazards,* 55**,** 621-635.

CANNON, T., TWIGG, J. & ROWELL, J. 2003. Social vulnerability, sustainable livelihoods and disasters. DFID.

CASHMAN, A. C. 2008. Institutional responses to urban flooding: Case studies from Bradford and Glasgow. *11th International Conference on Urban Drainage.* Edinburgh, Scotland, UK.

CASTELLS, M. 2000. Materials for an exploratory theory of the network society. *British Journal of Sociology,* 51**,** 5-24.

CASTELLS, M. 2011. *The rise of the network society: Second edition with a new preface*, Wiley-Blackwell.

CBDRR 2007. Community-based disaster risk reduction in Southeast Asia. *CBDRR in Southeast Asia,* 4.

CCT 2002a. Policy for development control near watercourses. *Version 1.0.* City of Cape Town (CCT) Development Services: Transport, Roads and Stormwater Directorate: Catchment, Stormwater and River Management Branch, Cape Town.

CCT 2002b. Stormwater management planning and design guidelines for new developments. *Version 1.0.* City of Cape Town (CCT) Development Services: Transport, Roads and Stormwater Directorate: Catchment, Stormwater and River Management Branch, Cape Town.

CCT 2005. Study on the social profile of residents of three selected informal settlements in Cape Town. Available: https://www.capetown.gov.za/en/stats/CityReports/Documents/Informal%20Settlements/Main_Report_2722006113759_359.pdf [Accessed: 2014.10.28].

CCT 2006. Informal dwelling count for Cape Town (1993-2005). *In:* RODRIQUES, E., GIE, J. & HASKINS, C. (eds.). Information and Knowledge Department, City of Cape Town (CCT).

CCT 2009. Floodplain and river corridor management policy: Balancing flood risk, ecological and socio-economic considerations near watercourses and wetlands. *C 58/05/09.* City of Cape Town (CCT), South Africa: Roads and Stormwater Department.

CCT 2010. City's Information Systems and Technology Department awarded for innovation. City of Cape Town (CCT), 19 November 2010, Available: https://www.capetown.gov.za/en/Pages/CISandTDepawardedforinnovation.aspx [Accessed: 2014.11.10].

CCT 2013. Ward 80 overview: 2011 census. Strategic Development Information and GIS Department, City of Cape Town (CCT). Available: http://www.capetown.gov.za/en/stats/Documents/2011%20Census/Wards/2011_Census_CT_Ward_080_Profile.pdf [Accessed: 2013.07.20].

CCT 2014. Integrated human settlements five-year strategic plan, July 2012 - June 2017: 2013/2014 REVIEW. Cape Town: City of Cape Town (CCT). Available: https://www.capetown.gov.za/en/Housing/Documents/T4IB03837_CCT_Housing_Plan_Prf7.pdf [Accessed: 2014.09.01].

CDKN 2012. Managing climate extremes and disasters in Africa: Lessons from the SREX report. Climate and Development Knowledge Network (CDKN).

CHAMBERS, R. & CONWAY, G. R. 1991. Sustainable rural livelihoods: Practical concepts for the 21st century. *IDS Discussion Paper,* 296.

CHAN, N. W. 2012. Impacts of disasters and disaster risk managment in Malaysia: The case of floods. *In:* SAWADA, Y. & OUM, S. (eds.) *Economic and welfare impacts of disasters in East Asia and policy responses.* ERIA Research Project Report 2011-8, Jakarta: ERIA.

CHARMAZ, K. 2006. *Constructing grounded theory: A practical guide through qualitative analysis*, SAGE Publications.

CHATTERJEE, M. 2010. Slum dwellers response to flooding events in the megacities of India. *Mitigation and Adaptation Strategies for Global Change,* 15**,** 337-353.

COCHRANE, J. R. 1999. *Circles of dignity: Community wisdom and theological reflection,* Minneapolis, Fortress Press.

CORBIN, J. & STRAUSS, A. 2008. *Basics of qualitative research,* 3rd Edition, SAGE Publications.

CORNWALL, A. 2002. Making spaces, changing places: Situating participation in development. *IDS Working Paper 170*.

COWAN, G. & ARSENAULT, A. 2008. Moving from monologue to dialogue to collaboration: The three layers of public diplomacy. *The ANNALS of the American Academy of Political and Social Science,* 616**,** 10-30.

CUTTER, S. L. 1996. Vulnerability to environmental hazards. *Progress in Human Geography,* 20**,** 529-539.

CUTTER, S. L., BARNES, L., BERRY, M., BURTON, C., EVANS, E., TATE, E. & WEBB, J. 2008. A place-based model for understanding community resilience to natural disasters. *Global Environmental Change,* 18**,** 598-606.

CUTTER, S. L., BORUFF, B. J. & SHIRLEY, W. L. 2003. Social vulnerability to environmental hazards. *Social Science Quarterly,* 84**,** 242-261.

CUTTER, S. L., BURTON, C. & EMRICH, C. T. 2010. Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management,* 7**,** 1-22.

DAILY MAVERICK. 2014. *Marikana settlement, Cape Town: A demolition battle with no solution in sight.* [Online]. 16 January 2014. Available: http://www.dailymaverick.co.za/article/2014-01-16-marikana-settlement-cape-town-a-demolition-battle-with-no-solution-in-sight/#.VFj_qckxiAM [Accessed: 2014.11.04].

DAVIDSON, D. J. 2013. We still have a long way to go, and a short time to get there: A response to Fikret Berkes and Helen Ross. *Society & Natural Resources: An International Journal,* 26**,** 21-24.

DAVOUDI, S. 2012. Resilience: A bridging concept or a dead end? *Planning Theory & Practice,* 13**,** 299-307.

DE BRUIJIN, K. M., GREEN, C., JOHNSON, C. & MCFADDEN, L. 2007. Evolving concepts in flood risk management: Searching for a common language. *In:* BEGUM, S., STIVE, M. J. F. &

WALL, J. W. (eds.) *Flood risk management in Europe: Innovation in policy and practice.* Doordrecht, Netherlands: Springer.

DE LILLE, P. 2013. *The City has spent over R2.6 million on relief provision to residents affected by heavy rains* [Online]. Statement by the Executive Mayor of Cape Town, Alderman Patricia de Lille: 15 August 2013, City of Cape Town (CCT). Available: http://www.capetown.gov.za/en/mayor/Pages/Speeches.aspx [Accessed: 2013.08.27].

DE VISSER, J. 2012. Cities and climate change: *Ex abundanti cautela* - 'from an excess of caution'? *In:* CARTWRIGHT, A., PARNELL, S., OELOFSE, G. & WARD, S. (eds.) *Climate change at the city scale: Impacts, mitigation and adaptation in Cape Town.* London: Routledge.

DEA 2013. Climate trends and scenarios for South Africa. *Long-term Adaptation Scenarios Flagship Research Programme (LTAS) for South Africa.* Pretoria, South Africa: Department of Environmental Affairs (DEA). [Online]. Available: http://www.sanbi.org/node/8065 [Accessed: 2014.08.29].

DEFRA 2005. Making space for water: Taking forward a new government strategy for flood and coastal erosion risk management in England. London, U.K.: Department for Environment, Food and Rural Affairs (DEFRA).

DENZIN, N. K. & LINCOLN, Y. S. 2011. Introduction: The discipline and practice of qualitative research. *In:* DENZIN, N. K. & LINCOLN, Y. S. (eds.) *The SAGE handbook of qualitative research.* 4th Edition: SAGE Publications.

DESPORTES, I. 2014. *"We've got to address the underlying causes": A case-study of stakeholders' initiatives to increase resilience to flood risk in Sweet Home informal settlement, Cape Town.* Master of Science Thesis. The Netherlands: University of Amsterdam.

DESPORTES, I., WADDELL, J. & HORDIJK, M. 2015. Improving flood governance through multi-stakeholder collaboration: A case study of Sweet Home informal settlement, Cape Town. *South African Geographical Journal,* Forthcoming.

DFID 1999. Sustainable livelihoods guidance sheets. London, U.K.: Department for International Development.

DIAGNE, K. & NDIAYE, A. 2009. History, governance and the millennium development goals: Flood risk reduction in Saint-Louis, Senegal. *In:* PELLING, M. & WISNER, B. (eds.) *Disaster risk reduction: Cases from urban Africa.* Earthscan.

DICKE, W. & MEIJERINK, S. 2008. The public-private divide in flood management. *International Journal of Water Resources Development,* 24**,** 495-497.

DIMP 2005. August 2004 severe storm: Post flood assessment. Cape Town: The Disaster Mitigation for Sustainable Livelihoods Programme (DiMP), University of Cape Town.

DIMP 2009. Community risk assessment report: Sweet Home Farm, July 2009. *Disaster Risk Science Honours Students' Report: Disaster Mitigation for Sustainable Livelihoods Programme (DiMP).* Cape Town: University of Cape Town.

DIXON, J. 2013. *Moving through the city: Gender and floods at play: A case study in Sweet Home Farm informal settlement, Cape Town.* Master of Science Thesis. Budapest, Hungary: Central European University.

DJALANTE, R. 2012. Adaptive governance and resilience: The role of multi-stakeholder platforms in disaster risk reduction. *Natural Hazards and Earth System Sciences,* 12**,** 2923-2942.

DJALANTE, R., HOLLEY, C. & THOMALLA, F. 2011. Adaptive governance and managing resilience to natural hazards. *International Journal of Disaster Risk Science,* 2**,** 1-14.

DJALANTE, R., HOLLEY, C., THOMALLA, F. & CARNEGIE, M. 2013. Pathways for adaptive and integrated disaster resilience. *Natural Hazards,* 69**,** 2105-2135.

DJALANTE, R. & THOMALLA, F. 2012. Disaster risk reduction and climate change adaptation in Indonesia: Institutional challenges and opportunities for integration. *International Journal of Disaster Resilience in the Built Environment,* 3**,** 166-180.

DMAF 2012. Meeting minutes. *City of Cape Town Disaster Management Advisory Forum (DMAF) Meeting.* Council Chambers, Cape Town: Wednesday 8-9 am, 28 November 2012.

DMAF 2014. Meeting minutes. *City of Cape Town Disaster Management Advisory Forum (DMAF) Meeting.* Council Chambers, Cape Town: Monday 8-9 am, 30 June 2014.

DODMAN, D. & MITLIN, D. 2013. Challenges for community-based adaptation: Discovering the potential for transformation. *Journal of International Development,* 25**,** 640-659.

DOUGLAS, I., ALAM, K., MAGHENDA, M., MCDONNELL, Y., MCLEAN, L. & CAMPBELL, J. 2008. Unjust waters: Climate change, flooding and the urban poor in Africa. *Environment and Urbanization,* 20**,** 187-205.

DRAHOS, P. 2004. Intellectual property and pharmaceutical markets: A nodal governance approach. *Temple Law Review,* 77**,** 401-424.

DRIVDAL, L. 2011a. Report on flooding in the informal settlement 'Egoli', in Philippi/Schaapkraal, Cape Town, 2010 and 2011. *Flooding in Cape Town under Climate Risk (FliCCR) Project.* Cape Town: University of Cape Town.

DRIVDAL, L. 2011b. Report on flooding in the informal settlement 'The Graveyard Pond', Philippi, Cape Town, 2010-2011. *Flooding in Cape Town under Climate Risk (FliCCR) Project.* Cape Town: University of Cape Town.

DRIVDAL, L. 2014. *The politics of leadership organizing in informal settlements: Ambiguities of speaking publicly and mediating conflicting institutional logics.* Doctoral Thesis. South Africa: University of Cape Town.

DRIVDAL, L. 2015. Flooding in Cape Town's informal settlements: Conditions for community leaders to work towards adaptation. *South African Geographical Journal,* Forthcoming.

DRMC 2009. Winter preparedness strategy: Report to MAYCO. Disaster Risk Management Centre (DRMC), City of Cape Town.

DRMC 2010. Winter plan 2010: Close-out report. *Presented to the Disaster Management Advisory Forum (DMAF).* Cape Town, 23 November 2010: Disaster Risk Management Centre (DRMC), City of Cape Town.

DRMC 2011a. Municipal disaster risk management plan. Disaster Risk Management Centre (DRMC), City of Cape Town.

DRMC 2011b. Winter plan 2011: Close-out report. *Presented to the Disaster Management Advisory Forum (DMAF).* Cape Town, 29 November 2011: Disaster Risk Management Centre (DRMC), City of Cape Town.

DRMC 2012a. Municipal disaster risk management plan. Disaster Risk Management Centre (DRMC), City of Cape Town.

DRMC 2012b. Winter plan 2012: Close-out report. *Presented to the Disaster Management Advisory Forum (DMAF).* Cape Town, 28 November 2012: Disaster Risk Management Centre (DRMC), City of Cape Town.

DUMINY, J., WATSON, V. & ODENDAAL, N. 2013. Doing research in African cities: The case study method. *In:* KRESL, P. K. & SOBRINO, J. (eds.) *Handbook of research methods and applications in urban economies.* Cheltenham, U.K.: Edward Elgar Publishing Limited.

EDWARDS, C. 2009. Resilient nation. DEMOS.

EISENHARDT, K. M. 1989. Building theories from case study research. *The Academy of Management Review,* 14**,** 532-550.

EISENHARDT, K. M. 1991. Better stories and better constructs: The case for rigor and comparative logic. *Academy of Management Review,* 16**,** 620-627.

EKSTROM, J. A., MOSER, S. C. & TORN, M. 2011. Barriers to climate change adaptation: A diagnostic framework. California Energy Commission: Public Interest Energy Research (PIER) Program: Final Project Report.

EM-DAT. 2014. *2013 disasters in numbers. The OFDA/CRED International Disaster Database.* [Online]. Université Catholique de Louvain, Brussels, Belgium. Available: www.emdat.be [Accessed: 2016.01.19].

ENGLE, N. L. 2011. Adaptive capacity and its assessment. *Global Environmental Change,* 21**,** 647-656.

FALING, W. 2012. The impact of spatial policies on the risk and vulnerability of South African settlements. *1st Biennial Conference: Uniting Theory and Practice.* 10-12 October. North-West University, Potchefstroom Campus, South Africa.

FATTI, C. E. & PATEL, Z. 2013. Perceptions and responses to urban flood risk: Implications for climate governance in the South. *Applied Geography,* 36**,** 13-22.

FAY, M., GHESQUIRE, F. & SOLO, T. 2003. Natural disasters and the urban poor. *En Brève (World Bank notes),* 32**,** 1-4.

FAYSSE, N. 2006. Troubles on the way: An analysis of the challenges faced by multi-stakeholder platforms. *Natural Resources Forum,* 30**,** 219-229.

FEW, R. 2003. Flooding, vulnerability and coping strategies: Local responses to a global threat. *Progress in Development Studies,* 3**,** 43-58.

FOIS, F. & FORINO, G. 2014. The self-built ecovillage in L'Aquila, Italy: Community resilience as a grassroots response to environmental shock. *Disasters,* 38**,** 719-739.

FOLKE, C. 2006. Resilience: The emergence of a perspective for social-ecological systems analyses. *Global Environmental Change,* 16**,** 253-267.

FOLKE, C., CARPENTER, S. R., WALKER, B., SCHEFFER, M., CHAPIN, T. & ROCKSTRÖM, J. 2010. Resilience thinking: Integrating resilience, adaptability and transformability. *Ecology and Society,* 15.

FOLKE, C., HAHN, T., OLSSON, P. & NORBERG, J. 2005. Adaptive governance of socio-ecological systems. *Annual Review of Environment and Resources,* 30**,** 441-473.

FOSTER, P. 2011. *Japan earthquake: Country better prepared than anyone for quakes and tsunamis* [Online]. The Telegraph. Available: http://www.telegraph.co.uk/news/worldnews/asia/japan/8375591/Japan-earthquake-country-better-prepared-than-anyone-for-quakes-and-tsunamis.html [Accessed: 2014.12.23].

FREEMAN, J. 1997. Collaborative governance in the administrative state. *UCLA Law Review,* 45**,** 1-98.

FUCHS, S., KUCHLICKE, C. & MEYER, V. 2011. Editorial for the special issue: Vulnerability to natural hazards - The challenge of integration. *Natural Hazards,* 58**,** 609-619.

FUNG, A. 2006. Varieties of participation in complex governance. *Public Administration Review***,** 66-75.

GAILLARD, J. C. & MERCER, J. 2012. From knowledge to action: Bridging gaps in disaster risk reduction. *Progress in Human Geography,* 37**,** 93-114.

GASTON, B.-W., TONGWA, A. F., BURNLEY, C. & ISABELLA, Z. T. 2013. Local governance in disaster risk reduction in Cameroon. *Jàmbá: Journal of Disaster Risk Studies,* 4.

GAVENTA, J. 2006. Finding the spaces for change: A power analysis. *IDS Bulletin,* 37**,** 23-33.

GEERTZ, C. 1973. Thick description: Toward an interpretive theory of culture. *In:* GEERTZ, C. (ed.) *The interpretation of cultures: Selected essays.* New York: Basic Book.

GILL, E. 2008. Making space for water: Urban flood risk and integrated drainage (HA2). London, U.K.: Department for Environment, Food and Rural Affairs (DEFRA).

GNDR 2011. Views from the frontline. www.globalnetwork-dr.org: Global Network of Civil Society Organisations for Disaster Reduction (GNDR).

GNDR 2013. Views from the frontline: Beyond 2015. www.globalnetwork-dr.org: Global Network of Civil Society Organisations for Disaster Reduction (GNDR).

GODSCHALK, D. R., BRODY, S. & BURBY, R. 2003. Public participation in natural hazard mitigation policy formation: Challenges for comprehensive planning. *Journal of Environmental Planning and Management,* 46**,** 733-754.

GRAHAM, N. 2006. Informal settlement upgrading in Cape Town: Challenges, constraints and contradictions within local government. *In:* HUCHZERMEYER, M. & KARAM, A. (eds.) *Informal settlements: A perpetual challenge?* Cape Town: UCT Press.

GRAHAM, S. (ed.) 2010. *Disrupted cities: When infrastructure fails,* New York and London: Taylor & Francis.

GUPTA, J., PFEFFER, K., ROS-TONEN, M. & VERREST, H. 2015a. Setting the scene: The geographies of urban governance. *In:* GUPTA, J., PFEFFER, K., VERREST, H. & ROS-TONEN, M. (eds.) *Geographies of urban governance: Advanced theories, methods and practices.* Switzerland: Springer International.

GUPTA, J., PFEFFER, K., VERREST, H. & ROS-TONEN, M. (eds.) 2015b. *Geographies of urban governance: Advanced theories, methods and practices,* Switzerland: Springer International Publishing.

HALLEGATTE, S. 2009. Strategies to adapt to an uncertain climate change. *Global Environmental Change,* 19**,** 240-247.

HAMANN, R. & APRIL, K. 2013. On the role and capabilities of collaborative intermediary organisations in urban sustainability transitions. *Journal of Cleaner Production,* 50**,** 12-21.

HAQUE, A. N., DODMAN, D. & HOSSAIN, M. M. 2014. Individual, communal and institutional responses to climate change by low-income households in Khulna, Bangladesh. *Environment and Urbanization,* 26**,** 112-129.

HARDOY, J., HERNÁNDEZ, I., PACHECO, J. A. & SIERRA, G. 2014. Institutionalizing climate change adaptation at municipal and state level in Chetumal and Quintana Roo, Mexico. *Environment and Urbanization,* 26**,** 69-85.

HARTLEY, J. 2004. Case Study Research. *In:* CASSELL, C. & SYMON, G. (eds.) *Essential Guide to Qualitative Methods in Organizational Research.* London: SAGE Publications Ltd.

HEGGER, D. L. T., GREEN, C., DRIESSEN, P., BAKKER, M., DIEPERINK, C., CRABBÉ, A., DEKETELAERE, K., DELVAUX, B., SUYKENS, C., BEYERS, J. C., FOURNIER, M., LARRUE, C.,

MANSON, C., VAN DOORN-HOEKVELD, W., VAN RIJSWICK, M., KUNDZEWICZ, Z. W. & GOYTIA CASERMEIRO, S. 2013. Flood risk management in Europe - Similarities and differences between the STAR-FLOOD consortium countries. Utrecht, The Netherlands: STAR-FLOOD Consortium.

HILL, E. 2014a. *3 dead in floods in Western and Eastern Cape, South Africa* [Online]. Floodlist.com, 9 January 2014. Available: http://floodlist.com/africa/3-dead-floods-western-eastern-cape-south-africa [Accessed: 2014.09.01].

HILL, E. 2014b. *Boy drowns in flooding, South Africa's Eastern Cape province* [Online]. Floodlist.com, 25 April 2014. Available: http://floodlist.com/africa/boy-drowns-flooding-south-africas-eastern-cape-province [Accessed: 2014.09.01].

HILL, E. 2014c. *Flood death toll in South Africa climbs to 32* [Online]. Floodlist.com, 18 March 2014. Available: http://floodlist.com/africa/south-africa-floods-kill-32 [Accessed: 2014.09.01].

HILL, E. 2014d. *Flooding spreads to 3 provinces in South Africa* [Online]. Floodlist.com, 6 March 2014. Available: http://floodlist.com/africa/flooding-spreads-3-provinces-south-africa [Accessed: 2014.09.01].

HILL, E. 2014e. *Hundreds displaced in South Africa floods* [Online]. Floodlist.com, 11 March 2014. Available: http://floodlist.com/africa/displaced-south-africa-floods [Accessed: 2014.09.01].

HIRSCH, M. 2013a. *Gale force winds, rain headed for the Cape* [Online]. Cape Times, Cape Town, South Africa. 16 September 2013.: Available: http://www.iol.co.za/news/south-africa/western-cape/gale-force-winds-rain-headed-for-the-cape-1.1578079#.Ujfe4D9qM9U [Accessed: 2013.09.17].

HIRSCH, M. 2013b. *Rainfall was almost double the average* [Online]. Cape Times, Cape Town, South Africa. 20 September 2013: Available: http://www.iol.co.za/capetimes/rainfall-was-almost-double-the-average-1.1580353#.UjxtBD9qM9V [Accessed: 2013.09.20].

HIWASAKI, L., LUNA, E. & SHAW, R. 2014. Process for integrating local and indigenous knowledge with science for hydro-meteorological disaster risk reduction and climate change adaptation in coastal and small island communities. *International Journal of Disaster Risk Reduction,* 10**,** 15-27.

HODSON, M. & MARVIN, S. 2010. Urbanism in the anthropocene: Ecological urbanism or premium ecological enclaves? *City: Analysis of Urban Trends, Culture, Theory, Policy, Action,* 14**,** 298-313.

HOLLEY, C. 2010. Facilitating monitoring, subverting self-interest and limiting discretion: Learning from "new" forms of accountability in practice. *Columbia Journal of Environmental Law,* 35**,** 127-211.

HOLLEY, C., GUNNINGHAM, N. & SHEARING, C. 2011. *The new environmental governance*, Routledge.

HOLLOWAY, A. 2003. Disaster risk reduction in Southern Africa. *African Security Review,* 12**,** 29-38.

HOLLOWAY, A., FORTUNE, G. & VIMBAI, C. 2010. *Risk and development annual review (RADAR): Western Cape 2010,* Cape Town, The Disaster Mitigation for Sustainable Livelihoods Programme (DiMP), University of Cape Town.

HOLLOWAY, A. & ROOMANEY, R. 2008. Weathering the storm: Participatory risk assessment for informal settlements. Periperi Publications, University of Cape Town: Disaster Mitigation for Sustainable Livelihoods Programme (DiMP).

HOUSING DEVELOPMENT AGENCY 2013. Western Cape: Informal settlement status. *Research Reports.* Available: http://www.thehda.co.za/uploads/images/HDA_Western_Cape_Report.pdf [Accessed: 2014.03.18].

HOWELLS, J. 2006. Intermediation and the role of intermediaries in innovation. *Research Policy,* 35**,** 715-728.

HUCHZERMEYER, M. 2002. Informal settlements: Production and intervention in twentieth-century Brazil and South Africa. *Latin American Perspectives,* 29**,** 83-105.

HUCHZERMEYER, M. 2003. Housing rights in South Africa: Invasions, evictions, the media, and the courts in the cases of Grootboom, Alexandra, and Bredell. *Urban Forum,* 14**,** 80-107.

HUCHZERMEYER, M. & KARAM, A. 2006. *Informal settlements: A perpetual challenge?,* Cape Town, UCT Press.

HUQ, S., KOVATS, S., REID, H. & SATTERTHWAITE, D. 2007. Editorial: Reducing risks to cities from disasters and climate change. *Environment and Urbanization,* 19**,** 3-15.

IFRC 2004. World disasters report 2004: Focus on community resilience. International Federation of Red Cross and Red Crescent Societies (IFRC).

IFRC 2009. World disasters report 2000: Focus on early warning, early action. International Federation of Red Cross and Red Crescent Societies (IFRC).

IFRC 2010. World disasters report 2010: Focus on urban risk. International Federation of Red Cross and Red Crescent Societies (IFRC).

IFRC 2012. Analysis of legislation related to disaster risk reduction in South Africa. Geneva: International Federation of Red Cross and Red Crescent Societies (IFRC).

IKEDA, S. & NAGASAKA, T. 2011. An emergent framework of disaster risk governance towards innovating coping capability for reducing disaster risks in local communities. *International Journal of Disaster Risk Science,* 2**,** 1-9.

IKEDA, S., SATO, T. & FUKUZONO, T. 2008. Towards an integrated management framework for emerging disaster risks in Japan. *Natural Hazards,* 44**,** 267-280.

INNOCENTI, D. & ALBRITO, P. 2011. Reducing the risks posed by natural hazards and climate change: The need for a participatory dialogue between the scientific community and policy makers. *Environmental Science and Policy,* 14**,** 730-733.

IPCC 2007. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007. *In:* PARRY, M. L., CANZIANI, O. F., PALUTIKOF, J. P., VAN DER LINDEN, P. J. & HANSON, C. E. (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC 2012. *Managing the risks of extreme events and disasters to advance climate change adaptation*, A special report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC), Cambridge, UK, and New York, NY, USA.

ISANDLA INSTITUTE 2011. Local politics and factionalism: Local government as a site of contestation. Cape Town: Discussion Paper and Roundtable Report, Isandla Institute.

ISANDLA INSTITUTE 2012. Advancing active citizenship: A citizenship academy as a means to strengthen local democracy? Cape Town: Discussion Paper and Roundtable Report, Isandla Institute.

JABEEN, H., JOHNSON, C. & ALLEN, A. 2010. Built-in resilience: Learning from grassroots coping strategies for climate variability. *Environment and Urbanization,* 22**,** 415-431.

JENTOFT, S., CHUENPAGDEE, R., BUNDY, A. & MAHON, R. 2010. Pyramids and roses: Alternative images for the governance of fisheries systems. *Marine Policy,* 34**,** 1315-1321.

JHA, A. K., BLOCH, R. & LAMOND, J. 2012. *Cities and flooding: A guide to integrated urban flood risk management for the 21st century,* Washington, D.C., USA, The World Bank.

JONES, L., JASPARS, S., PAVANELLO, S., LUDI, E., SLATER, R., ARNALL, A., GRIST, N. & MTISI, S. 2010a. Responding to a changing climate: Exploring how disaster risk reduction, social protection and livelihoods approaches promote features of adaptive capacity. Overseas Development Institute (ODI): Working Paper 319.

JONES, L., LUDI, E. & LEVINE, S. 2010b. Towards a characterisation of adaptive capacity: A framework for analysing adaptive capacity at the local level. Overseas Development Institute (ODI): Background Note.

JOZIPOVIC, M. 2015. *Flood risk and sanitation service delivery in informal settlements under climate change: A case study of Cape Town, South Africa.* Master of Environmental Studies in Planning Thesis. Ontario, Canada: University of Waterloo.

KAPUCU, N. 2011. Collaborative governance in international disasters: Nargis cyclone in Myanmar and Sichuan earthquake in China cases. *International Journal of Emergency Management,* 8**,** 1-25.

KASPERSON, R. E., ARCHER, E., CACERES, D., DOW, K., DOWNING, T., ELMQVIST, T., FOLKE, C., HAN, G., LYENGAR, K., VOGEL, C., WILSON, K. & ZIERVOGEL, G. 2005. Vulnerable people and places. *In:* HASSAN, R., SCHOLES, R. & ASH, N. (eds.) *Ecosystems and human well-being: Millennium assessment report: Current state and trends.* Washington D.C.: Island Press.

KATZ, C. 1994. Playing the field: Questions of fieldwork in geography. *Professional Geographer,* 46**,** 67-72.

KELMAN, I. 2007. Decision-making for flood-threatened properties. *In:* BEGUM, S., STIVE, M. J. F. & W., H. J. (eds.) *Flood risk management in Europe: Innovation in policy and practice.* Doordrecht, Netherlands: Springer.

KELMAN, I. 2015. Disaster risk governance for Pacific island communities. *The Asia-Pacific Journal,* 13.

KENNEDY, L., ROBBINS, G., SCOTT, D., SUTHERLAND, C., DENIS, E., ANDRADE, J., MIRANDA, L., VARREL, A., DUPONT, V. & BON, B. 2011. The politics of large-scale economic and infrastructure projects in fast-growing cities of the South: Literature review. Bonn, Germany: Chance 2 Sustain.

KJAER, A. M. 2009. Governance and the urban bureaucracy. *In:* DAVIES, J. S. & IMBROSCIO, D. L. (eds.) *Theories of urban politics.* London: SAGE Publications Ltd.

KLEIN, R. J. T., MIDGLEY, G. F., PRESTON, B. L., ALAM, M., BERKHOUT, F. G. H., DOW, K. & SHAW, M. R. 2014. Adaptation opportunities, constraints, and limits. *In:* FIELD, C. B., BARROS, V. R., DOKKEN, D. J., MACH, K. J., MASTRANDREA, M. D., BILIR, T. E., CHATTERJEE, M., EBI, K. L., ESTRADA, Y. O., GENOVA, R. C., GIRMA, B., KISSEL, E. S., LEVY, A. N., MACCRACKEN, S., MASTRANDREA, P. R. & WHITE, L. L. (eds.) *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).* Cambridge, United Kingdom and New York, NY, USA.: Cambridge University Press.

KNOETZE, D. 2014. *Law enforcement bounces around blame for Philippi evictions* [Online]. Mail and Guardian, 13 August 2014. Available: http://mg.co.za/article/2014-08-13-law-enforcement-bounces-around-blame-for-philippi-evictions%C2%A0 [Accessed: 2014.11.04].

KOHLBACHER, F. 2006. The use of qualitative content analysis in case study research. *Forum: Qualitative Social Research,* 7.

KOOIMAN, J., BAVINCK, M., CHUENPAGDEE, R., MAHON, R. & PULLIN, R. 2008. Interactive governance and governability: An introduction. *The Journal of Transdisciplinary Environmental Studies,* 7**,** 1-11.

KOOIMAN, J. & JENTOFT, S. 2009. Meta-governance: Values, norms and principles, and the making of hard choices. *Public Administration,* 87**,** 818-836.

LALLOO, K. 1999. Arenas of contested citizenship: Housing policy in South Africa. *Habitat International,* 23**,** 35-47.

LANDMAN, K. & NAPIER, M. 2009. Waiting for a house or building your own? Reconsidering state provision, aided and unaided self-help in South Africa. *Habitat International,* 34**,** 299-305.

LASSA, J. A. 2010. *Institutional vulnerability and governance of disaster risk reduction: Macro, meso, and micro scale assessment.* Doctoral Thesis. Bonn, Germany: Rheinischen Friedrich-Wilhelms-Universität.

LEACH, W. D., PELKEY, N. W. & SABATIER, P. A. 2002. Stakeholder partnerships as collaborative policymaking: Evaluation criteria applied to watershed management in California and Washington. *Journal of Policy Analysis and Management,* 21**,** 645-670.

LEBEL, L., MANUTA, J. B. & GARDEN, P. 2011. Institutional traps and vulnerability to changes in climate and flood regimes in Thailand. *Regional Environmental Change,* 11**,** 45-58.

LEONHARDT, M. 2012. Together we are strong: Networks, platforms and the social relations that support a people's process. *Environment and Urbanization,* 24**,** 481-496.

LIPSON, M. 2005. Interorganizational coordination in complex peacekeeping. *Annual Meeting: International Studies Association.* Honolulu, Hawaii, March 1-5, 2005.

LOPEZ-MARRERO, T. & TSCHAKERT, P. 2001. From theory to practice: Building more resilience communities in flood-prone areas. *Environment and Urbanization,* 23**,** 229-249.

LRC. no date. *Philippi: An eviction by any other name.* [Online]. Legal Resources Centre (LRC). Available: http://www.lrc.org.za/other-news/3200-philippi-an-eviction-by-any-other-name [Accessed: 2014.11.04].

LYNN, L., HEINRICH, C. J. & HILL, C. J. 2001. *Improving governance: A new logic for empirical research,* Washington, D.C., Georgetown University Press.

MACHIRIDZA, R. D. 2013. *Exploring and profiling of childhood illnesses in informal settlements in relation to flooding: A case study of Barcelona, Cape Town, South Africa.* Master of Philosophy Thesis. South Africa: University of Cape Town.

MACUN, I. & POSEL, D. 1998. Focus groups: A South African experience and a methodological reflection. *African Sociological Review,* 2**,** 114-135.

MANYENA, S. B. 2006. The concept of resilience revisited. *Disasters,* 30**,** 433-450.

MANYENA, S. B., MAVHURA, E., MUZENDA, C. & MABASO, E. 2013. Disaster risk reduction legislations: Is there a move from events to processes? *Global Environmental Change,* 23**,** 1786-1794.

MARKS, M., SHEARING, C. & WOOD, J. 2009. Who should the police be? Finding a new narrative for community policing in South Africa. *Police Practice and Research,* 10**,** 145-155.

MASIKO-KAMBALA, P. 2013. *Service delivery needs total revamp* [Online]. Cape Argus, 24 June 2013, Cape Town. Available: http://www.iol.co.za/capeargus/service-delivery-needs-total-revamp-1.1536798 [Accessed: 2013.07.09].

MATSUOKA, Y., JOERIN, J., SHAW, R. & TAKEUCHI, Y. 2012. Partnership between city government and community-based disaster prevention organizations in Kobe, Japan. *In:* SHAW, R. (ed.) *Community-based disaster risk reduction.* Bingley, United Kingdom: Emerald Group Publishing Limited.

MAYUNGA, J. S. 2007. Understanding and applying the concept of community disaster resilience: A capital-based approach. *Summer Academy: Megacities as hotspots of risk: Social vulnerability and resilience building.* Munich, Germany, 22-28 July 2007.

MEASHAM, T. G., PRESTON, B. L., SMITH, T. F., BROOKE, C., GORDDARD, R., WITHYCOMBE, G. & MORRISON, C. 2011. Adapting to climate change through local municipal planning: Barriers and challenges. *Mitigation and Adaptation Strategies for Global Change,* 16**,** 889-909.

MEIJERINK, S. & DICKE, W. 2008. Shifts in the public-private divide in flood management. *International Journal of Water Resources Development,* 24**,** 499-512.

MERCER, J. 2010. Disaster risk reduction or climate change adaptation: Are we reinventing the wheel? *Journal of International Development,* 22**,** 247-264.

MERCER, J., KELMAN, I., LLOYD, K. & SUCHET-PEARSON, S. 2008. Reflections on use of participatory research for disaster risk reduction. *Area,* 40**,** 172-183.

MERRIAM, S. B. 1998. *Qualitative Research and Case Study Applications in Education,* San Francisco, Jossey-Bass Publishers.

MESSNER, F. & MEYER, V. 2005. Flood damage, vulnerability and risk perception: Challenges for flood damage research. *UFZ Discussion Papers.*

MFUPI, U. 2013. *Response to flood risk in Cape Town: Preparing or responding to flooding?* Honours Thesis. South Africa: University of Cape Town.

MICHELUTTI, E. & SMITH, H. C. 2014. The realpolitik of informal city governance. The interplay of powers in Mumbai's un-recognized settlements. *Habitat International,* 44**,** 367-374.

MIDGLEY, G. F., CHAPMAN, R. A., HEWITSON, B., JOHNSTON, P., DE WIT, M., ZIERVOGEL, G., MUKHEIBIR, P., VAN NIEKERK, L., TADROSS, M., VAN WILGEN, B. W., KGOBE, B., MORANT, P. D., THERON, A., SCHOLES, R. J. & FORSYTH, G. G. 2005. A status quo, vulnerability and adaptation assessment of the physical and socio-economic effects of climate change in the Western Cape. *Report to the Western Cape Government.* Cape Town, South Africa.

MILLSTEIN, M., OLDFIELD, S. & STOKKE, K. 2003. uTshani BuyaKhuluma - The grass speaks. The political space and capacity of the South African Homeless People's Federation. *Geoforum,* 34**,** 457-468.

MIRAFTAB, F. 2004. Invited and invented spaces of participation: Neoliberal citizenship and feminists' expanded notion of politics. *Wagadu,* 1**,** 1-7.

MIRAFTAB, F. & WILLS, S. 2005. Insurgency and spaces of active citizenship: The story of Western Cape anti-eviction campaign in South Africa. *Journal of Planning Education and Research,* 25**,** 200-217.

MITCHELL, J. K. 2003. European river floods in a changing world. *Risk Analysis,* 23**,** 567-574.

MORSS, R. E., WILHELMI, O. V., DOWNTON, M. W. & GRUNTFEST, E. 2005. Flood risk, uncertainty, and scientific information for decision making. *Bulletin of the American Meteorological Society,* 86**,** 1593-1601.

MOSER, S. C. & EKSTROM, J. A. 2010. A framework to diagnose barriers to climate change adaptation. *PNAS,* 107**,** 22026-22031.

MUSUNGU, K. 2012. *A participatory GIS approach to flood risk assessment of informal settlements: The case of Cape Town.* Masters Thesis, University of Cape Town.

NAMBISAN, S. 2009. Platforms for collaboration. *Stanford Social Innovation Review,* Summer**,** 44-49.

NESTEGARD, C. A. 2009. *"We are struggling": Coping with chronic disaster in a changing environment.* Masters Thesis. Norway: University of Oslo.

NEWELL, P., PATTBERG, P. & SCHROEDER, H. 2012. Multiactor governance and the environment. *Annual Review of Environment and Resources,* 37**,** 365-387.

NOMBEMBE, P. 2012. *De Lille calls in police to help her clean up toilets* [Online]. The Times, 12 June 2013, Cape Town. Available: http://www.timeslive.co.za/thetimes/2013/06/12/de-lille-calls-in-police-to-help-her-clean-up-toilets [Accessed: 2013.06.19].

NORIO, O., YE, T., KAJITANI, Y., SHI, P. & TATANO, H. 2011. The 2011 Eastern Japan great earthquake disaster: Overview and comment. *International Journal of Disaster Risk Science,* 2**,** 34-42.

O'BRIEN, G., O'KEEFE, P., ROSE, J. & WISNER, B. 2006. Climate change and disaster management. *Disasters,* 30**,** 64-80.

O'BRIEN, K., SYGNA, L., LEICHENKO, R., ADGER, N. W., BARNETT, J., MITCHELL, T., SCHIPPER, L., TANNER, T., VOGEL, C. & MORTEUX, C. 2008. Disaster risk reduction, climate change adaptation and human security. Report prepared for the Royal Norwegian Ministry of Foreign Affairs by the Global Environmental Change and Human Security (GECHS) Project, GECHS Report 2008:3.

OLDFIELD, S. 2007. Making sense of multiple conversations: Research, teaching, and activism in and with communities in South African cities. *South African Geographical Journal,* 89**,** 104-110.

ORANGIO, C. 2012. *Barriers to flood risk adaptation: A case study of cross-scale collaboration in the informal settlement of Graveyard Pond, Philippi.* Master of Philosophy Thesis. South Africa: University of Cape Town.

ORANJE, M. 2010. Post-Apartheid national spatial development planning in South Africa: A brief history. *European Spatial Research and Policy,* 17**,** 55-70.

ORUM, A. M., FEAGIN, J. R. & SJOBERG, G. 1991. Introduction: The nature of the case study. *In:* FEAGIN, J. R., ORUM, A. M. & SJOBERG, G. (eds.) *A case for the case study.* The University of North Carolina Press.

OSTROM, E. 2010. Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review,* 100**,** 1-33.

OTENG-ABABIO, M. 2013. 'Prevention is better than cure': Assessing Ghana's preparedness (capacity) for disaster management. *Jàmbá: Journal of Disaster Risk Studies,* 5.

OTENG-ABABIO, M. & SARPONG, A. O. 2015. Fire risk reduction through a community-based risk assessment: Reflections from Makola Market, Accra, Ghana. *Disasters,* 39**,** 570-591.

ÖZERDEM, A. & JACOBY, T. 2006. *Disaster management and civil society: Earthquake relief in Japan, Turkey and India,* London, I.B. Tauris & Co. Ltd.

PAHL-WOSTL, C., TÀBARA, D., BOUWEN, R., CRAPS, M., DEWULF, A., MOSTERT, E., RIDDER, D. & TAILLIEU, T. 2008. The importance of social learning and culture for sustainable water management. *Ecological Economics,* 64**,** 484-495.

PARKINSON, J. & MARK, O. 2005. Urban stormwater management in developing countries. London, UK: IWA Publishing.

PAUL, S. K. & ROUTRAY, J. K. 2009. Flood proneness and coping strategies: the experiences of two villages in Bangladesh. *Disasters,* Early View.

PEARCE, L. 2003. Disaster management and community planning, and public participation: How to achieve sustainable hazard mitigation. *Natural Hazards,* 28**,** 211-228.

PELLING, M. 1999. The political ecology of flood hazard in urban Guyana. *Geoforum,* 30**,** 249-261.

PELLING, M. (ed.) 2003a. *Natural disasters and development in a globalizing world*: Routledge.

PELLING, M. 2003b. *The vulnerability of cities: Natural disasters and social resilience,* London and Sterling, VA, Earthscan Publications Ltd.

PELLING, M. & HOLLOWAY, A. 2006. Legislation for mainstreaming disaster risk reduction. Teddington, Middlesex, United Kingdom: Tearfund.

PELLING, M. & WISNER, B. (eds.) 2009. *Disaster risk reduction: Cases from urban Africa*: Earthscan.

PHAROAH, R. 2006. *An assessment of the City of Cape Town's 2006 winter preparedness strategy.* Honours Thesis. South Africa: University of Cape Town.

PHAROAH, R. 2013. *"Sometimes I think the shack was better": Examining flood-risk in subsidised housing areas in Cape Town.* Doctoral Thesis. South Africa: University of Cape Town.

PIERRE, J. 2005. Comparative urban governance: Uncovering complex causalities. *Urban Affairs Review,* 40**,** 446-462.

PIETERSE, E. 2008. *City futures: Confronting the crisis of urban development*, Zed Books and UCT Press.

PIPER, L. & DEACON, R. 2008. Partisan ward committees, elite accountability and community participation: The Msunduzi case. *Critical Dialogue,* 4**,** 41-45.

PLATE, E. J. 2002. Flood risk and flood management. *Journal of Hydrology,* 267**,** 2-11.

POAPONGSAKORN, N. & MEETHOM, P. 2012. Impact of the 2011 floods, and flood management in Thailand. *In:* SAWADA, Y. & OUM, S. (eds.) *Economic and welfare impacts of disasters in East Asia and policy responses.* ERIA Research Project Report 2011-8, Jakarta: ERIA.

POWELL, W. W. 1990. Neither market nor hierarchy: Network forms of organizations. *Research in Organizational Behavior,* 12**,** 295-336.

RAKODI, C. 2002. A livelihoods approach: Conceptual issues and definitions. *In:* RAKODI, C. & LLOYD-JONES, T. (eds.) *Urban livelihoods: A people-centred approach to reducing poverty.* Routledge.

RAMUTSINDELA, M. 2007. Geographical knowledge, case studies and the division of labour. *South African Geographical Journal,* 89**,** 121-127.

REID, H., ALAM, M., BERGER, R., CANNON, T., HUQ, S. & MILLIGAN, A. 2009. Community-based adaptation to climate change: An overview. *Participatory Learning and Action (PLA) Notes,* 60**,** 11-33, IIED London.

RENN, O. 2008a. *Risk governance: Coping with uncertainty in a complex world,* London, Earthscan.

RENN, O. 2008b. White paper on risk governance: Toward an integrative framework. *In:* RENN, O. & WALKER, K. (eds.) *Global risk governance: Concept and practice using the IRGC framework.* Netherlands: Springer.

RHODES, R. A. W. 1990. Policy networks: A British perspective. *Journal of Theoretical Politics,* 2**,** 293-317.

RHODES, R. A. W. 1996. The new governance: Governing without government. *Political Studies,* XLIV**,** 652-667.

ROBERTS, D. 2008. Thinking globally, acting locally - Institutionalizing climate change at the local government level in Durban, South Africa. *Environment and Urbanization,* 20**,** 521-537.

ROBERTS, D. & O'DONOGHUE, S. 2013. Urban environmental challenges and climate change action in Durban, South Africa. *Environment and Urbanization,* 25**,** 299-319.

ROSENAU, J. N. & CZEMPIEL, E. O. 1992. *Governance without government: Order and change in world politics*, Cambridge University Press.

ROY, A. 2009. The 21st-century metropolis: New geographies of theory. *Regional Studies,* 43**,** 819-830.

SACKS, J. 2012. Sweet Home report: An investigation into the socio-political character of recent road blockades by protesting shackdwellers. Cape Town.

SACKS, J. 2014. Sweet Home: A preliminary investigation into the socio-political character of recent road blockades by protesting shack dwellers in South Africa. *Journal of Asian and African Studies,* 49**,** 115-125.

SATTERTHWAITE, D. 2011. How can urban centers adapt to climate change with ineffective or unrepresentative local governments. *WIREs Climate Change,* 2**,** 767-776.

SATTERTHWAITE, D. & DODMAN, D. 2013. Towards resilience and transformation for cities within a finite planet. *Environment and Urbanization,* 25**,** 291-298.

SATTERTHWAITE, D., HUQ, S., PELLING, M., REID, H. & LANKAO, P. R. 2007. Adapting to climate change in urban areas: The possibilities and constraints in low- and middle-income nations. *Human Settlements Discussion Paper Series*.

SCHIPPER, L. 2007. Climate change adaptation and development: Exploring the linkages. *Tyndall Centre for Climate Change Research,* Working Paper 107.

SCHIPPER, L. 2009. Meeting at the crossroads? Exploring the linkages between climate change adaptation and disaster risk reduction. *Climate and Development,* 1**,** 16-30.

SCHIPPER, L. & PELLING, M. 2006. Disaster risk, climate change and international development: Scope for, and challenges to, integration. *Disasters,* 30**,** 19-38.

SCHOLZ, R. W. & TIETJE, O. (eds.) 2002. *Embedded case study methods,* Thousand Oaks, CA: SAGE Publications, Inc.

SCOONES, I. 1998. Sustainable rural livelihoods: A framework for analysis. *IDS Working Paper,* 72.

SCOTT, J. C. 1991. *Domination and the arts of resistance: Hidden transcripts,* New Haven, Yale University Press.

SHACKLETON, S., ZIERVOGEL, G., SALLU, S., GILL, T. & TSCHAKERT, P. 2015. Why is socially-just climate change adaptation in sub-Saharan Africa so challenging? A review of barriers

identified from empirical cases. *Wiley Interdisciplinary Reviews: Climate Change,* 6**,** 321-344.

SHANNON, R., HOPE, M., MCCLOSKEY, J., CROWLEY, D. & CRICHTON, P. 2014. Social dimensions of science-humanitarian collaboration: Lessons from Padang, Sumatra, Indonesia. *Disasters,* 38**,** 636-653.

SHAW, R. 2006. Community-based climate change adaptation in Vietnam: Inter-linkages of environment, disaster, and human security. *Multiple Dimension of Global Environmental Changes.* (Unpublished) TERI Publication.

SHAW, R. 2012. Overview of community-based disaster risk reduction. *In:* SHAW, R. (ed.) *Community-based disaster risk reduction.* Bingley, United Kingdom: Emerald Group Publishing Limited.

SHEARING, C. 2005. Nodal security. *Police Quarterly***,** 57.

SHEARING, C. & JOHNSTON, L. 2010. Nodal wars and network fallacies: A genealogical analysis of global insecurities. *Theoretical Criminology,* 14**,** 495-514.

SILVERMAN, D. 2011. *Interpreting qualitative data,* 4th Edition, SAGE Publications.

SINWELL, L. 2010. The Alexandra Development Forum (ADF): The tyranny of invited participatory spaces? *Transformation,* 74**,** 23-46.

SMIT, B. & PILIFOSOVA, O. 2001. Adaptation to climate change in the context of sustainable development and equity. *In:* MCCARTHY, J. J., CANZIANI, O. F., LEARY, N. A., DOKKEN, D. J. & WHITE, K. S. (eds.) *Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge: Cambridge University Press.

SMIT, B. & WANDEL, J. 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change,* 16**,** 282-292.

SMIT, W. 2004. The urban development imagination and realpolitik. *Development Update,* 5**,** 53-80.

SMIT, W. 2006. Understanding the complexities of informal settlements: Insights from Cape Town. *In:* HUCHZERMEYER, M. & KARAM, A. (eds.) *Informal settlements: A perpetual challenge?* Cape Town: UCT Press.

SMUCKER, T. A. & WISNER, B. 2008. Changing household responses to drought in Tharaka, Kenya: Vulnerability, persistence and challenge. *Disasters,* 32**,** 190-215.

SOMERVILLE, P. & HAINES, N. 2008. Prospects for local co-governance. *Local Government Studies,* 34**,** 61-79.

SOUTH AFRICA 1998. Green Paper on Disaster Management. Republic of South Africa: Ministry for Provincial Affairs and Constitutional Development.

SOUTH AFRICA 2002. Disaster Management Act, 2002. *Act No. 57 of 2002.* Republic of South Africa: Government Gazette.

SOUTH AFRICA. 2014. *South African Government Services* [Online]. Available: http://www.services.gov.za/services/content/Home/ServicesForPeople/Socialbenefits/en_ZA [Accessed: 2014.10.29].

ST. MARTIN, K. 2001. Making space for the community resource management in fisheries. *Annals of the Association of American Geographers,* 91**,** 122-142.

STATSSA. 2011. *Statistics South Africa: City of Cape Town.* [Online]. Available: http://beta2.statssa.gov.za/?page_id=1021&id=city-of-cape-town-municipality [Accessed: 2014.10.30].

STEINS, N. A. & EDWARDS, V. M. 1999. Synthesis: Platforms for collective action in multiple-use common-pool resources. *Agriculture and Human Values,* 16**,** 309-315.

STOKER, G. 1998. Governance as theory: Five propositions. *International Social Science Journal,* 50**,** 17-28.

STOKER, G. 2004. Designing institutions for governance in complex environments: Normative rational choice and cultural institutional theories explored and contrasted. *ESRC Fellowship Paper No.1.* June 2004.

STRAUSS, A. & CORBIN, J. 1990. *Basics of qualitative research,* Newbury Park, C.A., SAGE Publications Inc.

SWISS RE 2013. Mind the risk - A global ranking of cities under threat from natural disasters. Zürich: Swiss Reinsurance Company (Swiss Re).

TAING, L., ARMITAGE, N. & SPIEGEL, A. 2011. Cape Town's problematic vacuum sewer: A reflection on the technical, social and institutional blockages that constrain municipal management. *12th International Conference on Urban Drainage.* Porto Alegre/Brazil, 10-15 September 2011.

TANNER, T., MITCHELL, T., POLACK, E. & GUENTHER, B. 2009. Urban governance for adaptation: Assessing climate change resilience in ten Asian cities. *IDS Working Paper,* 315**,** 1-47.

TANSEY, J. & O'RIORDAN, T. 1999. Cultural theory and risk: A review. *Health, Risk & Society,* 1**,** 71-90.

TARLOCK, D. A. 1999. The creation of new risk sharing water entitlement regimes: The case of the Truckee-Carson Basin. *Ecology Law Quarterly,* 25**,** 674-691.

TAŞ, M., TAŞ, N., DURAK, S. & ATANUR, G. 2013. Flood disaster vulnerability in informal settlements in Bursa, Turkey. *Environment and Urbanization,* 25**,** 443-463.

TEFRE, Ø. S. 2010. *A comparative study of the capacity of three communities in Hout Bay to influence policing.* Masters Thesis. Norway: University of Bergen.

THOMALLA, F. & LARSEN, R. K. 2010. Resilience in the context of tsunami early warning systems and community disaster preparedness in the Indian Ocean region. *Environmental Hazards,* 9**,** 249-265.

THOMPSON, L. 2007. 'Created' and 'invited' spaces: Participatory strategies and processes and their impact on the environmental policies leading to the building of the Berg dam. *In:* THOMPSON, L. (ed.) *Participatory Governance? Citizens and the State in South Africa.* University of the Western Cape, Cape Town, South Africa: African Centre for Citizenship and Democracy.

TIERNEY, K. 2012. Disaster governance: Social, political, and economic dimensions. *Annual Review of Environment and Resources,* 37**,** 341-363.

TIERNEY, K. 2014. *The social roots of risk: Producing disasters, promoting resilience*, Stanford University Press.

TORFING, J., PETERS, B. G., PIERRE, J. & SØRENSEN, E. 2012. *Interactive governance: Advancing the paradigm,* Oxford, Oxford University Press.

TRUNG, L. D. 2012. Economic and welfare impacts of disasters in East Asia and policy responses: The case of Vietnam. *In:* SAWADA, Y. & OUM, S. (eds.) *Economic and welfare impacts of disasters in East Asia and policy responses.* ERIA Research Project Report 2011-8, Jakarta: ERIA.

TSENG, C.-P. & PENNING-ROWSELL, E. C. 2012. Micro-political and related barriers to stakeholder engagement in flood risk management. *The Geographical Journal,* 178**,** 253-269.

TWIGG, J. 2007. Characteristics of a disaster-resilient community: A guidance note. *DFID Disaster Risk Reduction Interagency Coordination Group.*

TWIGG, J. 2015. Disaster risk reduction. *Good Practice Review 9.* United Kingdom: Humanitarian Policy Group, Overseas Development Institute (ODI).

UITTO, J. I. & SHAW, R. 2006. Adaptation to changing climate: Promoting community-based approaches in the developing countries. Kyoto University: Kyoto University Research Information Repository.

UN-HABITAT 2012. State of the world's cities 2012/2013: Prosperity of cities. United Nations Human Settlements Programme (UN-HABITAT).

UN-HABITAT 2014. The state of African cities 2014: Re-imagining sustainable urban transitions. United Nations Human Settlements Programme (UN-HABITAT).

UNISDR 2004. Living with risk: A global review of disaster reduction initiatives. Geneva: United Nations International Strategy for Disaster Reduction (UNISDR).

UNISDR 2005. Hyogo framework for action 2005-2015: Building the resilience of nations and communities to disasters. *World Conference on Disaster Reduction.* 18-22 January 2006,

Kobe, Hyogo, Japan: Geneva: United Nations International Strategy for Disaster Reduction (UNISDR).

UNISDR 2007. Guidelines: National platforms for disaster risk reduction. Geneva: United Nations International Strategy for Disaster Reduction (UNISDR).

UNISDR 2009a. 2009 UNISDR terminology on disaster risk reduction. Geneva, Switzerland: United Nations International Strategy for Disaster Reduction (UNISDR).

UNISDR 2009b. Risk and poverty in a changing climate. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations Strategy for Disaster Reduction (UNISDR).

UNISDR 2010. Toolkit for national platforms for disaster risk reduction in Africa: Contributing to the implementation of the Hyogo Framework for Action and the Africa Regional Strategy and Programme of Action for DRR. *In:* WESTGATE, K. (ed.). Nairobi: United Nations International Strategy for Disaster Reduction (UNISDR): Regional Office for Africa.

UNISDR 2011. Revealing risk, redefining development. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations Strategy for Disaster Reduction (UNISDR).

UNISDR 2013. From shared risk to shared value - The business case for disaster risk reduction. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations International Strategy for Disaster Reduction (UNISDR).

UNISDR 2015. Making development sustainable, the future of disaster risk management. Global Assessment Report on Disaster Risk Reduction. Geneva, Switzerland: United Nations International Strategy for Disaster Reduction (UNISDR).

UPHAM, P., WHITMARSH, L., POORTINGA, W., PURDAM, K., DARNTON, A., MCLACHLAN, C. & DEVINE-WRIGHT, P. 2009. Public attitudes to environmental change: A selective review of theory and practice. *Living with Environmental Change Research Programme (LWEC).* Research Councils UK.

VAN AALST, M. K. 2006. The impacts of climate change on the risk of natural disasters. *Disasters,* 30**,** 5-18.

VAN ASSELT, M. B. A. & RENN, O. 2011. Risk governance. *Journal of Risk Research,* 14**,** 431-449.

VAN NIEKERK, D. 2006. Disaster risk management in South Africa: The function and the activity - Towards an integrated approach. *Politeia,* 25**,** 96-116.

VAN NIEKERK, D. 2011. The South African disaster risk management policy and legislation - A critique. *Concept Paper.* Potchefstroom, South Africa: North-West University.

VAN NIEKERK, D. 2013. Translating disaster resilience into spatial planning practice in South Africa: Challenges and champions. *Jàmbá: Journal of Disaster Risk Studies,* 5.

VAN NIEKERK, D. 2014. A critical analysis of the South African Disaster Management Act and Policy Framework. *Disasters,* 38**,** 858-877.

VAN NIEKERK, D. & COETZEE, C. 2012. African experiences in community-based disaster risk reduction. *In:* SHAW, R. (ed.) *Community-based disaster risk reduction.* Bingley, U.K.: Emerald Group Publishing Limited.

VAN RIET, G. 2009a. Disaster risk assessment in South Africa: Some current challenges. *South African Review of Sociology,* 40**,** 194-208.

VAN RIET, G. 2009b. Qualitative and quantitative community level approaches: Disaster risk assessment in the Fezile Dabi District Municipality. *Africanus: Journal of Development Studies,* 39**,** 31-43.

VAN RIET, G. & DIEDRICKS, M. 2010. The placement of the disaster management function within district, metropolitan and provincial government structures in South Africa. *Administratio Publica,* 18**,** 155-173.

VAN RIET, G. & VAN NIEKERK, D. 2012. Capacity development for participatory disaster risk assessment. *Environmental Hazards***,** 1-13.

VEDELD, T., HELLEVIK, S., KOMBE, W., KWEKA-MSALE, C., COLY, A., NDOUR, N. M., GUÉYE, S., KLAUSEN, J. E. & SAGLIE, I.-L. 2012. Report on planning system and government structure in 2 case cities.: CLUVA deliverable D3.1. Available: http://www.cluva.eu/deliverables/CLUVA_D3.1.pdf [Accessed: 2016.01.22].

VEDELD, T., KOMBE, W., KWEKA-MSALE, C. & HELLEVIK, S. B. 2015. Multilevel governance and coproduction in urban flood-risk management. *In:* INDERBERG, T. H., ERIKSEN, S., O'BRIEN, K. & SYGNA, L. (eds.) *Climate change adaptation and development: Transforming paradigms and practices.* London and New York: Routledge: Taylor and Francis Group.

WACHTENDORF, T. 2000. When disasters defy borders: What we can learn from the Red River flood about transnational disasters. *Australian Journal of Emergency Management,* 15**,** 36-41.

WADDELL, J., SMIT, W., ZIERVOGEL, G. & DRIVDAL, L. 2013. Flooding in Cape Town: The trickle-down effect. *The Cape Times*, 2013.06.24.

WADDELL, J. & ZIERVOGEL, G. 2014. Multi-actor flood governance in Cape Town's informal settlements: Unpacking the barriers to collaborative governance. *5th global Forum on Urban Resilience and Adaptation: Resilient Cities 2014.* Bonn, Germany, 29-31 May 2014. Available: http://resilient-cities.iclei.org/fileadmin/sites/resilient-cities/files/docs/Waddell_and_Ziervogel_Cape_Town.pdf [Accessed: 2014.06.25].

WALKER, G., WHITTLE, R., MEDD, W., WATSON, N., KUHLICKE, C., STEINFÜHRER, A. & DINARÈS, M. 2010. Risk governance and natural hazards. WP 2 Report, Version 3: CapHaz-Net:

Social capacity building for natural hazards toward more resilient societies. Available: http://eprints.lancs.ac.uk/49475/1/WP2_final.pdf [Accessed: 2011.12.13].

WAMSLER, C. 2007. Bridging the gaps: Stakeholder-based strategies for risk reduction and financing for the urban poor. *Environment and Urbanization,* 19**,** 115-142.

WARNER, J., SMITS, S., WINNUBST, M. & BUTTERWORTH, J. 2006. Local governance in Integrated Water Resources Management in the Netherlands. European Commission: Part of the project 'LoGo Water': Towards effective involvement of local government in Integrated Water Resources Management (IWRM) in river basins of the Southern African Development Community (SADC) region.

WARNER, J. F. 2006. More sustainable participation? Multi-stakeholder platforms for integrated catchment management. *International Journal of Water Resources Development,* 22**,** 15-35.

WARNER, J. F., VAN BUUREN, A. & EDELENBOS, J. (eds.) 2013. *Making space for the river. Governance experiences with multifunctional river flood management in the US and Europe,* London, U.K.: IWA Publishing.

WATSON, V. 2009. Seeing from the South: Refocusing urban planning on the globe's central issues. *Urban Studies,* 46**,** 2259-2275.

WEICHSELGARTNER, J. & OBERSTEINER, M. 2002. Knowing sufficient and applying more: Challenges in hazards management. *Environmental Hazards,* 4**,** 73-77.

WELSH, M. 2014. Resilience and responsibility: Governing uncertainty in a complex world. *The Geographical Journal,* 180**,** 15-26.

WERRITTY, A. 2006. Sustainable flood management: Oxymoron or new paradigm? *Area,* 38**,** 16-23.

WESSELINK, A., PAAVOLA, J., FRITSCH, O. & RENN, O. 2011. Rationales for public participation in environmental policy and governance: Practitioners' perspectives. *Environment and Planning A,* 43**,** 2688-2704.

WHITMARSH, L. 2008. Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *Journal of Risk Research,* 11**,** 351-374.

WILKINSON, P. 1998. Housing policy in South Africa. *Habitat International,* 22**,** 215-229.

WILLIAMSON, D. L., CHOI, J., CHARCHUK, M., REMPEL, G. R., PITRE, N., BREITKREUZ, R. & KUSHNER, K. E. 2011. Interpreter-facilitated cross-language interviews: A research note. *Qualitative Research,* 11**,** 381-394.

WILLIS, J. W. 2007. *Foundations of qualitative research: Interpretive and critical approaches,* Thousand Oaks, C.A., SAGE Publications Inc.

WINKLER, T. 2011. Retracking Johannesburg: Spaces for participation and policy making. *Journal of Planning Education and Research,* 31**,** 258-271.

WISNER, B., BLAIKIE, P., CANNON, T. & DAVIS, I. 2004. *At risk: Natural hazards, people's vulnerability and disasters,* 2nd Edition, London, Routledge.

WISNER, B., KENT, G., GAILLARD, J. C., WILLISON, Z. D., VAN NIEKERK, D., BHATT, M., COOK, B., LASSA, J., CARDONA, O.-D., OXLEY, M., CARMALT, J., GIBSON, T. & KELMAN, I. 2011. Concept Paper: Political will for disaster reduction: What incentives build it, and why is it so hard to achieve? A contribution to the review of the draft GAR 2011, Chapters 5, 6 & 7. Geneva: United Nations International Strategy for Disaster Reduction.

WOOD, J. & SHEARING, C. 2007. *Imagining security,* Devon, William Publishing.

WORLD BANK 2013. World development report 2014: Risk and opportunity, managing risk for development. Washington D.C.: The World Bank.

YIN, R. K. 2014a. *Applications of case study research,* 3rd Edition, SAGE Publications Inc.

YIN, R. K. 2014b. *Case study research: Design and methods,* 5th Edition, SAGE Publications Inc.

ZEVENBERGEN, C. & GERSONIUS, B. 2007. Challenges in urban flood management. *In:* ASHLEY, R., GARVIN, S., PASCHE, E., VASSILOPOULOS, A. & ZEVENBERGEN, C. (eds.) *Advances in urban flood management.* London, UK: Taylor and Francis Group.

ZEVENBERGEN, C., VEERBEEK, W., GERSONIUS, B. & VAN HERK, S. 2008. Challenges in urban flood management: Travelling across spatial and temporal scales. *Journal of Flood Risk Management,* 1**,** 81-88.

ZHAI, G., SATO, T., FUKUZONO, T., IKEDA, S. & YOSHIDA, K. 2006. Willingness to pay for flood risk reduction and its determinants in Japan. *Journal of the American Water Resources Association (JAWRA),* 42**,** 927-940.

ZIERVOGEL, G., NEW, M., VAN GARDEREN, E. A., MIDGLEY, G., TAYLOR, A., HAMANN, R., STUART-HILL, S., MYERS, J. & WARBURTON, M. 2014a. Climate change impacts and adaptation in South Africa. *WIREs Climate Change,* 5**,** 605-620.

ZIERVOGEL, G. & SMIT, W. 2009. Learning to swim: Strengthening flooding governance in the city of Cape Town. *Conference on the human dimensions of global environmental change: 'Earth system governance: People, places and the planet'.* Amsterdam, 2-4 December 2009.

ZIERVOGEL, G. & TAYLOR, A. 2008. Feeling stressed: Integrating climate adaptation with other priorities in South Africa. *Environment,* 50**,** 32-41.

ZIERVOGEL, G., WADDELL, J., WARREN, S. & TAYLOR, A. 2014b. Flooding in Cape Town's informal settlements: Barriers to collaborative urban risk governance. *South African Geographical Journal,* 97.

APPENDICES

APPENDIX 1:

Community researchers: Photo-reporting information sheet

Aim:
To gain an insider* view into the multiple uses of the stormwater drainage system in Sweet Home Farm, through the use of photography, descriptive reporting, and reflexive writing.

*'Insider' here refers to someone who lives in Sweet Home Farm, and to whom these issues form part of their lived experience.

Intended Outcomes:

1. Get some data on the current status of the stormwater drainage system in Sweet Home Farm.
2. Get insight into local perspectives and understanding of stormwater drainage systems.
3. Establish illustrated and descriptive points of reference for on-going discussions with Sweet Home Farm residents, community leaders and City officials, on flood risk in Sweet Home Farm and the status of stormwater drainage systems in informal settlements.
4. Empower the community of Sweet Home Farm, in the form of engaging community leaders as researchers; giving them work experience and payment for work, and helping them gain insight into the role of stormwater drainage systems for reducing flood risk.

Time Commitment and Duration:
This research exercise will have two phases:

1. The first phase will help gather data on the current status of stormwater drainage systems and the multiple uses of these systems by the community, prior to the winter rain season, when flood risk is at its lowest: December-January.
2. The second phase will help gather data on flooding incidents and the impact that stormwater drainage systems have on these incidents, during the winter rainfall season, when flood risk is at its highest: May-June.

The community researchers will be expected to complete a report and take 2 relevant photos, for each session. The sessions would last about 2 hours, and it is expected that each community researcher carry out 2 sessions a week, for 6 weeks. This would result in 12 completed reports, and about 24 photos.

Phase 1
Duration: 17th December 2012, until 25th January 2013.
Evaluation Meeting: First week of February 2013.

Phase 2
Duration: 13th May 2013, until 21st June 2013.
Evaluation Meeting: Last week of June 2013.

Community Researcher Tasks:

- ✓ One complete report should be filled in for each session.
- ✓ Each session includes taking a photo, writing down what the picture is about, writing observations about what is happening, and writing your thoughts about the situation.
- ✓ Take pictures of the drain. Note down the date and what the picture is about, on the report sheet.
- ✓ Observe what is happening and write notes about this on the report sheet.
- ✓ Write extra notes about their own thoughts on the drainage system, or about how it is related to flooding, on the report sheet.
- ✓ If anyone asks what the researchers are doing, it should be explained to them. If they have any comments, these must be written on the report sheet as well.

Evaluation:

These meetings will take place at the completion of each phase. These meetings are an opportunity for the researcher and the community researchers to discuss the findings, to evaluate the process, and to explore any issues arising from the fieldwork and the overall process. This will also be an important time to consider any issues related to the write-up of the individual reports, and to clarify any misunderstandings or incomplete reports.

Payment:

Each community researcher will receive payment for their work. [*amount paid has been deleted*]. This payment will be made during the evaluation meetings at the end of each work phase.

Materials Provided:

Each community researcher will be provided with 15 copies of blank report sheets. 12 of these are to be completed and handed back to the head researcher during the evaluation meetings. Each community researcher will also be provided with a disposable camera that takes 27 photographs. These cameras will also be handed back to the head researcher during the evaluation meeting. Any camera lost and not handed back will result that particular researcher receiving [*Rx*] less from his/her total payment at the completion of the work.

Contact of the Head Researcher:

If you have any problems or questions, you can contact the researcher responsible: Joy Waddell (email and telephone provided in acceptance letter). You can also contact the community leader who is supporting this project and will be the central contact person in Sweet Home Farm: Siya and Pamela James (telephone number provided). Any queries that Siya and Pamela cannot answer, will be referred to Joy Waddell.

APPENDIX 2:

Community researchers: Photo-reporting activity #1
December 2012 - January 2013

Activity Aim:
To understand the state of the drains in Sweet Home Farm, how the community uses these drains and how these drains deal with flooding issues; through the use of photography, and descriptive reporting.

Job Description:
Duration: 17th December 2012 to 25th January 2013 (6 weeks)
Work 2 times a week, for about 2 hours each time, for 6 weeks.

What to do: Walk around Sweet Home Farm, looking for examples of people using the drains, of people fixing or damaging the drains, and of the drains causing, or reducing flooding problems.

When there, do the following:
- ✓ Take pictures of the drain (if people are using it, if the drain looks very bad/good, of people fixing or damaging the drain, or of flooding from/around the drain). Note down the date, where the picture was taken, and what the picture is about, on the sheet.
- ✓ Observe what happens and write notes about this on the sheets. You can fill the sheet out there, before or after you have taken the pictures.
- ✓ 2 photos should be taken each time you fill in a sheet.
- ✓ 2 sheets should be filled out each week.
- ✓ If anyone asks you what you are doing, explain it to them. If they have any comments, you can write these down on the sheets.
- ✓ You can also write extra notes about your own thoughts about the situation, on the sheets.
- ✓ **Remember!** It is better to write a lot than to write nothing. Even if you feel that what you write might not be that good.

Outcomes: You will deliver 2 sheets, every week, for 6 weeks. This is a total of 12 sheets. You will also deliver the camera (with about 24 photos that have been taken).

Evaluation: The first week of February 2013, we will have a meeting where we will discuss what you found during the 6 weeks of research. At this meeting, you will give Joy the 12 sheets you completed, and the camera.

Payment: You will be paid during the evaluation meeting, once you have given the completed report sheets, and the camera. [amount paid has been deleted]

Contacts: If you have any problems or questions, you can contact the researcher responsible: Joy Waddell (phone number provided). You can also talk to Siya and Pamela James, and they will contact Joy.

DRAINS AND THEIR USES:

Sheet #: _____ Place: _____ Date: _____

Pictures: Take a picture and make notes about it:

Picture 1: Date: What is it about?

_____
_____

Picture 2: Date: What is it about?

_____
_____

Picture 3: Date: What is it about?

_____
_____

Describe the Situation:

1. How does the drain look? Is it blocked? What is it blocked with? What does it smell like? How does the area around the drain look?

_____
_____
_____

2. Is anyone near the drain, or using the drain? Who are they and what are they doing? Has the drain been changed in any way? Describe those changes.

_____
_____
_____

3. Who should do something about the situation and what should they do? Write your own thoughts, but also ask people in the area for their thoughts.

_____
_____
_____

4. Write down comments from residents and people in the area, about the situation.

_____
_____
_____

5. Note your own thoughts; what do you think about this situation?

_____
_____
_____

Examples of feedback provided by community researchers:

Sheet #: One
Place: Sweet Home Vlei
Date: Monday 17 December 2012

Pictures: Take a picture and make notes about it:

Picture 1:

Blocked drain and toilets that are blocked in Sweet Home

Picture 2:

Is about blocked drains

Describe the situation: (** Answers are captured exactly as the participant wrote them)

1. **How does the drain look? Is it blocked? What is it blocked with? What does it smell like? How does the area around the drain look?**

It looks like a dam. It looks so disgusting and full of flies around it. It is blocked by the things people they put it inside the drain, for example, food, or use the rough papers when they using the toilet. It smell like the… The area around the drain look very bad. You can't even breath.

2. **Is anyone near the drain, or using the drain? Who are they and what are they doing? Has the drain been hanged in any way? Describe those changes.**

The people are using the drain they are complaining that the municipality come and fix it for one day after that the drain blocked again. So now the people decide to close the drain because it blocked everyday. The people put the stones and sand to close the drain.

3. **Who should do something about the situation and what should they do? Write your own thoughts, but also ask people in the area their thoughts.**

The municipality should do something, like to change the drain pipes and put the big pipes for drain, because those small one is easy to blocked.

4. **Write down comments from residents and people in the area, about the situation.**

The residents comments about the situation because it affects children. Children get sick everyday because childrens playing with that dirty water, even the adults are sick. Most of the people here in Sweet Home they are sick or suffering with TB because they breath dirty air.

5. **Note your own thoughts; what do you think about this situation?**

In my own thought, I think the municipality must change all the drains and make the new drain. And in that new drain must put the big pipes for toilets and drains. I think it will be better.

APPENDIX 3:

Community researchers: Photo-reporting activity #2
May - June 2013

Activity Aim:
To understand the state of the drains in Sweet Home Farm, how the community uses these drains and how these drains deal with flooding issues; through the use of photography, and descriptive reporting.

Job Description:
Duration: 13th May 2013 to 21st June 2013 (6 weeks)
Work 2 times a week, for about 2 hours each time, for 6 weeks.

What to do: Walk around Sweet Home Farm, looking for examples of people using the drains, of people fixing or damaging the drains, and of the drains causing, or reducing flooding problems.

When there, do the following:
- ✓ Take pictures of the drain (if people are using it, if the drain looks very bad/good, of people fixing or damaging the drain, or of flooding from/around the drain). Note down the date, where the picture was taken, and what the picture is about, on the sheet.
- ✓ Observe what happens and write notes about this on the sheets. You can fill the sheet out there, before or after you have taken the pictures.
- ✓ 2 photos should be taken each time you fill in a sheet.
- ✓ 2 sheets should be filled out each week.
- ✓ If anyone asks you what you are doing, explain it to them. If they have any comments, you can write these down on the sheets.
- ✓ You can also write extra notes about your own thoughts about the situation, on the sheets.
- ✓ **Remember!** It is better to write a lot than to write nothing. Even if you feel that what you write might not be that good.

Outcomes: You will deliver 2 sheets, every week, for 6 weeks. This is a total of 12 sheets. You will also deliver the camera (with about 24 photos that have been taken).

Evaluation: The last week of June 2013, we will have a meeting where we will discuss what you found during the 6 weeks of research. At this meeting, you will give Joy the 12 sheets you completed, and the camera.

Payment: You will be paid during the evaluation meeting, once you have given the completed report sheets, and the camera. [*amount paid has been deleted*]

Contacts: If you have any problems or questions, you can contact the researcher responsible: Joy Waddell (phone number provided). You can also talk to Siya and Pamela James, and they will contact Joy.

FLOOD EVENT:

Sheet #: _____ Place: _____ Date: _____

Pictures: Take a picture and make notes about it:

Picture 1: Date: What is it about?

_____

_____

Picture 2: Date: What is it about?

_____

_____

Picture 3: Date: What is it about?

_____

_____

Describe the Situation:

1. Describe the flooding: where is it, how deep is it, what is causing it?

_____

_____

_____

2. How many houses have been affected? What else has been affected?

_____

_____

_____

3. What are different people doing about the flooding? Who is doing what? Observe, but also ask questions and note their answers.

_____

_____

_____

4. Are there people from the government, NGOS, or other organisations coming to help? Who? What are they doing?

_____

_____

_____

5. Is there a drain nearby? Is it good or bad for the flooding? How? Why?

_____

_____

_____

6. Who should do something about the situation and what should they do? Write your own thoughts, but also ask people in the area for their thoughts.

_____
_____
_____

7. Write down comments from residents and people in the area, about the situation.

_____
_____
_____

8. Note your own thoughts; what do you think about this situation?

_____
_____
_____

Examples of feedback provided by community researchers:

Sheet #: One
Place: Sweet Home
Date: Sunday 26 May 2013

Pictures: Take a picture and make notes about it:

Picture 1:

It is about the floods in Sweet Home. And the house that are affected by the flooding.

Describe the situation: (** Answers are captured exactly as the participant wrote them)

1. Describe the flooding: where is it, how deep is it, what is causing it?
It is here in Sweet Home Farm. It is very deep because the houses are full of water. It caused by the rain and the conditions of the shacks, example, the place where the house build.

2. How many houses have been affected? What else has been affected?
Many houses are affect in this floods.

3. What are different people doing about the flooding? Who is doing what? Observe, but also ask questions and note their answers.
The is no different people come to help people who are affected.

4. Are there people from the government, NGOs, or other organisations coming to help? Who? What are they doing?
No people from government, NGO come to help. The is nothing government done to help the people.

5. Is there a drain nearby? Is it good or bad for the flooding? How? Why?
The is no drain that's why the houses are flooded. If the were drains maybe the floods were not that much.

6. Who should do something about the situation and what should they do? Write your own thoughts, but also ask people in the area for their thoughts.
The government should do something. The government make the drains so that when it raining, the water can go into the drain.

7. Write down comments from residents and people in the area, about the situation.
The residents comments about the government. they say government doesn't listen they complaints. They say if the government can build the houses it will be better. Some people say the government should makes drain, and bring the sand so that the houses not be affected by the floods.

8. Note your own thoughts; what do you think about this situation?
Me I think the government must help people by bring the sand so that people must can put their houses up. And the government should open more drain so that when its winter the floods doesn't affect people.

APPENDIX 4:

Information sheet provided to students attending the school programme

INFORMATION SHEET FOR STUDENTS

Part of the "Flooding in Cape Town under Climate Risk" (FliCCR) Project - University of Cape Town, South Africa

Flood Awareness and Reporting Activity for Grade 11 Learners, at Sinethemba High School.

I would like to invite you to take part in this afterschool, high-school based activity on flooding and flood awareness. You should read the information below about the project before deciding to take part. It is voluntary and if you decide not to take part, you will not be disadvantaged in any way. Before deciding, you should understand what the project is about and what you will have to do if you take part. Discuss this letter with your parents/guardians/teachers to make sure you understand everything.

Background

Joy Waddell is a PhD research student at the University of Cape Town, looking at how the City of Cape Town manages flooding in some of Philippi's informal settlements. Her research also tries to understand how residents living in these informal settlements cope with flooding and what they do to reduce their risk of flooding, and what they expect the City of Cape Town to do about the flood risk.

This activity, taking place with selected Grade 11 learners at Sinethemba High School, aims to help learners raise their awareness of flood risk and flooding impacts, in their communities. This project uses various activities to help learners explore what their experiences of flooding have been, and how they can reduce flood risk in their communities. This activity will help the researcher (Joy Waddell) with her own research, but mainly, it will help Grade 11 learners to have a better understanding of their own situation; with flood risk and how to reduce flood impacts.

Important Details about the Project

This project will take place over 3 weeks, during May 2013. Each lesson will take place after school, from 3pm until 4.15pm, 2 afternoons each week, for a total of 5 afternoons. Learners who decide to take part in this project need to commit to attending all 5 of those afternoons.

The activities during the afternoon lessons will start by looking at learners' experiences of flooding and how learners and their families have coped with flooding. The learners will then work in groups of 3, to design a research project. This research project will be displayed in the form of a poster at the end of the 5 afternoon lessons. Each group will be provided with a disposable camera, and 3 notebooks, to capture information after school, in their own communities. The research questions and theme for this will be decided during lesson times, by the learners, with help from the researcher. A very important part of this research is letting learners voice their own opinions and telling the researcher (Joy Waddell) what is important to them.

Information from these workshops will be used by the researcher to write a report about how Grade 11 learners living in/around Philippi experience and manage flooding. This report will be made available to learners and their

teachers. Each group of learners will also design a poster to be displayed in the school, at the end of the 5 afternoon lessons. Photographs developed from the disposable cameras will be given to the groups of learners for their personal use and/or for displaying on their posters.

Contact

If you decide to take part, please keep this information sheet and hand in the signed consent form. If you have any further questions, please feel free to contact the researcher, your geography teacher or school principal. Questions can be emailed directly to the researcher on: [email address and phone number provided]

Potential session dates and times

Session 1 (Wednesday 8th May 2013)

3pm – 4.15pm

Session 2 (Mon/Tues 13th/14th May 2013)

3pm – 4.15pm

Session 3 (Wednesday 15th May 2013)

3pm – 4.15pm

Session 4 (Mon/Tues 20/21 May 2013)

3pm – 4.15pm

Session 5 (Wednesday 22nd May 2013)

3pm – 4.15pm

Outcomes and Expectations

- ✓ 45 students will be selected from the Grade 11 geography class to take part in this project.
- ✓ Students selected will need to commit for the 3 weeks. Consent forms will need to be signed so students know what is expected of them, and they understand that some of the information from these sessions will be used in the researchers PhD at the University of Cape Town.
- ✓ The researcher will produce a summary report at the end of the project for any student and teacher who would like to have a copy. Any work and photos by students during the project will be used in this report.
- ✓ A poster will be produced at the end of the 3 weeks. These materials will remain at the school for use by teachers and students.
- ✓ 1 disposable camera will be given to each group. These cameras need to be returned to the researcher during the 2nd session. Photos developed from these cameras will be given to the group of students for use on their posters.
- ✓ Each student will be given a notebook to collect information, take notes and keep a research diary. This information will be used on the posters.
- ✓ All materials and snacks for the sessions will be provided by the facilitator.
- ✓ The sessions and writing will all be in English.

APPENDIX 5:

Chronological list of interviews, focus groups, and workshops

Interviewers' Initials	Interviewers' Names	Role
AC	Anton Cartwright	FliCCR Researcher
AT	Anna Taylor	FliCCR Researcher
CO	Christina Orangio	FliCCR Researcher
FS	FJ Solomon	FliCCR Researcher
GZ	Gina Ziervogel	FliCCR Researcher
ID	Isabelle Desportes	Masters Student (JW as local supervisor)

Interviewers' Initials	Interviewers' Names	Role
JD	Juliette Dixon	Masters Student (JW as local contact)
JW	Joy Waddell	FliCCR Researcher
KA	Kirsten Anderson	FliCCR Researcher
KL	Kent Locke	UCT student hired by FliCCR to produce a video
LD	Laura Drivdal	FliCCR Researcher
RF	Rebecca Freeth	Facilitator hired by FliCCR

Date	Method	Type of Participant	'Name' of Participant	# of Participants	# of Interviewers	Interviewer Initials	Type of Record Taken
15-Apr-10	In-depth, semi-structured interview	CCT official	DRMC	1	4	GZ, KA, FS, LD	Written notes
04-Jun-10	In-depth, semi-structured interview	CCT official	DRMC	1	1	KA	Written notes
02-Jul-10	In-depth, semi-structured interview	CCT official	Engineering Services	1	2	GZ, KA	Digital recording and full transcript
02-Jul-10	In-depth, semi-structured interview	CCT official	Informal Settlements Management	1	1	KA	Written notes
23-Aug-10	In-depth, semi-structured interview	CCT official	Development Services	1	2	GZ, KA	Digital recording and full transcript
08-Sep-10	In-depth, semi-structured interview	CCT official	Roads and Stormwater	2	2	GZ, AC	Digital recording and full transcript
01-Nov-10	In-depth, semi-structured interview	CCT official	Informal Settlements Management	1	2	KA, GZ	Digital recording and full transcript
09-Nov-11	FliCCR's workshop for the Flood Task Team	Flood Task Team / CCT official	DRMC; Provincial DRMC; Traffic Services; City Health; Environmental Resource Management; Fire and Rescue Services; Informal Settlements Management; Roads and Stormwater	23	4	JW, GZ, LD, AT	Digital recording, transcript, and written notes
23-Nov-11	In-depth, semi-structured interview	CCT official	Roads and Stormwater	1	2	JW, CO	Digital recording and full transcript
29-Nov-11	In-depth, semi-structured interview	CCT official	DRMC	1	2	CO, JW	Digital recording and full transcript
05-Dec-11	In-depth, semi-structured interview	CCT official	Environmental Health	1	2	JW, CO	Digital recording and full transcript
03-Feb-12	In-depth, semi-structured interview	CCT official	Ward Councillor	1	2	CO, LD	Transcript only
06-Feb-12	In-depth, semi-structured interview	CCT official	Ward Councillor	1	2	CO, LD	Transcript only
08-Mar-12	In-depth, semi-structured interview	CCT official	DRMC	1	1	JW	Written notes
26-Mar-12	In-depth, semi-structured interview	CCT official	DRMC	1	1	JW	Written notes
12-Jun-12	In-depth, semi-structured interview	CCT official	Development Services	1	1	JW	Written notes
17-Jun-12	Informal interview and discussion	NGO	The Warehouse	2	2	JW, GZ	Digital recording and full transcript
18-Jun-12	Informal interview and discussion	NGO	CORC/Ikhayalami	2	3	JW, GZ, RF	Written notes
19-Jun-12	In-depth, semi-structured interview	CCT official	DRMC	2	1	JW, GZ	Written notes
19-Jun-12	In-depth, semi-structured interview	CCT official	MAYCO - Safety and Security	1	2	JW, GZ	Written notes
19-Jun-12	In-depth, semi-structured interview	CCT official	Ward Councillor	1	3	JW, GZ, LD	Written notes
22-Jun-12	In-depth, semi-structured interview	CCT official	DRMC	2	1	JW	Written notes

26-Jun-12	In-depth, semi-structured interview	CCT official	Roads and Stormwater	1	1	JW	Written notes
26-Jun-12	In-depth, semi-structured interview	Residents	Sweet Home chairperson	1	1	JW	Written notes
26-Nov-12	Email Communication	CCT official	Solid Waste Management	3	1	JW	Email
28-Nov-12	Transect walk and in-depth, semi-structured interview	Residents	Sweet Home chairperson	1	1	JW	Written notes
29-Nov-12	Transect walk, house visits, and short interviews	Residents	Sweet Home residents	10	1	JW	Digital recording and full transcript, and written notes
03-Dec-12	In-depth, semi-structured interview	CCT official	Informal Settlements Management	2	1	JW	Digital recording and full transcript
04-Dec-12	Focus group	Residents	Sweet Home residents	9	1	JW	Digital recording, transcript, and written notes
06-Dec-12	In-depth, semi-structured interview	CCT official	Engineering Services	1	1	JW	Written notes
06-Dec-12	In-depth, semi-structured interview	CCT official	MAYCO - Utilities	1	1	JW	Written notes
31-Jan-13	FliCCR's workshop for the Flood Task Team	Flood Task Team / CCT official	DRMC; Development Services; Environmental Health; Informal Settlements Management; Roads and Stormwater; Water and Sanitation	15	4	JW, GZ, ID, LD	Digital recording, transcript, and written notes
31-Jan-13	Short interview for FliCCR video	CCT official	DRMC	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	CCT official	DRMC	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	CCT official	Water and Sanitation	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	CCT official	Environmental Health	1	2	JW, KL	Video recording and full transcript
14-Feb-13	In-depth, semi-structured interview	Residents	Sweet Home resident	1	3	JW, ID, JD	Digital recording and full transcript
19-Feb-13	Focus group	Residents	Sweet Home residents	18	3	JW, ID, JD	Digital recording, transcript, and written notes
21-Feb-13	Resident feedback workshop	Residents	5 informal settlements: Sweet Home; Graveyard Pond; Sheffield Road; Egoli; Kosovo	50+	5	JW, ID, JD, LD, GZ	Digital recording, transcript, and written notes
21-Feb-13	Short interview for FliCCR video	Residents	Sheffield Road resident	1	2	JW, KL	Video recording and full transcript
21-Feb-13	Short interview for FliCCR video	Residents	Egoli resident	1	2	JW, KL	Video recording and full transcript
21-Feb-13	Short interview for FliCCR video	Residents	Graveyard Pond resident	1	2	JW, KL	Video recording and full transcript
21-Feb-13	Short interview for FliCCR video	Residents	Community health worker	1	2	JW, KL	Video recording and full transcript
22-Feb-13	Participant observation of their fire awareness show in Sweet Home and informal interview	NGO	The Jungle Theatre Company	3	1	JW	Written notes and photographs
26-Feb-13	Focus group	Residents	Sweet Home residents	11	2	ID, JD	Digital recording, transcript, and written notes
27-Feb-13	Focus group	Residents	Sweet Home residents	3	1	ID	Digital recording and transcript
01-Mar-13	Email Communication	CCT official	Solid Waste Management	2	2	JW, ID	Email
01-Mar-13	FliCCR final feedback workshop	Residents, NGOs, CCT official	Ward Councillor; DRMC; Environmental Health; Transport, Roads and Major Projects; Informal Settlements Management; Roads and Stormwater; Department of Environmental Affairs and Development Planning; Residents from informal settlements; Community health workers; The Jungle Theatre Company; The	14 CCT officials, 7 NGO reps., 4 residents	5	JW, ID, JD, LD, GZ	Digital recording, transcript, and written notes

			Mustadafin Foundation; Ikhayalami; The South African Red Cross Society; The Warehouse/UBU				
6-8-Mar-13	Participant Observations and Short Interviews	Residents	Sweet Home residents	10+	1	JD	Digital recordings and full transcript
31-Jan-13	Short interview for FliCCR video	NGO	The Mustadafin Foundation	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	NGO	The South African Red Cross Society	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	NGO	The Jungle Theatre Company	1	2	JW, KL	Video recording and full transcript
31-Jan-13	Short interview for FliCCR video	CCT official	Ward Councillor	1	2	JW, KL	Video recording and full transcript
14-Feb-13	Video footage of Sweet Home	Residents	Sweet Home residents	5+	2	JW, KL	Video recording and transcript
14-Mar-13	Transect walk, house visits, and semi-structured interviews	Residents	Sweet Home residents	4	3	JW, ID, JD	Digital recording and full transcript, and written notes
19-Mar-13	Focus group	Residents	Sweet Home residents	7	3	ID, JD, JW	Digital recording, transcript, and written notes
20-Mar-13	In-depth, semi-structured interview	Residents	Sweet Home residents	3	1	ID	Transcript only
21-22-Mar-13	Sweet Home and CCT engagement workshop	Residents, CCT official	Sweet Home residents; Solid Waste Management; Environmental Health; Informal Settlements Management; DRMC; Roads and Stormwater	32 residents on 21 March; 12 residents and 9 CCT officials on 22 March	2	JW, ID	Digital recording, transcript, and written notes
22-Mar-13	Transect Walk, Interview, and Video	Residents	Graveyard Pond chairperson	1	2	JW, KL	Written notes and video recording
22-Mar-13	Focus group	Residents	Sweet Home residents	3	3	ID, JW, JD	Digital recording, transcript, and written notes
25-Mar-13	In-depth, semi-structured interview	NGO	The Mustadafin Foundation	1	2	JW, ID	Digital recording and full transcript
08-Apr-13	In-depth, semi-structured interview	CCT official	DRMC	1	2	JW, ID	Digital recording and full transcript
08-Apr-13	In-depth, semi-structured interview	CCT official	DRMC	2	2	JW, ID	Written notes
10-Apr-13	In-depth, semi-structured interview	CCT official	DRMC	2	2	JW, ID	Digital recording and full transcript
10-Apr-13	In-depth, semi-structured interview	CCT official	Environmental Health	3	2	JW, ID	Digital recording and full transcript
11-Apr-13	Presentation and Discussion Hosted by and for a CCT department	CCT official	Environmental Health	50+	N/A	JW, ID attended	Written notes and some digital recording (and transcript)
17-Apr-13	In-depth, semi-structured interview	CCT official	Roads and Stormwater	1	2	JW, ID	Digital recording and full transcript
24-Apr-13	In-depth, semi-structured interview	CCT official	Water and Sanitation	2	2	JW, ID	Digital recording and full transcript
10-May-13	Informal meeting and discussion	NGO	UBU	1	2	JW, ID	Written notes
13-May-13	Participant observation of flood awareness show in a junior school	NGO	The Jungle Theatre Company	3	1	JW	Written notes and photographs
15-May-13	Short discussion on the video produced by FliCCR	CCT official	DRMC	2	1	JW	Written notes
22-May-13	In-depth, semi-structured interview	Residents	Sweet Home chairperson and resident	2	2	JW, ID	Digital recording and full transcript
07-Jun-13	In-depth, semi-structured interview	CCT official	Ward Councillor	1	2	JW, ID	Digital recording and full transcript
12-Jun-13	In-depth, semi-structured interview	Residents	Sweet Home residents	4	2	JW, ID	Digital recording and full transcript
19-Jun-13	In-depth, semi-structured interview	CCT official	Ward Councillor	2	2	JW, ID	Digital recording and full transcript

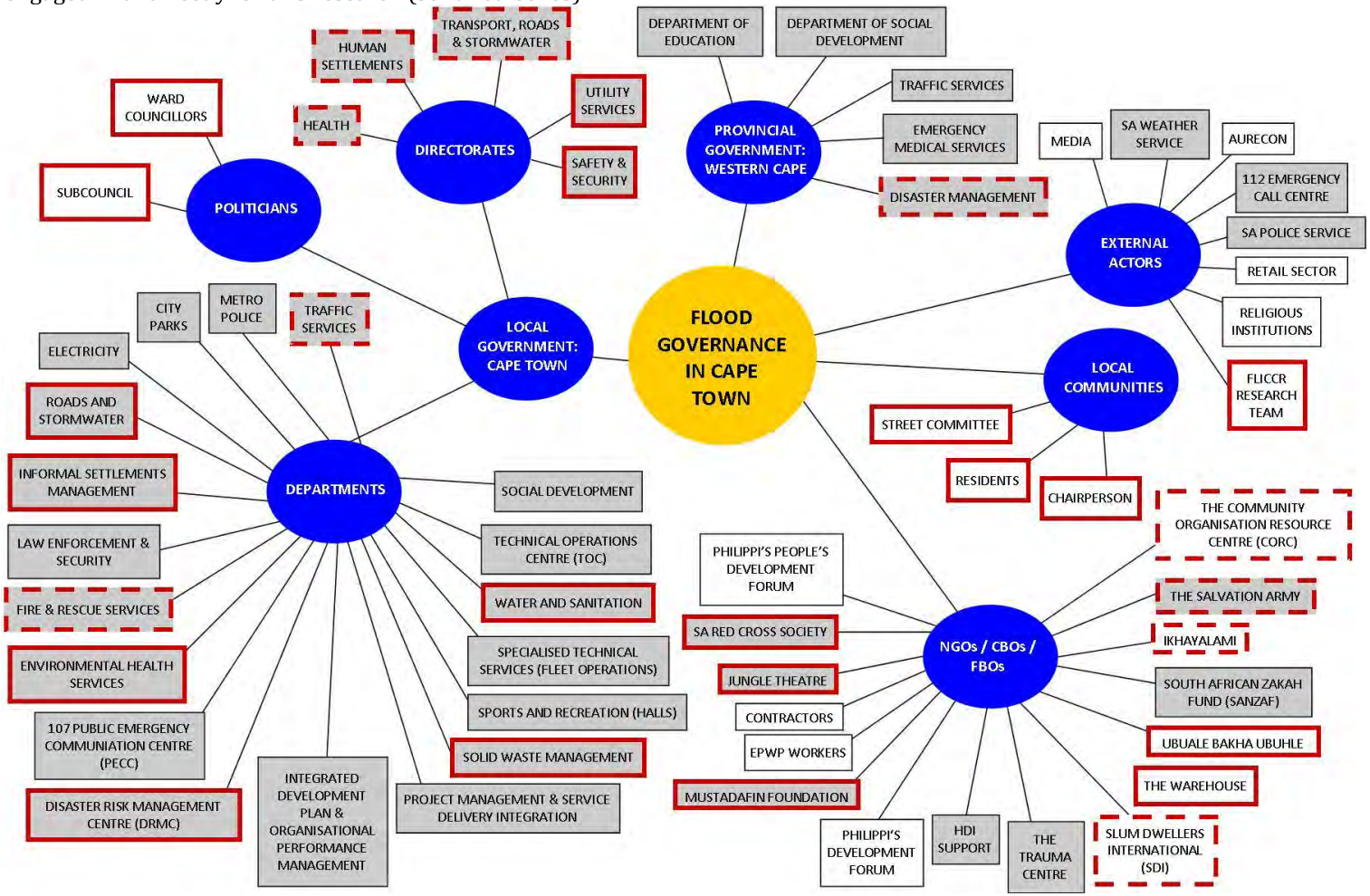
APPENDIX 6:
Details FLiCCR's workshops (2011-2013)

Date	Workshop Aims	Nodes in Attendance	Number of Attendees
9 Nov 2011	Validate data collected on current and ideal flood management interventions. Discuss how departments understand the nature of flooding and current responses. Unpack challenges and opportunities for strengthening flood governance.	City Health Directorate	2
		Disaster Risk Management Centre	11
		Environmental Resource Management Dept.	2
		Fire and Rescue Services	1
		Informal Settlements Management Dept.	3
		Provincial Disaster Risk Management Centre	1
		Roads and Stormwater Dept.	2
		Traffic Services Dept.	1
21 Jan 2013	Review and assess the Flood Task Team's activities in 2012. Unpack challenges with current and past activities. Discuss challenges with collaboration and ways to strengthen collaboration.	Development Services Dept.	1
		Disaster Risk Management Centre	9
		Environmental Health Dept.	1
		Informal Settlements Management Dept.	1
		Roads and Stormwater Dept.	2
		Water and Sanitation Dept.	1
21 Feb 2013	Present findings from the FliCCR research to residents who participated in the research. Allow residents to raise issues and explore ways to address flood risk at the community level.	Residents from five informal settlements: Egoli, Graveyard Pond, Kosovo, Sheffield Roads, and Sweet Home	+/- 50
		University of Cape Town – FliCCR colleagues	5
		Xhosa Translators/Facilitators	2
1 Mar 2013	Present findings from the FliCCR research to multiple actors central to flood governance in Cape Town. Provide a multi-actor knowledge platform to encourage dialogue and engagement between actors. Allow actors to raise issues key to addressing flood risk in Cape Town.	Community Leader from Egoli and Sheffield Rd. Informal Settlements	2
		Community Public Health Worker	2
		Disaster Risk Management Centre	5
		Environmental Affairs and Development Planning Dept.	1
		Environmental Health Dept.	1
		Ikhayalami (NGO)	1
		Informal Settlements Management Dept.	2
		Roads and Stormwater Dept.	1
		The Jungle Theatre Company (NGO)	1
		The Mustadafin Foundation (NGO)	2
		The South African Red Cross Society (NGO)	1
		The Warehouse / UBU (NGO)	1
		Transport, Roads, and Major Projects Dept.	2
		University of Cape Town – FliCCR colleagues	9
		Ward Councillor	1
21 & 22 May 2013	Provide a platform for Sweet Home residents and CCT officials to discuss flooding. Encourage participants to explore ways of working together to address flooding issues in Sweet Home.	DRMC	3
		Environmental Health Dept.	1
		Informal Settlements Management Dept.	2
		Residents from Sweet Home Informal Settlement (including community leaders)	12
		Roads and Stormwater Dept.	1
		Solid Waste Management Dept.	2

APPENDIX 7:

The multiple nodes governing flood risk in Cape Town

Many nodes were identified as playing a role in governing flood risk in Cape Town. Some of these nodes were identified as members of the Flood Task Team (grey boxes, see also Appendix 9 for the full list). Some of these nodes were involved in some aspect of FliCCR's research (red boxes, both solid and dashed), and some of these nodes were engaged with directly for this research (solid red boxes).

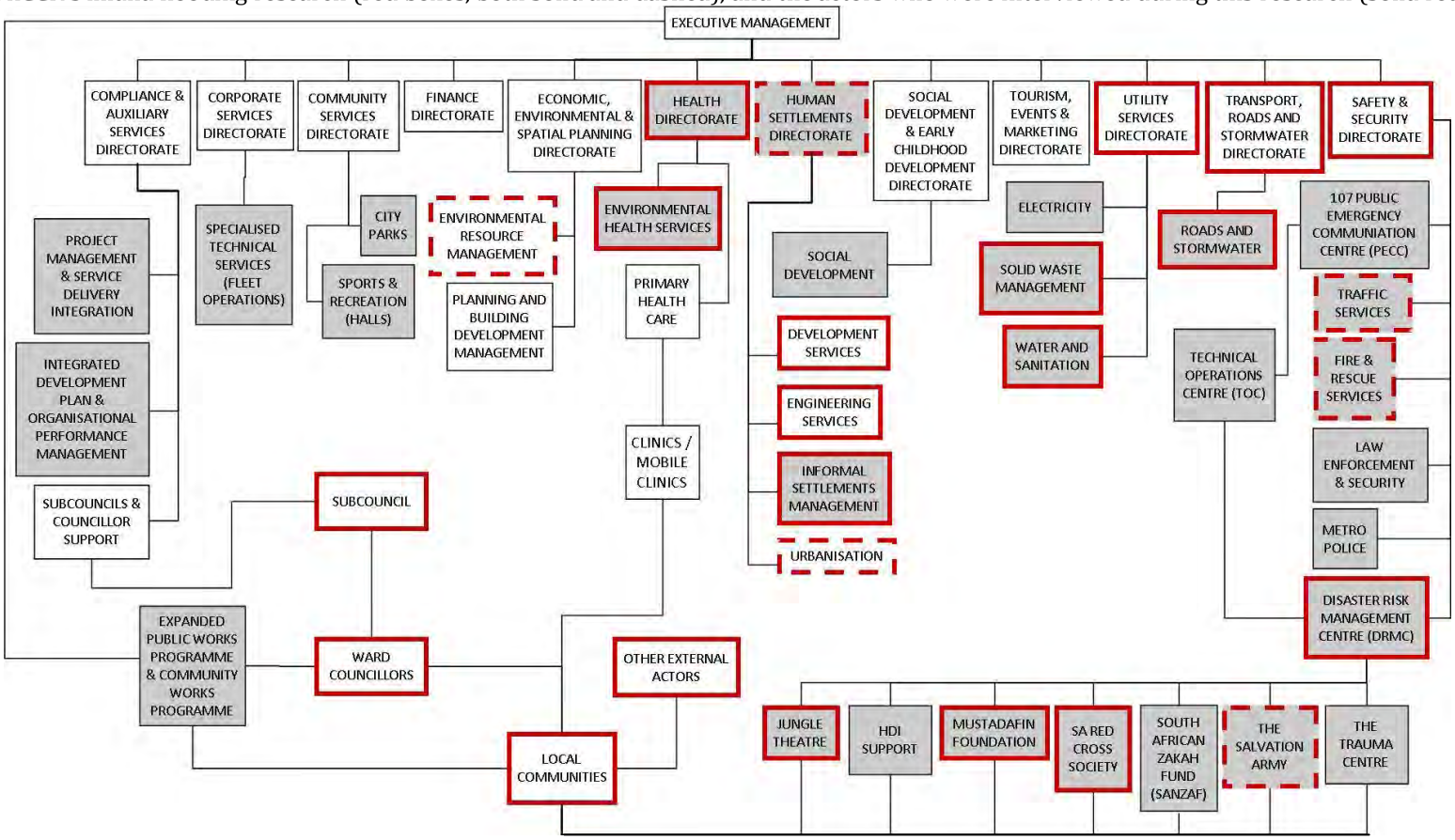


Source: Joy Waddell

APPENDIX 8:

The Flood Task Team within the CCT structure

This organogram, made by Joy Waddell, highlights the CCT structure, starting at the executive management level (Mayor's office and MAYCO), and ending at the community level. This structure shows how the 12 Directorates have several departments/line functions under them, and how these depts. are connected ('reports to') to Subcouncils and Ward Councillors, and external actors (*e.g.*, EPWP workers, NGOs, communities). Although this organogram does not capture the complexity of the communication channels between departments/actors, it highlights the actors who are directly involved on the Flood Task Team (grey boxes), the actors who participated in FliCCR's inland flooding research (red boxes, both solid and dashed), and the actors who were interviewed during this research (solid red boxes).



APPENDIX 9:
Membership list for the Flood Task Team

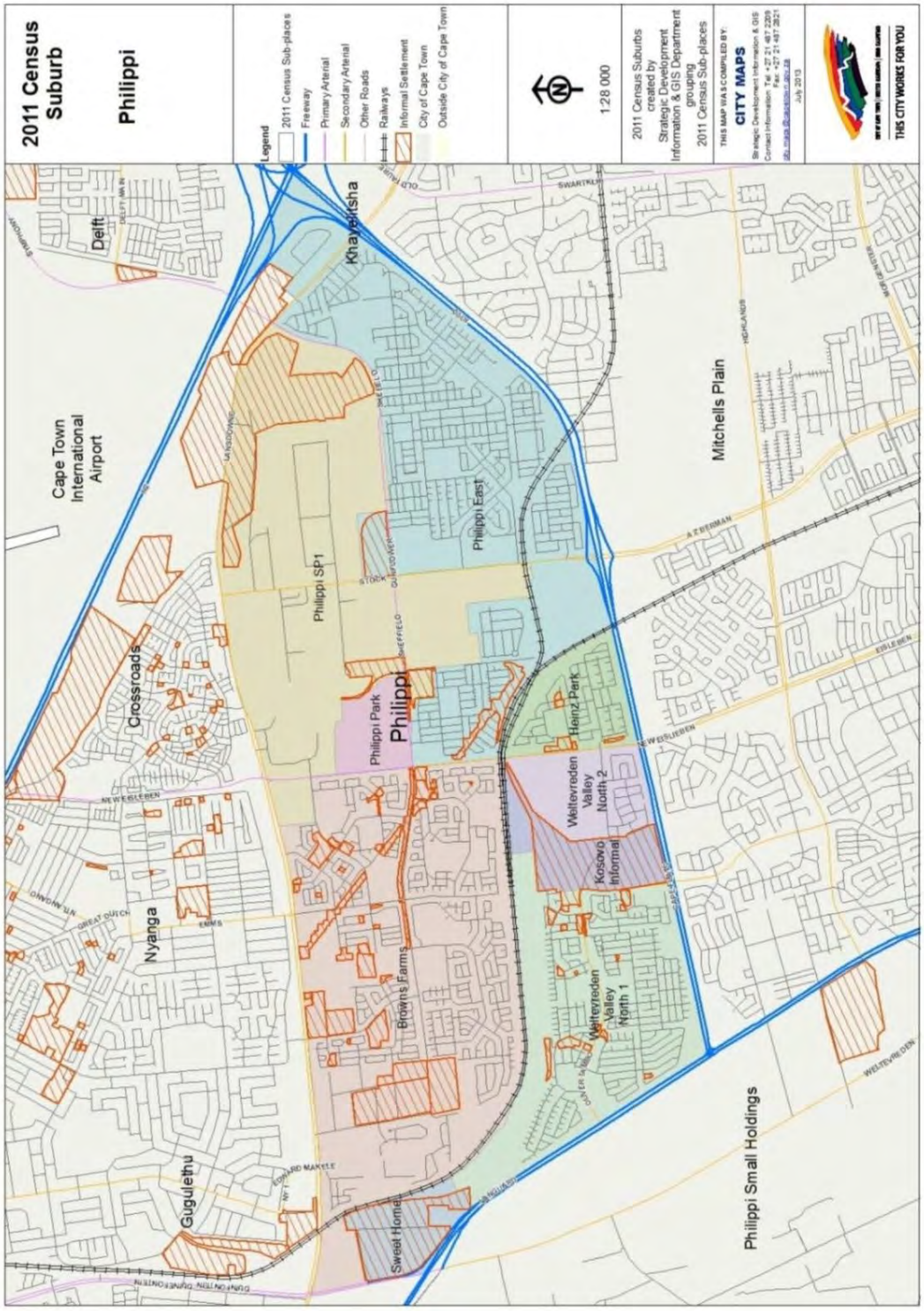
DEPARTMENT NAME	On the membership list*	Receives communication of plans*
107 Public Emergency Communications Centre (PECC)		√
112 Emergency Call Centre		√
Catchment, Stormwater, and River Management Department		√
Health Directorate (including Environmental Health Department)	√	√
City Manager		√
City Parks Department	√	√
Corporate Call Centre		√
Disaster Risk Management Centre (DRMC)	√	√
Electricity Services Department	√	√
City Emergency Services	√	√
Executive Directors: Safety and Security; Transport, Roads, and Stormwater; Human Settlements; Service Delivery Integration; City Health		√
Fire and Rescue Services	√	√
Human Settlements Directorate (largely Informal Settlements Management Department and Development Services Department)	√	√
Law Enforcement and Security Services	√	√
Media and Communication Department	√	√
Metropolitan police	√	√
NGOs: HDI Support; SA Red Cross Society; The Mustadafin Foundation; The Salvation Army; SANZAF; The Trauma Centre; The Jungle Theatre Company	√	√
Provincial Department of Education	√	√
Provincial Department of Social Development	√	√
Provincial Disaster Risk Management Centre	√	√
Provincial Emergency medical Services		√
Provincial Traffic Services		√
SA Police Services	√	√
Social Development Department		√
Solid Waste Management Department	√	√
Specialised Technical Services – Fleet operations		√
Sports and Recreation Department	√	√
Technical Operations Centre (TOC)		√
Traffic Services	√	√
Transport Planning and Traffic Signals		√
Transport, Roads, and Stormwater Directorate (including Roads and Stormwater Department)	√	√
Water and Sanitation Department	√	√

* Source: DRMC, 2012

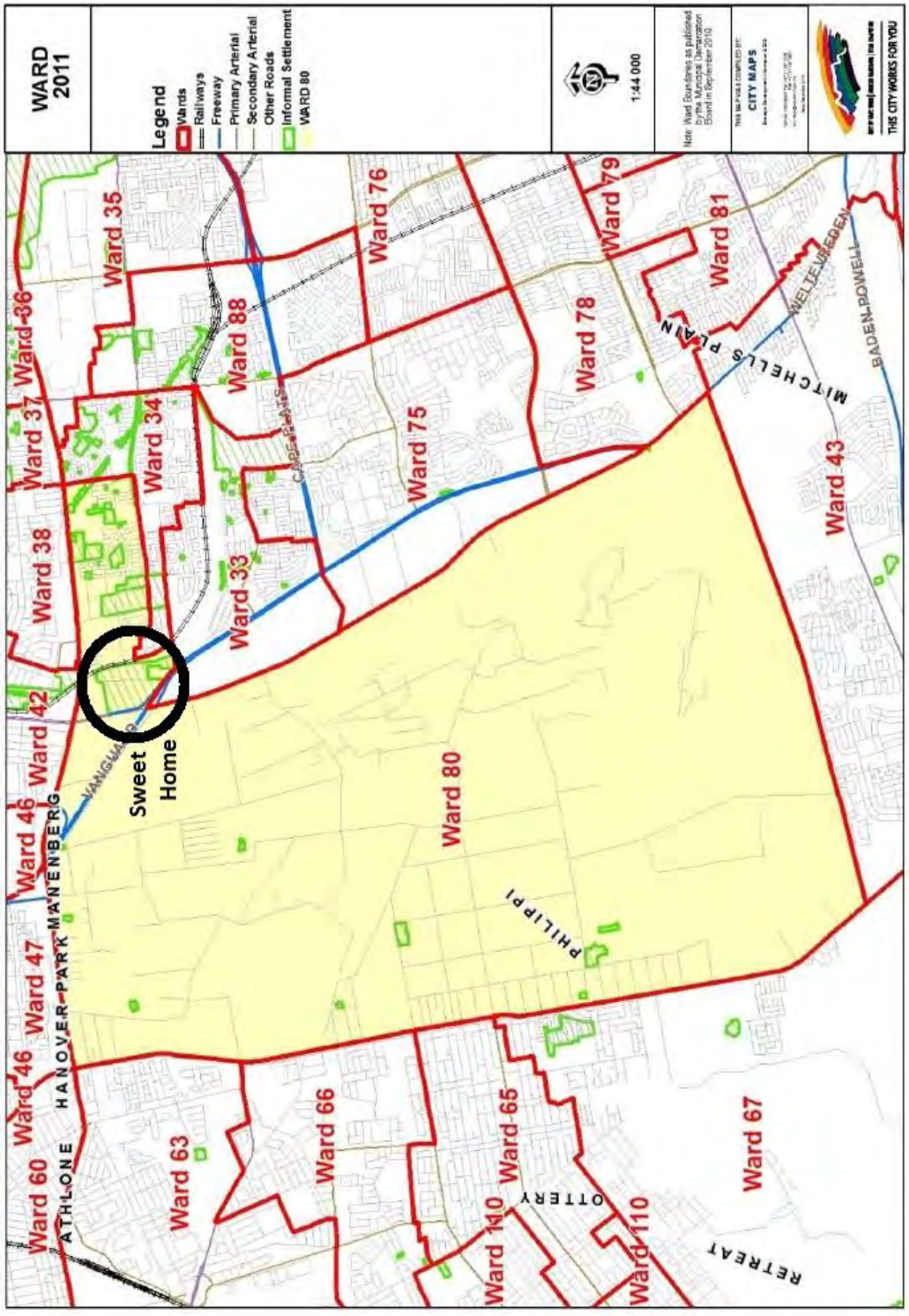
APPENDIX 10:

Maps showing the location of Sweet Home in Philippi, within Ward 80

Sweet Home, which is located in the suburb of Philippi on the Cape Flats, is shown in the far left-hand centre of the map below (Image source: CCT, 2013a).



Sweet Home is shown in the top right-hand corner of Ward 80, in the map below (Image and data source: CCT, 2013). 46,151 people living in this ward. 55 per cent of houses in Ward 80 are informal dwellings (shacks) while 10.6 per cent of houses are shacks built in the backyard of a formal house.



APPENDIX 11:

Examples of educational material, which are distributed by the CCT, on floods and the causes of floods

1. Pamphlets distributed by the National Disaster Management Centre on four types of risk: fires in informal settlements, floods, thunderstorms, and veld (bush) fires:

2. Stickers and pamphlets distributed by the Water and Sanitation department on (1) the numbers to call to report issues, (2) the causes of blockages to sanitation systems:

3. Pamphlets distributed in multiple languages (*e.g.*, Xhosa, Afrikaans, and English) by the DRMC on (1) and (2) how to protect yourself from floods, (3) how to prepare your family for a disaster, and (4) the emergency number:

4. Posters by the Environmental Health department (1) outlining the services they offer, and (2) illustrating the conditions that reduce access to clean and functioning sanitation facilities:

5. Zibi, the Solid Waste Management department's mascot for raising awareness on litter:

6. Pamphlet from the Roads and Stormwater department on flooding:

If you stay in an informal settlement

Either move to higher ground or raise the floor level of your house to be higher than the ground outside.

Dig drainage channels around the house to divert water away from the home.

Slope roofs to assist runoff and waterproof.

Residents to check and fix leaking roofs.

Precautions during floods

Keep away from flowing rivers, canals, ditches, and drains.

Obey road closed / flooded signage and never drive through standing or flowing water.

Avoid contact with flood water as it may be contaminated with harmful substances.

Report and keep away from damaged power lines.

Useful Contacts

Blocked drains and service disruptions
Tel: 0860 103 054

Life or property threatening emergencies
Tel: 107 (landlines)
Tel: 021 480 7700 (cellphones)

Missing drain covers or grids
and
Pollution of stormwater systems
Tel: 086 010 3054

Illegal Dumping
Tel: 086 010 3089

Further information relating to this brochure

Roads & Stormwater Department
Tel: 021 400 1205
Email: Csm.secretary@capetown.gov.za

THIS CITY WORKS FOR YOU

HELP PROTECT YOUR NEIGHBOURHOOD FROM FLOODING

Roads and Stormwater Department

Catchment, Stormwater and River Management Branch

THIS CITY WORKS FOR YOU

* All material was photographed/scanned by Joy Waddell

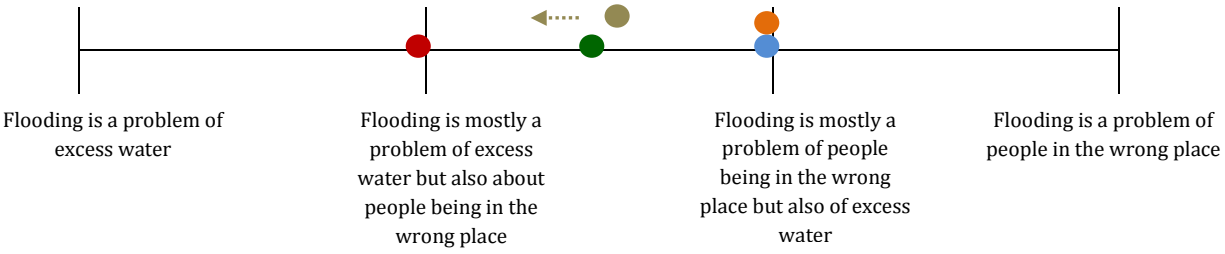
APPENDIX 12:
CCT departments' perceptions of their responses to flooding and understanding of flood risk

During the workshop held in November 2011 with Flood Task team representatives (and with follow-up during individual interviews), each department was presented with a number of questions and asked to place themselves on the axis in the position that best represented their department. Some of these questions and responses are presented below:

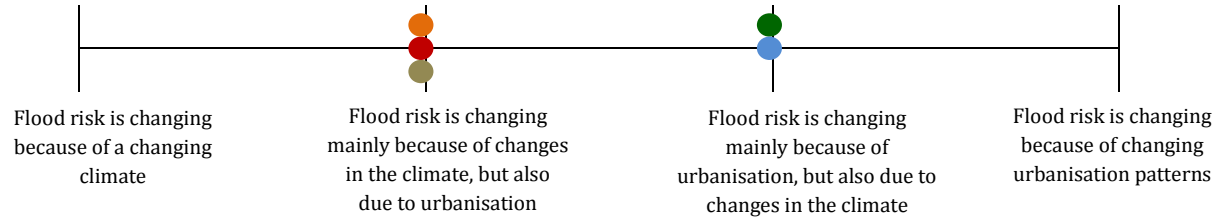
Key:

- City Health
- Disaster Risk Management Centre
- Informal Housing (Informal Settlements Management)
- Development Services
- Roads and Stormwater

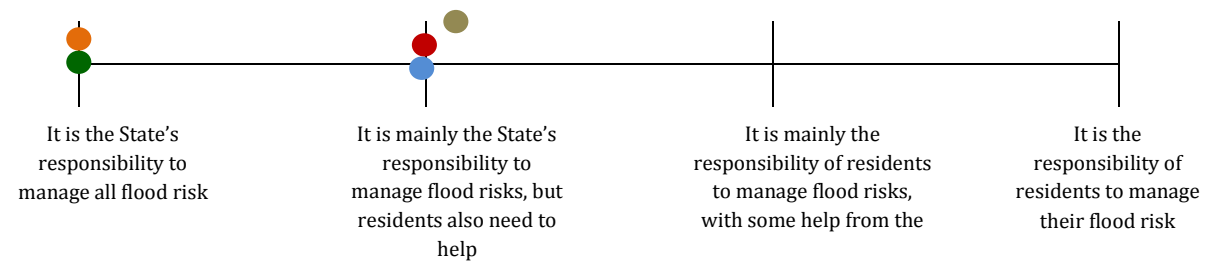
1. What is the nature of the problem when it comes to flooding in Cape Town?



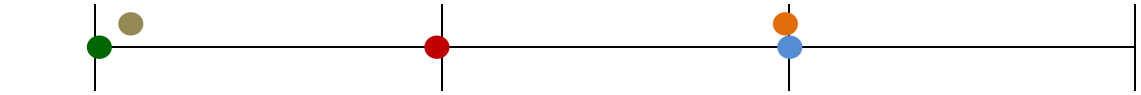
2. Is the nature or scale of the flooding problem currently changing? If not please leave blank, if yes then mark what is seen as the main cause of the change.



3. Who is currently responsible for tackling flood risks?



4. What measures to tackle flood risks are currently prioritised within your department?



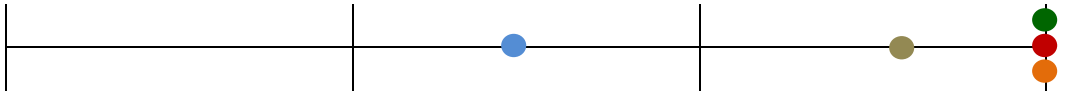
Reducing people's vulnerability to flood risk through social and institutional measures (*e.g.,* Early Warning Systems)

Mainly social and institutional measures, with some more technical and engineering measures

Mainly technical and engineering measures, with some social and institutional measures

Technical responses to reduce flood risk (*e.g.,* sewers, drainage)

5. What currently constrains effective flood risk management?



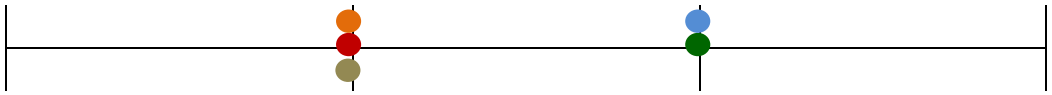
Flood management is constrained because of limited financial resources

The constraints are mainly financial, but there are also some institutional barriers

The constraints are mainly institutional, but there are also some financial barriers

Flood management is constrained because of institutional challenges (*e.g.,* capacity, coordination, public engagement, *etc.*)

6. Should civil society members and organisations be involved in managing flood risks?



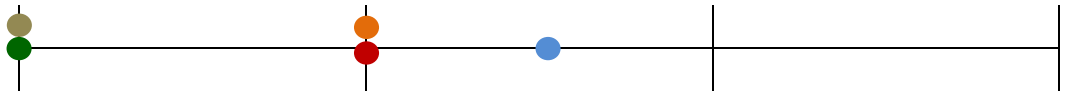
Civil society should lead in developing strategies for flood management

Civil society should be centrally engaged in developing strategies for flood management

Civil society should be consulted about flood management strategies

Civil society should not be involved in developing strategies for flood management

7. What measures to tackle flood risks should be prioritised within your department in the next 10-15 years?



Reducing people's vulnerability to flood risk through social and institutional measures (*e.g.,* Early Warning Systems)

Mainly social and institutional measures, with some more technical and engineering measures

Mainly technical and engineering measures, with some social and institutional measures

Technical / engineering responses to reduce flood risk (*e.g.,* sewers, drainage)