Fluid Governance

Scalar politics in the South African waterscape

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Scalar politics in the South African waterscape

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Abstract

This thesis offers a critical analysis of the scaling of water governance in South Africa and its implications for water access and allocation. As the complexity and severity of environmental problems increases, there is a growing tendency to look to environmental governance to offer solutions. I contend that water governance, as with all forms of environmental governance, is never an apolitical endeavour yet the antagonistic and collective decision-making aspect of environmental politics is often subsumed in a drive to foster sustainability. One of the ways that this de-politicisation occurs is through the uncritical application of scalar concepts. Scalar configurations are an outcome of the perpetual flux of socio-spatial and environmental dynamics and scales are therefore transformed through social conflict and political-economic struggle. A politics of scaling is part of social relations. Four mechanisms of scaling can be identified as follows: scale framing, scale jumping, scale bending and scale fixing. My research focuses on how the processes of scaling embedded in water governance affect prioritization in water access and allocations and ultimately, justice and fairness. The research examines how the production of scale and politics of scaling can be used to manipulate water access and allocation to the benefit and cost of different actor groups.

The intertwined nature of society with water means that ecological, economic and political forces are constantly shaping the hydrosocial landscape. Three formal decisions by the government are examined to uncover how the politics of scaling has affected the access and allocation of water as well as the inclusion and exclusion of actors in governance. These decisions are the approval of the construction of the De Hoop Dam, water service delivery mechanisms employed in the city of Johannesburg and the decision to explore hydraulic fracturing in the Karoo. In analysing these decisions, I show how cross-scalar dynamics; production of scale; and four processes of scaling are used in governance processes as means of empowerment and disempowerment. The findings from the case studies show that historical patterns of privilege and disadvantage are perpetuated through processes of scaling. Three main findings arise out of the research. Firstly, scaling processes are actively used by actors in water governance to empower some and disempower others – thus scaling processes are political processes. Secondly, politics of scaling influences and is influenced by social relations and material practices in South Africa. Thirdly, the theoretical development of scale can benefit from an interdisciplinary approach drawing from the different disciplines such as political science and human geography, working on scaling and governance.

Key words: governance, scale, water, politics

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ABSTRACT

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I dedicate this piece of work to my biggest supporter, my role model and my mother, Suriakumari Ramasar, who passed away in 2012. I'd like to think she would have used this book to prop up something at home.

RELATED ARTICLES

1. Hansen M, Ramasar V and Buchanan K (2014) Localising global environmental governance norms: implications for justice. In: Sowman M and Wynberg R (eds) *Environmental Governance for Social Justice—Lessons Across Natural Resource Sectors in Southern Africa*. Cape Town: Routledge, pp. 43-62.

2. Meissner R and Ramasar V (2014) Governance and Politics in the Upper Limpopo River Basin, South Africa. *GeoJournal.* Epub ahead of print 18 August 2014. DOI: 10.1007/s10708-014-9589-z.

3. Boda C and Ramasar V (2014) Sustainable management of coastal zones: Six cross-scale and cross-level interactions. **(**Submitted to a journal for review).

4. Nastar M and Ramasar V (2012) Transition in South African water governance: Insights from a perspective on power. *Ecological Innovation and Societal Transitions* 4: 7-24.

ACRONYMS

ANC	African National Congress
ARP	Alexandra Renewal Project
ASGISA	Accelerated and Shared Growth Initiative for South Africa
BKB	Boeremakelaars (Koöperatief) Beperk
BRICS	Brazil, Russia, India, China and South Africa
CoJ	City of Johannesburg
CMA	Catchment Management Agency
CSIR	Council for Scientific and Industial Research
DEAR	Department of Environmental Affairs and Tourism
DHD	De Hoop Dam
DM	District Municipality
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DPLG	Department of Provincial and Local Government
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EWT	Endangered Wildlife Trust
GEAR	Growth, Employment and Redistribution
GSA	Government of South Africa
IFP	Inkatha Freedom Party
IMF	International Monetary Fund
IWRM	Integrated Water Resources Management

JOWAM	Johannesburg Water Management Company
JW	Johannesburg Water
KDF	Karoo Development Foundation
LM	Local Municipality
LOS	Level of Service
MEC	Minerals-Energy Complex
MOA	Memorandum of Agreement
NEMA	National Environmental Management Act
NGO	Non-governmental organisation
NPSGT	National Parks Support Group Trust
NWA	National Water Act
OPEC	Organisation of Petroleum Exporting Countries
PetroSA	Petroleum Agency South Africa
RDP	Reconstruction and Development Programme
RoD	Record of Decision
RSA	Republic of South Africa
SADC	Southern African Development Community
SAHRC	South African Human Rights Commission
SALGA	South African Local Government Association
SARVA	South African Risk and Vulnerability Atlas
SAWC	Southern African Water Caucus
TKAG	Treasure Karoo Action Group
UAW	Unaccounted for Water
UNEP	United Nations Environment Programme
UNCED	United Nations Convention on Environment and Development
UDM	United Democratic Movement
USA	United States of America
USD	United States Dollar
USHR	United States House of Representatives

VIP	Ventilated Improved Pit
ZAR	South African Rand
Fracking	Hydraulic fracturing

1. INTRODUCTION

At the outset, my focus on scaling and governance stems from what I see as the intersection of two processes; the *evolution* of environmental governance and a *renewed interest* in the politics of scaling. This intersection of politics of scaling and environmental governance deserves more theoretical development as well as empirical evidence.

We are living in a world that is increasingly complex, where unsustainable changes to water, climate, land and biodiversity are growing alongside inequality, strife, poverty and human rights violations. These multiple sustainability challenges require a response from across society including state and non-state actors. On a daily basis, people around the world struggle to reduce, manage and cope with environmental changes. Some of these responses have been formalised through governance institutions. A global environmental governance system has developed to include non-state actors in policy development, decision-making and implementation of sustainability strategies. We now have a nested environmental governance system that extends from the local through to global levels (Biermann et al., 2009) involving different actors across a range of scales and levels in environmental governance. Multilateral environmental treaty organisations as well as international non-governmental organisations (NGOs) such as Global Water Partnership, World Wildlife Fund for Nature, international development agencies such as the United Nations Environment Programme (UNEP) and the Global Environmental Facility, and multinational corporations in the global economy play a significant role in producing the norms and standards for managing environmental changes (Hansen, Ramasar and Buchanan, 2014; Klein, 2014). The environmental governance regime thus has fundamental and far-reaching consequences across scales and levels (Conca, 2006).

Etsy and Ivanova (2002) suggest that a great deal of environmental governance is often formulated from an administrative and process-oriented perspective. When dealing with environmental issues, this is aligned with the view that scientists and engineers, with their knowledge on ecosystems are in the best position to govern natural resources (Ford and Martinez, 2000). This partly stems from a seperation between humans and the non-human enviroment. As a result of a reliance on scientists focusing discretely on some form of non-human environment, there has been greater focus on the administrative and process-oriented elements of governing rather than the political and

potentially antagonistic elements of collective decision-making that is part of society. This leads to the depoliticisation of governance (Swyngedouw, 2013).

When depoliticisation of environmental governance occurs, the very real tensions that are an inevitable part of human-nature interactions may be ignored in the drive to foster sustainability. In the course of my research, I use the concept of a hydrosocial landscape or waterscape, which I take to mean the same thing. The 'hydrosocial landscape' and waterscape concepts have been used by Swyngeouw in 2007 and 1999 respectively in reference to hydro-social research (Swyngedouw, 1999:443; 2007:10). He describes hydro-social research 'as a sustained attempt to transcend the modernist nature-society binaries' and 'envisions the circulation of water as a combined physical and social process, as a hybridized social-natural flow that fuses together nature and society in inseperable manners' (Swyngedouw, 2009:56). My use of the hydrosocial landscape concept is in keeping with my desire to re-assert the polical element into discussions of water governance and to recognise the dialectic of water or the hydrological cycle and social, political, economic and cultural power. One of the ways that this depoliticisation occurs is through the production of scale. What, where, when and how natural resources are to be managed is determined by who is responsible for the scaling of an issue and why a particular scale is chosen (Herod, 2011). If scale is taken as something predefined and given, it is logical to assume that a 'natural' scale exists which might be the right fit for solving a particular environmental problem, e.g., the river basin. However, given the complex and cross-scalar socio-ecological interactions that occur, it would be naïve to say that there is a 'right' scale to offer a solution to a problem. Alternatively, we could reflect on the who and why questions and seek to understand who is deciding on the scaling of issues, what motivations drive a particular scalar choice and what consequences arise from this decision. An investigation of the politics of scaling thus becomes a worthwhile endeavor, especially in the face of the expanding global environmental governance discourse.

1.2 Aims and scope of the research

My research focuses on how the politics of scaling influences water governance. I examine how scaling processes affect decisions about access and allocation of water. I contend that water governance, as with all forms of environmental governance is never an apolitical endeavour and that scaling is part of environmental politics, a part that is often overlooked.

The scaling of water governance can be used to maintain a hegemonic state as well as a means to change the state. Power and politics are an integral part of decision-making and can result in decisions which are inherently skewed and do not meet the needs of the less powerful actors in multi-level negotiations. Allocating water resources is further

complicated by the fact that water is a mobile resource that crosses temporal and spatial scales. This allows different actors to make claims to the same water resources but across different spaces and times. A the same time, governance practices form and transform scales. Cross-scalar dynamics become a challenge to governing water resources and ensuring equity and justice in what I describe as the hydrosocial landscape.

Overall, my aim in my PhD research is to understand how scaling processes are used and influence decision-making processes about water access and allocation in South Africa.

My research questions are:

1. How are scales produced and contested by different actors in water governance?
2. How do actors exercise processes of scaling in water governance?
3. How can different scaling processes be used to empower and disempower actors in decision making over water access and allocation?
4. How does the politics of scaling influence social relations and material practices in South Africa?

My research is focused on three cases in South Africa. South Africa has followed an approach to the use and management of its water resources in a manner that is aligned with global trends in water governance (Conca, 2006). This framing in terms of water governance offers both opportunities and constraints in a country that faces many challenges including disparities in access and allocation of water amongst South Africans and limitations of the water resource (Bond and Duggard, 2008). In meeting these challenges the democratically-elected government, after apartheid, has established new institutions for water governance including new policies, new government departments and new systems of rules for determining access and allocation (Hallowes, Pott and Dockel, 2008). My research offers a critical investigation of water governance in South Africa using the notion of scales and scaling to uncover some of the politics associated with decision-making around access and allocation of water and the implications for justice and fairness in social relations and material practices.

1.3 Extending the research through contributions to research articles

In the course of my doctoral research, I have focused on various aspects of scales, governance and power as they relate to water and the hydrosocial landscape. The main output of my research has been this thesis, which presents an exploration of the politics

of scaling in connection with three cases in South Africa. This is presented as a coherent story through the rest of this monograph. However, research is never carried out in isolation and the development of my ideas and even my fieldwork has benefited from interactions with other researchers and research. My collaborations on three journal articles and one book chapter (listed on pg. 5) have been most significant in allowing me to build and extend the arguments of my research by application to different cases and engaging with additional theories (Table 1). The outputs are all collaborative pieces where I have contributed in to the development and analysis of the material. For two of the articles (articles three and four) I made an equal contribution to the work as my co-author. In this section I will present the scientific content of the articles and how I see them relating and contributing to my doctoral research project. The first two contributions deepened my work on governance in South Africa, the third offers an alternative case study to test theories of cross-scalar dynamics and the politics of scale and the fourth contribution focuses on the case of Johannesburg (discussed in chapter seven) and the politics of the water service delivery transition.

Table 1. Situating the four related articles and their empirical and theoretical foci

	Concrete (Empirical)	Abstract (Theoretical)
Article 1	Conservation management, iSimangaliso Wetland Park, RSA.	Norms of environmental governance
Article 2	Water governance and politics, A63E and A71l Catchments of the Upper Limpopo River, RSA.	Everyday international political economy and environmentalism
Article 3	Coastal zone management, Flagler Beach, USA.	Linkages across scales and levels
Article 4	Urban water governance, Johannesburg, RSA.	Water politics, distribution and sustainability transitions

The book chapter co-authored with Hansen and Buchanan (Hansen et al., 2014) highlights the cross-level interactions that lead to the diffusion of global environmental governance norms at the local level. In my research, I situate South Africa's water governance within the context of global environmental governance. I suggest that water governance in South Africa internalizes a certain relation to global governance and thus, the global influences are forces that shape and are shaped by experiences locally, in a co-evolving relationship (Harvey, 2010). In the book chapter, my co-authors and I focus on how norms of sustainability governance have influenced conservation management in the iSimangaliso Wetland Park, South Africa. Normative concepts including those of democratization, public participation, and the maintenance of

ecological integrity have become standards for sustainability governance but their realisation is not unproblematic. We investigate some of the tensions of the uncritical application of these international norms to environmental governance at the local level in South Africa. Scaling practices and justice questions are uncovered by looking at the relationship between various actors, with a focus on the state authorities and residents of the surrounding communities who hold different normative positions. This analysis reveals some of the problems associated with localizing global norms of sustainability and the conflicts this has caused in the management of the iSimangaliso Wetland Park and in the relations between actors with interests in the park. We find that in making normative discourses relevant to a local context, it is important to address challenges such as legal pluralism, different approaches to conservation management, agency in participatory decision-making, and the framing of development in terms of neoliberal economic growth. The study shows how influential global governance forces can be in South Africa and highlights the need to be careful in their application in a local setting. This finding is consistent with the recent work by van Koppen and Schreiner (2014) and Mehta et al. (2014) who find similar problems with the introduction of Integrated Water Resource Management (IWRM) in a developing country context without modification for the local context.

The second related publication is a journal article co-authored with Richard Meissner that addresses the governance and politics in the Upper Limpopo River in South Africa. Using the concept of everyday international political economy, we consider how individual actors and actor groups shape governance of natural resources. South Africa at the end of apartheid, under the leadership of the great/late Nelson Mandela, was lauded for its progressive policies including the Constitution (GSA, 1996) and the National Water Act (GSA, 1998a). Much attention has been placed on the way government has worked to transform the hydrosocial landscape in a more equitable manner. Agency at other levels, making contributions that have a narrower scope of impact, is sometimes diminished in the focus on the grand projects of the state. In line with Alex Loftus' (2012) arguments in the book '*Everyday Environmentalism'* we suggest that the everyday politics of actors who 'live' the environment significantly shape water governance and politics in South Africa. Drawing on historical sources we show how everyday actions by different actors have shaped the hydrosocial landscape of two quartenary catchments, A63E and A71L in the Limpopo River basin, South Africa. Using four events that have taken place over different periods, we find that everyday international political economy and reflexive agential power are important forces in shaping water governance - forces that are sometimes ignored through neoliberal institutionalism. In contrast to the book chapter, which highlights the role of global influences on South African water governance, this article emphasizes how everyday politics shape water governance. In my research, I continue to explore the agency of different actors in shaping water governance by drawing out the politics of scaling in their practices.

The third contribution is a journal article looking at six cross-scale and cross-level linkages in the sustainable management of coastal zones, co-authored with Chad Boda (Boda and Ramasar, 2014). Unlike the first two contributions that are based in South Africa, this article takes the case of Flagler Beach in the United States of America (USA). In my thesis, I suggest that water governance is one form of environmental governance and that the lessons are potentially valuable across different themes of environmental governance. In this article, the focus is shifted from water governance to governance and management of the coastal zone. Similar to the second contribution, we take a historical perspective to explore how scalar linkages of the past shape contemporary coastal management. We structure our analysis around six key social-ecological features that are prominent in the dynamics of change in coastal environments and show how the different cross-scale and cross-level linkages associated with these six features intermingle, creating unique, often emergent context-based outcomes that complicate planning and pose site-specific challenges for management. This study draws on the elaboration of cross-scalar dynamics articulated by Cash et al. (2006) which I also use in this monograph to identify some of the cross-scalar dynamics.

The fourth related article co-authored with Maryam Nastar, offers an additional perspective on the case of water service delivery in Johannesburg that is presented in chapter seven of this thesis (Nastar and Ramasar, 2012). Here we address politics and power in water service delivery from a different starting point, namely, the pathway of a transition. Using some of the same case data as I use for my analysis of politics of scaling, this study focuses on the vision of water service delivery in post-apartheid South Africa and the reality of the societal transition towards this vision. In the article, we highlight the importance of addressing the quality of water service delivery and note the influence of different payment schemes and participation opportunities on how people live their environments. This raises questions of equality and justice in service delivery as Cunliffe-Jones (2013) has pointed out. This inequality in water access is the foundation of my investigation of scaling in chapter seven. The journal article sets out some of the politics in water service delivery and I continue and extend this in my monograph by looking at the processes of scaling used by actors to influence water governance in Johannesburg and in the process, also transform scales.

By presentating these four scientific outputs that sit a little outside the main storyline of the monograph, I offer a hybrid format of a thesis, which contains both a monograph as well as related articles. The monograph is a stand-alone piece of work but the research process has been broader and the articles are supporting evidence of my broader research engagement. I have chosen to follow this route as I believe that this stand-alone monograph fosters a flow in telling the story of the politics of scaling in water governance in South Africa. The articles have been part of the research process and working on them has greatly improved my understanding of my study context, South Africa, as well as allowed me to test theoretical concepts in different settings. In doing so, it has strengthened my research project. Contributing to journal articles and book

chapters has also allowed me to participate in interdisciplinary projects with researchers from different disciplinary backgrounds and share my research in multiple fora.

1.4 Structure of the thesis

My thesis is structured to describe the concepts, theories and methods I use in my research first before turning attention to the context and then a presentation of the results before I conclude. Chapter two provides an overview of governance. Chapter three relates my research to existing scale literature and lays out the framing of the research by presenting theories of scale and processes of scaling that will be used in the investigation. Chapter four is a methodology chapter and documents the framework for the research, methods used in this study as well as the limitations associated with the research. Chapter five describes the context of water governance in South Africa and highlights some of the political aspects of access and allocation, historically and in the present. The results of the empirical investigations are presented in chapters six, seven and eight. Chapter nine concludes my thesis with a summary of the research findings, some thoughts on the challenges of environmental politics in South Africa and suggestions for future research.

2. ALL ABOARD THE GOVERNANCE TRAIN

2.1 From government to governance

In 1992, as a teenager, I was beginning to develop my environmental consciousness, and recall the Earth Summit (UN, 1992) taking place as a ground-breaking meeting about sustainability. The voices of NGOs at this forum were strong and it felt like a global commitment was made to work together to save the planet. In 2002, I was able to participate in the World Summit on Sustainable Development held in Johannesburg (UN, 2002) and there one of the main discussion points was public-private partnerships as a means to realize sustainability goals. The formal role of governments around the negotiating table was obvious but outside the main negotiations there was a great deal of lobbying and commitments made by actors from corporations, NGOs and community-based organisations (CBOs). It was clear that governance, with the inclusion of various non-state actors in practices of governing for sustainability and other issues, had become acknowledged as necessary for sustainability. Governance, rather than government, is the focus of my research as I seek to understand the social relations amongst various actors involved in using, controlling and managing water resources in the hydrosocial landscape. Adger and Jordan (2009:10) suggest that governance is 'a term in good currency, but it is often used very loosely to refer to a host of what can in practice be very different things'. They suggest that there are three main governance discourses, namely, the empirical phenomenon of governance; governance theory; and governance as normative prescription (Adger and Jordan, 2009). I explain each of these discourses below with illustrative examples.

The empirical phenomenon of governance recognises the growing role of of non-state actors in different forms of governing. Private corporates, NGOs, CBOs and para-statal organisations are all developing policies, making agreements and implementing programmes and projects beyond the scope of their own internal operations. As a result, different forms of policy instruments are being produced such as certification schemes, community monitoring programmes, market-based instruments and voluntary agreements (Levy and Newell, 2005). In the process, different actors have taken on different roles as watchdogs, knowledge providers and norm setters, many of these roles

the traditional domain of government. For example, the Global Water Partnership (GWP) is a network that has been established by the World Bank, the United Nations Development Programme (UNDP) and the Swedish International Development Cooperation Agency (SIDA) to foster integrated water resources management globally (GWP, 2014). GWP operates as a knowledge provider by undertaking research on the management of water resources, it is a norm purveyor by advocating for IWRM globally and it is an education provider by working with country governments in training to staff. As a result of the empirical phenomenon of governance, new political relationships are being formed between different actors and actor groups (Smith, 1998). In this new scenario, non-state actors may have more authority, legitimacy and/or power than governments. Bob Jessop (1997:574) sees this as 'a destatization of the political system, reflected in a shift from government to governance on various territorial scales and across various functional domains'. Hence the state apparatus is no longer the sole focus of policy-making. This has opened up the way for many actors to govern and for different forms of governance to be established such as the public-private partnerships that have developed to address greenhouse gas emission reductions and the involvement of international NGOs in addressing the Millenium Development Goals. In South Africa, government has been known to sub-contract service delivery to private sector consultants, multinational corporations provide education facilities around their operations, and NGOs are re-writing policy around health care. In analysing the phenomenon of governance, one can distinguish between the nature of organizations, institutions and actors involved in the production of policy outcomes and the nature of the relationships between organizations and the particular form of coordination between them.

The second discourse of governance is more an academic research field where researchers have tried to formulate theories of governance in the same manner as there are theories of government. Flinders (2002) suggests that governance theory is focused on control, co-ordination, accountability and political power across a range of actors. Where in the past, government may have been considered the main holder of power able to affect the lives of all citizens, in current times, new formulations of governance mean that government no longer has a privileged role and in some cases, may not be the most powerful force. For example, in fragile states such as the Democratic Republic of Congo, the role of international organisations, multinational corporations and rebel groups such as the Lord's Resistance Army (LRA) who operate across the region may have more power than the government of the country (Engelbert and Denis, 2008). This shift in political power lies at the heart of governance theory. Some have argued that this shift from government to governance has led to a 'hollowing out' of the state (Rhodes, 1994) or while others argue it has led to an 'overloaded' state (Marinetto, 2007: 58). Rhodes (1994) sees it implying a distinct shift taking place within government from a hierarchical bureaucratic organisation to a fragmented and decentralised entity into something that is described in the Anglo-governance school of

theory (Marinetto, 2005: 59). In this view, the state form has evolved into a decentralised model where the different parts of government operate almost as discrete units. This decentralised state model also opens up questions of power and authority across jurisdictions and levels. The way the state has been reformed through decentralisation in South Africa affects the politics of scaling in the three cases that I study in this project and present further in the thesis. Although something that has been called an Anglo-governance model has been put forward by Rhodes (1994), very few would claim that there is a grand theory of governance (Adger and Jordan, 2009; Flinders, 2002; Young, 2005).

Governance as normative prescription speaks to the notion that governing is not simply an act of doing but has embedded within it norms of what is right or good to do. When different actors use the term governance, there may be an implicit element of norms which guide the type of governance that they advocate. When we consider governance for sustainability, there is often a normative prescription of what governance should entail in order to address sustainability challenges (Dingwerth and Pattberg, 2006). For example, governance for sustainability often includes notions such as inter- and intra-generational equity (WCED, 1987). If governance is a normative prescription, it stands to reason that different definitions by different actors may have different norms underlying them. Governance thus becomes complicated when different normative positions are in conflict with each other (Hansen et al., 2014). One normative position may lead to one approach to addressing problems whereas another normative approach may have a contradictory solution. As Adger and Jordan (2009:14) stress, 'the underlying causes of, and solutions to, unsustainability are, in reality, deeply contested'. Different normative positions may be in direct conflict and this is where the contestation of politics is played out.

In the course of my research, I draw out the evidence from my three cases of governance as an empirical phenomenon with a focus on the dialectical relationship with scaling. Keil and Mahon (2009: 3) suggest that through global environmental governance, the relations across scales is being deepened 'in a time of post-Fordism, globalization, and the transformation of the Westphalian nation-states which have brought supra- and subnational entities to the fore'. I also focus on governance as normative prescription is examined through highlighting different discourses and how they play out through the politics of scaling.

2.2 The 'good governance' orthodoxy and the neoliberal state

Understanding governance as normative prescription is important in the context of my study as it has shaped the way water is being regulated and managed; how decisions of access and allocation are made; and how the politics of scaling is used by different actors in their relations to others. As Adger and Jordan (2009) explain, a particular normative discourse will have its own set of explanations for a problem and related remedies. Some might argue that in a case of land degradation, poverty is the cause while others might argue it is large-scale monoculture farms using fertilisers and pesticides. The solutions may be large-scale growing of cash crops to stimulate economic growth and lift people out of poverty or a turn to more organic agriculture on smaller farms, respectively.

In order to set the context for my research, I elaborate here on the ideology of governance and normative prescriptions that dominate recent South African policy making. In South Africa there is a particular ideology of governance which is grounded in 'ideals of efficiency and rationality of administration, bringing together significant "stakeholders" (the favoured term) to come up with "optimal" but "politically neutral" public policies' (Harvey, 2009a:71). This ties closely to the notions of "good governance" advocated by the World Bank under the Washington and Post-Washington Consensus (Stiglitz, 2002). The Washington Consensus was a set of strategies that international organisations encouraged countries in financial crisis and post-colonialism to adopt. It came to be seen as encouraging privatization, liberalization, and macro-stability (Williamson, 2004). Market liberalization was introduced through structural adjustment programmes attached to loans to post-colonial countries and shock therapy strategies developed for countries after the financial crises in Latin America and Asia as well as for post-communist states after the break-down of the Union of Soviet Socialist Republics (USSR) (Stiglitz, 2002). When market mechanisms failed to solve the problems of these states, the failure was seen to lie with weak governments. The Post-Washington Consensus advocated a normative prescription of good governance including norms of transparency, property rights regimes and corporate governance (Stiglitz, 2002). At the end of apartheid, the ANC-led government faced the challenge of earning the trust of the international financial community. Although not required to adopt a programme of structural adjustment policies as many other African countries were required to at independence, South Africa did implement the Post-Washington Consensus normative prescriptions of governance to gain confidence of international lenders such as the IMF and World Bank (Calland, 2006; Robins, 2008).

This normative prescription of governance is viewed by Ong (2006) as the essence of neo-liberalization. Harvey (2009a:71) suggests that 'grounded in the idea of "private-public partnerships" and elaborate mechanisms for bringing various stakeholders into a consensual coalition, governance effectively masks the class and social relations that are redistributing wealth and income to the affluent through a networked and decentralised system of organized political-economic power'. Following Harvey's (2009a) normative prescription of governance, the South African state could be seen as operating as a neoliberal state. In accordance with the Post-Washington Consensus ideas, the state has an important role to play in facilitating the market. This role includes 'the proliferation of individual private property rights, the rule of law and the instruments of freely functioning markets and free trade' (Harvey, 2009b:64). The regulation of environmental resources are no less influenced by this normative prescription of governance and this has led to norms and instruments of environmental governance that support global capital through the ecological market economy.

2.3 Neoliberal water governance and the ecological market economy

In an effort to foster 'good governance' there has been a greater reliance on the market to regulate and manage resources, including water (Finger, 2005). In keeping with privatision and liberalisation strategies, water has been increasingly commodified, water services have been transferred from the state to private sector actors and in many developing countries, water infrastructure development is being developed through partnerships with international organisations and private sector investors. In the process, water has taken on different meanings and has value as a commodity rather than as a common good. The legitimation of market mechanisms has made private sector participation in water supply and sanitation sectors more acceptable (Bakker, 2010). In the shift from government to governance, there is a reshuffling of power relationships between actors. Policy is being made by non-state actors, market actors are setting pricing for water and international organisations are driving the water governance agendas in countries. Water governance globally has taken a neoliberal form and South Africa is no exception to this turn.

2.3.1 Integrated Water Resources Management

Apart from the broad trends in neoliberalism, global norms in water governance have been highly influential on the architecture of the water governance regime in post-apartheid South Africa. The ideology of IWRM has become a dominant norm. As an

outcome of the International Conference on Water and Environment, the Dublin Statement on Water and Sustainable Development was adopted (ICWE, 1992) and has been implemented by countries across the globe. The Statement established a set of global water governance norms that came to be known as IWRM. These have been articulated as four guiding principles for IWRM as follows:

1. 'Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment
2. Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels
3. Women play a central part in the provision, management and safeguarding of water
4. Water has an economic value in all its competing uses and should be recognized as an economic good' (ICWE, 1992:4).

In summary, water governance is driven by a recognition of the fragile and finite nature of the resource, the need for participation, especially of women in the use and management of water and the formulation of water as a economic good. In practice, the contradictions between the first three principles and the fourth principle of water as an economic good is not easily reconciled and many advocates tend to ignore the tensions that arise. Finger (2005:280) argues that the fourth principle of the Dublin Statement has been driving governance discourses, and that 'water has been transformed from a basic human right that is threatened by development to an economic good that is essential for development'.

In July 2010 the UN General Assembly adopted the resolution that recognised the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights (UN, 2010). This was confirmed as legally binding by adoption by the UN Human Rights Council in September 2010 (Sultana and Loftus, 2012). However, the interpretation of the right to water is under a great deal of discussion and is interpreted differently in different contexts (Naidoo, 2010). Despite the UN resolution, neoliberal water governance continues to hold way and Sultana and Loftus (2012: 9) suggest that the right to water risks becoming a floating signifier. Treating water as an economic good has led to the commodification and marketization of water with far-reaching consequences for the human right to water. Bakker (2011) and Sultana and Loftus (2011) provide thoughtful analyses of the problem. The water conflicts that have arisen in South Africa as a result of the market-driven approach will be discussed in more detail later in the thesis, with reference to the case studies.

2.3.2 Implications of neoliberal water governance

As a result of the empirical phenomenon of governance being widespread when it comes to water, power is exercised by different actors across scales and levels as they shape discourse, make policy and implement activities. I have illustrated how water governance globally is being shaped by a few distinct sets of norms, practices and relations between actors. As a result, one particular governance regime (articuled as good governance and IWRM) has become hegemonic (Conca, 2006). In addressing water sustainability challenges, it may very well be the case that the hegemonic framing of the problem and the solutions to address it, are in fact exacerbating inequities in the hydrosocial landscape. The South Centre (1996:32) has cautioned that 'an international community ridden with inequalities and injustice, institutionalizing 'global governance' without paying careful attention to the question of who wields power and without adequate safe-guards, is tantamount to sanctioning governance of the many weak by the powerful few'. However there are many other voices in water governance and with different interests and normative positions, the interpretations of global water challenges as well as the solutions formulated are subject to contestation. Having IWRM and 'good governance' as the dominant and accepted norms for water governance has promoted a neoliberal framing of water governance in South Africa but this is not without challenge by other actors. Through my research, I intend to explore how water governance can be manipulated, through the politics of scaling, by different actors. This affects water access and allocation and ultimately fairness, justice and sustainability.

2.4 Conclusion

Governance as a concept has diverse meanings and interpretations. I follow Adger and Jordan (2009) in accepting that governance can be an empirical phenomenon, a theory as well as a normative perspective. Governance in South Africa is guided by notions of good governance and neoliberal development and this has led to a particular form of managerial discourse being hegemonic in the Gramscian sense. This normative perspective on governance has shaped the post-apartheid hydrosocial landscape. The South African state, acting as a neoliberal state, has developed policy outcomes that favour market-mechanisms of environmental regulation and favour economic growth as a development solution. Government has in some ways become instrumentalized to transnational corporations with the help of multilateral organisations and international NGOs. However, there are a plethora of organizations and actors involved in water governance in South Africa on a daily basis. As a result, there is more than one normative prescription of governance present. When different actors have different normative discourses of governance, this leads to conflict and contestation over policy

outcomes, discourses, the nature of the relationships between actors and the coordination between them as I found in my research. As I show in three cases, some of this is enacted through processes of scaling.

3. THE POLITICS OF SCALING

3.1 Introduction

In this chapter I lay out the theoretical body of work underpinning my research. I use theories of scale and scaling as my theoretical foundation and as part of my analytical framework to examine empirical cases of water governance in South Africa. In doing so, my intention is to make a contribution to theories of scaling in environmental governance by offering empirical evidence from South Africa of how scaling processes can be used as political tools in the governance and management of natural resources. I also explore the opportunities for complementarity between different bodies of work on scale coming from different disciplines, namely production of scale and scale in environmental governance.

Considering environmental problems in particular, Meadowcroft (2002:169) suggests that there is 'a density of physical and social scales implicated in the constitution and resolution of such problems'. As discussed in the governance chapter, this density would be deepened even further when one considers the sustainability challenges of our time. Problems such as climate change, land degradation and water security that engage many social and natural dimensions are driving researchers to understand cross-scale and cross-level dynamics. There are problems in policy and management such as overlapping responsibilities (plurality) and conflicts in jurisdiction, some issues falling between the gaps (ignorance) and management authorities not having jurisdiction to addresses causes of problems but only symptoms (mismatches) (Boda and Ramasar, 2014; Cash et al., 2006). Scale has thus come to be the forefront in many discussions about who, where and how to tackle sustainability challenges. 'Thinking globally and acting locally' calls upon us to define the global and the local; measure and observe phenomena on different scales and levels; and as discussed in chapter two on governance, create governance institutions across scales and levels. As we move forward in a time of globalization, it is necessary to be cautious about what we mean and how we use scale.

The chapter begins by establishing some of the scalar concepts that are used in this thesis. In the process, I address the ontological and epistemological debates surrounding scale and provide a short description of the use of scale in academic research drawing mainly on the fields of geography (physical and human) and political science. Looking

across the natural and social sciences, it is evident that there is a great deal of variation in the definitions attached to various terms used in scale literature. In section 3.2 I also establish the definitions for the vocabulary that will be used in this research. In section 3.3 I present the theoretical development of the production of scale, the key researchers contributing to this body of knowledge as well as empirical case material that has been used to build up this area of study. This is followed by a consideration of cross-scalar dynamics in section 3.4. The next section (3.5) follows with a review of some of the critiques of scale research. I pick up on the recommendations from critics and elaborate on the politics of scaling in section 3.6. In the process, I draw out some of the socio-spatial processes of scaling. These processes form part of the analytical framework used later in the research to understand the politics of scaling in water governance in South Africa, the forces driving the production of scale and the implications of scaling for fairness and justice.

3.2 What is scale?

Scale and scalar (i.e. to do with scale) concepts have been used liberally across both the social and natural sciences and with these varied uses have come a vocabulary consistent with the different fields in which it is used. Scale is often used as a tool of observation and measurement but also one of analysis, most often in considering spatial and temporal features of ecosystems. Cartographic scales and hierarchy in biogeography are two frequent uses of scale with discussions of spatial resolution, Modifiable Areal Unit Problem and questions of generalizability used to inform mapping and measurement of ecological and biophysical systems (McMaster and Sheppard, 2004). Within human geography it is commonly linked to concepts of space and place (Lefebvre, 1976; Massey, 2004). In this way scale becomes a way of ordering social relations as well as non-human parts of the environment (Smith, 1990). The explicit study of scale in the social sciences received a renewal of interest in the early 1990s. Research was previously grounded in political geography and geopolitics (largely focused on the spatial scale) and historians (focused on the temporal scale). Gibson et al. (2000:217) recognize that interdisciplinary work requires some 'common understanding about scaling issues' across the natural/social science divide. In looking for a common understanding, it is also necessary to tackle the ontological and epistemological contradictions in the different understandings and uses of scale.

Different definitions and uses of scale display considerable variability in the ontological and epistemological understandings of scale. Harvey (2006:121) makes a tripartite division in the way space can be understood, which is equally valid for understandings of scale:

If we regard space as absolute it becomes a 'thing in itself' with an existence independent of matter. It then possesses a structure which we can use to pigeon-hole or individuate phenomena. The view of relative space proposes that it can be understood as a relationship between objects which exists only because objects exist and relate to each other. There is another sense in which space can be viewed as relative and I choose to call this relational space – space regarded in the manner of Leibniz, as being contained in objects in the sense that an object can be said to exist only insofar as it contains and represents within itself relationships to other objects.

There are at least two distinct views regarding scale and its production. On the one hand, many of the researchers involved in earth system research (and largely coming from a natural science background) work from an assumption of scale as *pre-defined* and something which exists in absolute space. From this understanding of the world and our knowledge of the world, scale is seen as 'unproblematic, pre-given and a fixed hierarchy of levels' (Delaney and Leitner, 1997:93). When studying and working with socio-ecological phenomena and processes, there is an assumptiont that a particular scale size or boundary exists and that processes and phenomena take place at a certain level (Padt and Arts, 2014). Given this assumption, researchers can observe and measure hydrological systems as well as hydrosocial systems when social relations are introduced into the system. Research also focuses on the interactions between levels and scales. This treatment of scale does not question the existence of different levels or the logic behind the level to which something is allocated. In this context, scale in the research is taken as a matter of selecting a level of analysis.

On the other hand, there is a body of research focused on scale conceptualised as socially constructed rather than ontologically pre-given (Marston, 2000). Scale is constitutive of social, economic, ecological and political processes in relational space. Delaney and Leitner (1997:94) suggest that scale is 'itself a tool to persuade or convince; to create in the minds of others a kind of mental map and scale is not simply an external fact awaiting discovery but a way of framing conceptions of reality'. Much of the focus of this body of research is on the connections between power and practice among a wide group of actors in the *production* of scale. Marston (2000) suggests that research in this area can be divided into abstract theorizing and case studies focused on capitalist production, social reproduction and consumption.

In navigating these different views, I draw on the guidance of Sayre (2009), Padt and Arts (2014) and Rangan and Kull (2009) in using the notions of ontological, epistemological and interpretive moments of scale. Sayre (2009:281) suggests that there is an objective characteristic of complex natural and social interactions, which he refers to as the 'ontological moment'. Rivers, lakes, dams and irrigation systems thus have certain material scale size and hydrological processes take place at a certain level. Padt and Arts (2014:8) building on Sayre's work explain that the epistemological moment is when it is 'the scale itself that structures observations and hence, the

description of social and ecological phenomena'. In this moment, scale is constantly being constructed. Although scale may take on material form, it is produced through our social relations. Scale can thus be seen as being produced through our interactions through political processes (Swyngedouw, 2004). This will be discussed further in section 4.6. Rangan and Kull (2009) add to Sayre's scale moments by suggesting that there is an interpretative moment which plays a role in the production of scale, because it provides the actions or practices where differences and change are articulated, challenged or defended. The interpretative moment is then 'an active process producing scale carried out by political actors to exercise power or oppose authority through means such as scalar narratives' Rangan and Kull (2009:40). I am particularly interested in the interpretative moment as it speaks to the active processes of scaling. In examining this interpretative moment of scaling I focus on the notion of relational scale and its dialectical relation to governance. As Harvey (2006:125) says 'space is neither absolute, relative or relational in itself, but it can become one or all simultaneously depending on the circumstances. The problem of the proper conceptualisation of space is resolved through human practice with respect to it'.

In my research then, I consider that scale is produced through social relations and the process of producing and transforming scales is dialectical. Although I maintain that scale is constantly subjected to social relations, the processes of scaling do lead to material practices that are evident in the hydrosocial landscape.

3.3 Defining scalar terms

So, what then is scale? In a simple definition, Howitt (1998:49) suggests that in geography, scale possesses 'three facets, namely, size, level and relation'. The notion of relation is an important feature of scale and speaks to the recognition of there being connections between and within scales. In addition, the relational aspect identifies scale as a conceptual tool linked to space, place and environment (Harvey, 2006).

Gibbons et al. (2000:218) define scale as 'the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon, and the "levels" as the units of analysis that are located at different positions on a scale'.

Critical human geographers such as Smith (1990) in his book *Uneven Development* have spoken of an ordering of space through capitalist production into three scales, namely, the urban scale; the national scale and the global or world scale. Using a Marxist framing, he explains the differentiation of different scales according to the workings of the capitalist system of production and suggests that uneven development is a consequence of this scaling. Marston (2000) adds to this by showing that scales are also sites of social reproduction and consumption. Both definitions relate scale to social

relations and in a similar but slightly broader definition, Agnew (1997:100) sees scale as 'the focal setting at which spatial boundaries are defined for a specific social claim, activity or behavior'.

Other social scientists, particularly political scientists, however distinguish between different types of *scales* and recognize urban, national and global as *levels* within a spatial or jurisdictional scale (Figure 1). Types of scales include (amongst others) geographical space or spatial scale; temporal scale; jurisdictional scale; and knowledge scales (Young, 2006). Even within the social sciences, there are thus differences in the terminology and associated meanings used in scalar literature.

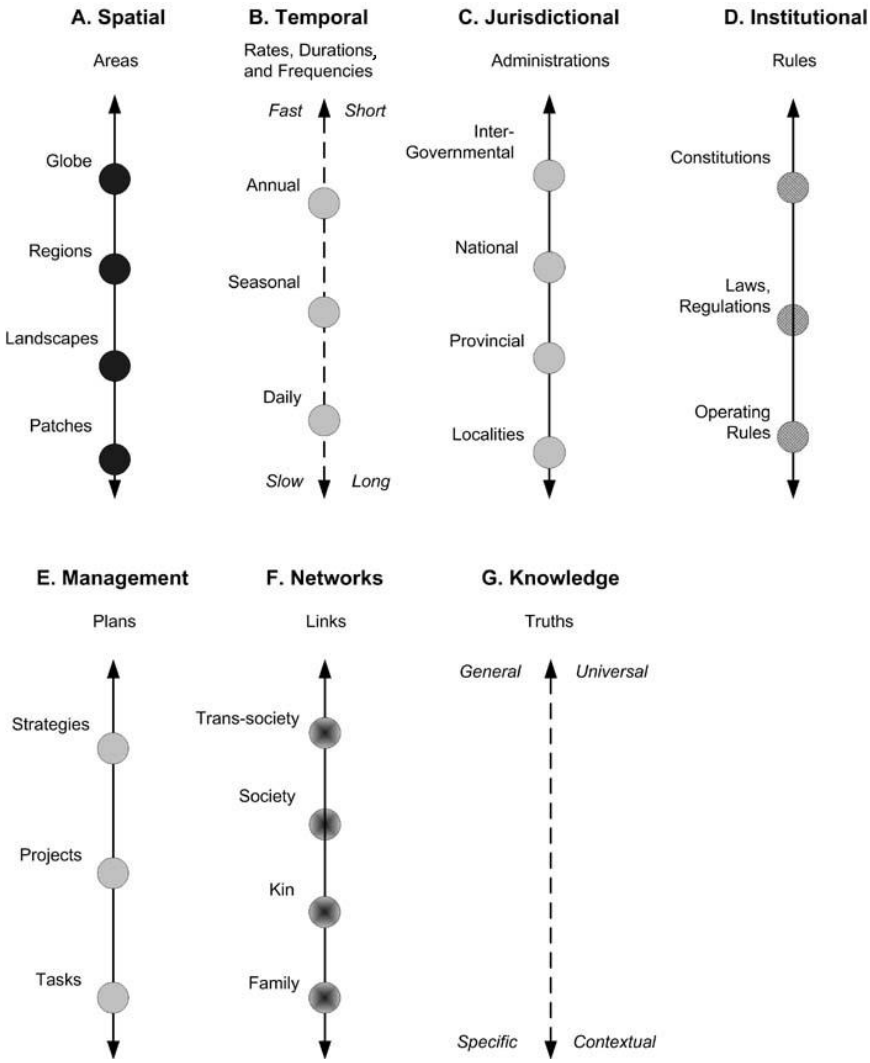

Figure 1. Illustration of different scales and levels (Cash et al., 2006)

For the purposes of my research, I use the notion of scales to refer to different ordering systems for space, time, jurisdictions, institutions and so forth. Within each scale, I recognize that there are levels that represent the positions within a particular scale. Although Smith, Marston, Swyngedouw and others use scale instead of levels, I take heed of the warnings from Sayre (2005) and Lebel et al. (2005) to avoid the conflation of the terms scale and level. Through my research I talk, for example, of an administration *scale* and within the (South Africa) administrative scale, talk of household; municipal; provincial; national; and international *levels* of administration.

In trying to reconcile the different perspectives on scale (confining scale to spatial dimensions on one hand and the perspective on scale as ordering space, jurisdictions, ecosystems on the other) I would suggest that the additional scales used by researchers such as Cash et al. (2006) and Young (2006) are products of social-spatial dynamics and therefore we can conceptualise them as critical geographers conceptualise spatial scales. Marston (2000) has shown that we risk explanatory value by being too rigidly tied to capitalist production but can think more broadly. I argue that the processes of production, social reproduction and consumption are similarly at work in producing scales of administration, institutions and jurisdictions. The descriptive value of naming different types of scales lies in being able to offer an additional way of sorting environmental governance systems and identifying different arenas where the politics of scaling plays out.

3.4 Scale in Environmental Governance Research

Given that this research looks at the politics within water governance, I look at how scale is used in environmental governance and particularly, water governance literature. Andonova and Mitchell (2010:255) recognize that environmental governance has been dramatically rescaled and become increasingly complex and interconnected with respect to the level at which they take place, the range of actors engaged in them, and the linkages between them and nominally non-environmental issues. A great deal of the research in environmental governance starts from the position that scales exist and to some extent, levels are defined within scales (Berkes, 2006; Borgström et al., 2006; Brukmeier, 2012; Cash and Moser, 2000; Cumming et al., 2006; Folke et al., 2007) . Scales and levels are thus used as stable features in the landscape for looking at how governance is practiced as it affects rule of law and human-nature interactions. A great deal of attention is paid to processes of horizontal and vertical rescaling and Cash et al (2006) are frequently cited for their discussion of these cross-scalar dynamics. Horizontal rescaling looks at the cross-scalar linkages across traditional boundaries between jurisdictions, institutions, sectors and actor groups. Within the horizontal rescaling literature, much attention has been given to scalar mismatches between ecosystems and the jurisdictions of the bodies regulating the ecosystems (Cummings et al., 2006; Ernoul and Wardell-Johnson, 2013; Olsson et al., 2007). Issues such as transboundary pollution and global commons have raised the attention to the difficulties when there are overlapping or gaps in the jurisdictions of bodies to manage natural resources and ecosystem. Vertical rescaling looks at the cross-level interactions shifting or linking political action across geographical space and jurisdictions and institutions, for example, from local to global (Lebel et al., 2005). Within vertical rescaling literature, many scholars have focused on the growing body of global environmental governance and the growth of supranational institutions and

organisations to manage natural resources (Dietz et al., 2003; Jones, 2012; Larsen, 2008). In doing so, theoretical contributions have been made by institutional scholars such as Oran Young in looking at the interplay across levels (Young, 2006). The work done in this stream seeks to bring in a discussion of authority and power and how they are used in scaling processes to address the political (Adger, 2001; Bulkeley, 2005; Moss and Newig, 2010).

In recognizing different types of scales, researchers who study environment governance have attempted to isolate cross-scalar dynamics. Cash et al. (2006:9) describe the 'cross-level interactions as interactions among levels within a scale', whereas 'cross-scale means interactions across different scales', for example between spatial domains and jurisdictions. Multi-level describes the presence of more than one level and multi-scale is the presence of more than one scale (Figure 2).

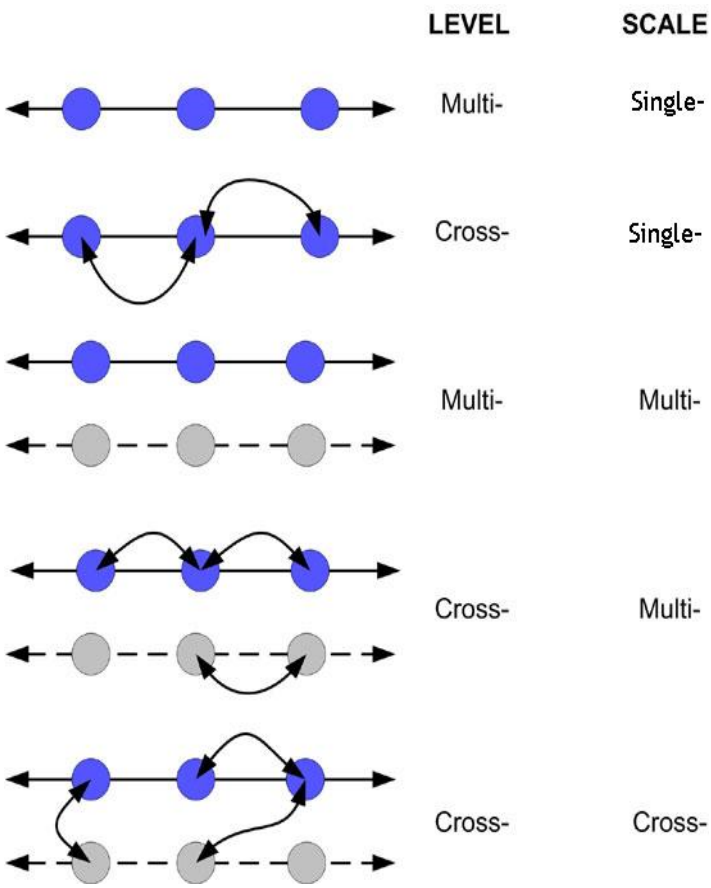

Figure 2. Illustration of cross-level, cross-scale and mutliscalar interactions (Cash et al., 2006)

There is a wealth of research on cross-scalar dynamics which all offer useful material to improve environmental governance for example by focusing on overcoming problems of scale mismatch or plurality of scales involved in governance (Berkes, 2006; Bruckmeier, 2012; Cash and Moser, 2000; Folke et al., 2007). To some extent, authors such as Lebel et al. (2005), Meadowcroft (2002) and Bulkeley (2005) address the politics related to scale in environmental governance. What one finds then is work on the politics of scale and scaling stemming from firstly the production of scale literature out of geography and secondly, cross-scalar research from other fields, most notably, political science. I attempt to combine the theoretical contributions from the two fields to investigate whether the cross-scalar governance interactions can be combined with the work on the production of scale to deepen the analysis of politics of scaling in water governance and environmental governance processes more generally. For example, whether the concepts multi-level and multi-scale as used by Cash et al. (2006) are meaningful when thinking about social relations (which are inherently multi-level and multi-scale) is something that I explore further in my research.

3.5 Critiques of scale research

There have been on-going debates on the value of scale and here I acknowledge and highlight some of the key arguments that have been made. Marston et al. (2005) suggest that there has been too much focus on scale. In the view of Marston and her colleagues (2005:427), scale is an epistemology that, though potentially helpful in a methodological sense, is problematic because of the reliance on hierarchical structuring which '(de)limits practical agency as a necessary outcome of its organization'. They offer in its place a flat ontology (Marston et al., 2005). This view continues to generate much debate (see Hoefle, 2006; Leitner and Miller, 2007; Jones et al., 2007). Erasing scale from geographical research seems not to be a useful exercise. Other critics of the use of scale offer more valuable contributions in my view.

Neil Brenner (2001) and Adam Moore (2008) have both raised concerns regarding how scale is used. Brenner (2001:591) suggests that the plethora of research on scale has led to an 'analytical blunting' of the concept while Moore (2008:207) calls for a distinction between 'scales of analysis and scales of practice'. Both offer valid evidence in suggesting that the fluidity of definition as well as the careless use of scale and governance language in research risks making scale a buzzword with little theoretical value. Brenner (2008:599) makes the argument that we can differentiate between two meanings of 'politics of scale', one singular and one plural. Brenner (2008:599) argues that a singular meaning of 'politics of scale denotes the production, reconfiguration or contestation of some aspect of sociospatial organization *within* a relatively bounded geographical arena or scale'. In other words, political actions are confined to a particular

area, for example the politics between nation-states negotiating over a transboundary river system.

There is also a plural meaning of 'politics of scale' which refers to the 'production, reconfiguration or contestation of particular differentiations, orderings and hierarchies *among* geographical scales' (Brenner, 2008:600). This second meaning acknowledges that politics takes place within and across scales so that it acknowledges that for a transboundary river system, you will have politics between nation-states, but also within countries where different water users fight for the right to use the resources of a transboundary river. This second meaning speaks to the cross-scalar dynamics addressed by Cash et al. (2006). Significant here is the notion of a process of scaling rather than a static notion of scale. This suggests that it is both scale and the sociospatial that is subject to constant modification. Scale itself is thus open to re-interpretation both discursively and materially. An example of the consequences of the process of scaling is the introduction of water basin/catchment/watershed management into water governance through IWRM. Where previously transboundary rivers were managed by states within their internal borders, the discursive turn towards basin management led to rethinking transboundary rivers as shared resources. This led to changes in administrative scales to accommodate co-operative management bodies at regional level. It has also materially affected how water resources within shared systems are used and managed. As scales are produced, they are also open to modification by social interactions amongst actors (with different interpretations of scale) and thus scales and levels may be contested and transformed. I extend this argument to then consider how scale effects are produced through the politics of scaling (as opposed to a politics of scale).

3.6 Politics of scaling

"Scaling" is an active process of producing scale discursively and allocating certain material resources or activities. Scales can produce social and ecological materialities through the implementation of projects and policies. The process of scaling can be viewed as a site for political manipulation – where contestation occurs through the exertion of power in order to include or exclude. Erik Swyngedouw (2008:132-134) makes ten points to describe the social and material production of scale and scalar gestalts which are worth quoting here:

1. 'Scalar configurations, whether ecological on in terms of regulatory order (s), as well as their discursive and theoretical representation, are always a result, an outcome of the perpetual movement of the flux of socio-spatial and environmental dynamics.

2. Struggling to command a particular scale in any given socio-spatial conjuncture can be of eminent importance.
3. A process-based approach to scale focuses attention on the mechanism of scale transformation through social conflict and political-economic struggle.
4. Scalar political strategies are actively mobilised as parts of strategies of empowerment and disempowerment.
5. There is a simultaneous 'nested' yet partially hierarchical relationship between scales.
6. Scale configurations change as power shifts, both in terms of their nesting and interrelations and in terms of their spatial extent.
7. Similarly, ecological scales are transformed as and when the socio-ecological transformation of nature takes new or different forms.
8. Scale also emerges as the site where co-operation and competition find a (fragile) stand-off.
9. Processes of scale formation are cut through by all manners of fragmenting, divisive and differentiating processes (nationalism, localism, class differentiation, competition and so forth).
10. The mobilisation of scalar narratives, scalar politics, and scalar practices, then, becomes an integral part of political power struggles and strategies'.

The politics of scaling takes place through various mechanisms deployed by actors seeking to produce or transform scale and social interactions in the interests of political economic or political goals. Scale is actively created in everyday practices and can, thus, become a 'hand-tool by which to actively govern social and natural processes in systems, networks and hierarchies' (Padt and Arts, 2014:13). I highlight four related acts of scaling that have been described in the literature, namely, scale framing; scale jumping; scale bending and scale fixing.

3.6.1 Scale framing

Entman (1993:52) suggests that 'to frame is to select some aspects of perceived reality and make them more salient in a communicating text'. When applied to questions of scale, Kurtz (2003:894) describes scale frames as the 'discursive practices that construct meaningful (and actionable) linkages between the scale at which a social problem is experienced and the scale(s) at which it could be politically addressed of resolved'. This leaves space for different actors to interpret the world and make it meaningful through different frames. Scale frames have a discursive element where our scale frames affect what we know and what we consider important (Mansfield and Haas, 2006). This shapes how we can understand a problem and how solutions are formulated much like

the way discourse influences our conceptualisation of problems and the solutions we produce in relation to this understanding. When there are contesting framings that are used to undermine a particular scale frame, this can be termed a counter-scale frame (Kurtz, 2003). In her work on environmental injustice in Convent, Louisiana, Kurtz (2002) describes how scale frames can firstly be used to invoke geographical (or jurisdictional) scale as scale of regulation, by appealing to different tiers and agencies of government for recourse, secondly to construct scale as a means of legitimating inclusion and exclusion in political debate, and thirdly can invoke scale as an analytical category through the practices of both academic and bureaucratic spatial analysis. In the case discussed in her article, she shows how scale framing was used in the naming of the 'St James Citizens for Jobs and Environment' social movement to include the entire parish of St James and not simply the people in Convent who live in the immediate vicinity of a proposed polyvinylchloride production facility (legitimating inclusion). A second scale framing was carried out when local citizens filed an environmental justice complaint to the Environmental Protection Agency, a federal agency against the Louisiana Department of Environmental Quality thus appealing to a higher government authority for recourse (scale of regulation). I use scale framing in this research to uncover how discourses frame the level and scale appropriate for decision-making.

3.6.2 Scale jumping

Neil Smith (1990;1992) developed the concept of scale jumping to describe the strategies that effective social movements develop in order to take their concerns beyond the local level. He presents the case of the homeless vehicle, Poliscar as an means for homeless people to jump scales (Smith, 1996). The Poliscar was an art project developed by Kryzysztof Wodiczko as a vehicle which can be used by homeless people to move around the city. It could be used to improve communication by increasing mobility and also to provide shelter when in a vertical sleeping position. According to Smith (1996:65) the Poliscar 'empowers its users by providing enhanced access to urban space at the same time as it allows for the remaking of the geographical scale of daily social and political intercourse'. Through the use of the Poliscar, homeless people were much more mobile and able to traverse New York, entering spaces that they had previously not had access to and making connections across a larger spectrum of people. In this way, homeless people were able to jump scales and move beyond the usually restricted area that their homelessness allowed. Another example is the now famous Zapatistas movement that began as a highly localised social movement in Chiapas province, Mexico but through jumping scales has been able to influence global processes (Pleyers, 2010). I use scale jumping to identify how actors in my three cases operate across scales and levels to suit their purposes. I also indentify the material practices involved in scale jumping.

3.6.3 Scale bending

Scale bending is the phenomenon where 'actors engage scale in ways that are unexpected and operate outside the conventional box we expect them to operate in' (Smith, 2004:193). Smith (2004) describes the unexpected cases of billionaire financier George Soros providing USD1/2 billion in loans to the new capitalist state in Russia under the Yeltsin government; the Disney Company appointing Henry Kissinger as its ambassador to China on the release of a film about Tibet; and the Kensington Welfare Rights Union marching to the UN buildings in New York arguing that the plight of poor people contravened the 1948 UN Declaration of Human Rights. In all three cases, actors appealed across the levels they would normally operate at and shifted their scales of practice. Scale bending is used as a process of scaling in order to effect some social change and thus actors may bend scales so that they can operate across and within different scales and levels at the same time (Harvey, 2000). Multinational corporations often identify themselves as being simultaneously both locally grounded as well as an international player through a process of bending scale to suit their needs for local political acceptance and global capitalist expansion respectively. For example in the case of fracking presented in my research, a company such as Shell identifies itself as being part of the South African economy through its national subsidiary but also as a multinational corporation when speaking of its experience globally. I investigate how scale bending processes re-shaping scales that seem to be quite stable and in the process, allow actors to operate across scales and levels.

3.6.4 Scale fixing

According to Herod (2011:28-29) scalar fixes occur when 'certain aspects of daily life may become enframed within relatively stable geographical hierarchies in which social practices organized at certain scales predominate'. As a result of scale fixing, scales may become relatively fixed geographical structures and these thus form boundaries for political, ecological, political, economic and cultural activities in specific ways (Smith, 1995). Once scalar fixes are established, these can be difficult to contest and transform. As a result of powerful actors maintaining the scalar fix, it may be difficult for other actors to justify other scales of practice For example, in many parts of the world, water service delivery has been decentralised to local authorities. This is viewed as the most efficient and effective way of ensuring water services (ICWE, 1992). The scalar fix of water service delivery to local authorities makes it difficult for citizens to raise their concerns about justice and fairness to higher authorities. Brenner (2010) suggests that when there is a scalar fix, scalar change is incremental because the dominant scalar fix may be inflexible and self-reinforcing. Breaking scalar fixes although not easy, may be a worthwhile endeavour as it creates opportunities for alternatives to be introduced such as re-negotiating who has the right to participate in certain forms of governance. In my research, I explore how scale fixing can be used as means of inclusion or exclusion and in the creation of identities.

To sum up, in all four processes of scaling, a fundamental question that must be asked are how are actors included or excluded through the process. In this way, we begin to uncover the political aspect of the politics of scaling. In all cases, scale framing, jumping, bending and scale fixing can be used as means of legitimizing inclusion and exclusion of actors and arguments (Swyngedouw, 2004). Importantly, the focus on scaling rather than scale allows room to focus on actors and agency and the opportunities within the political process of scaling. There is a risk of too much emphasis on structures whilst ignoring the potential of agents at affect change. In moving forward, scaling can be seen as both an exercise in oppression and emancipation. Soja (2010:19) suggests that 'since we construct our multi-scalar geographies, or they are constructed for us by more powerful others, it follows that we can act to change or reconfigure them to increase the positive or decrease the negative effects'. The tools of scaling thus become the tools of rescaling. This could create an important opportunity for actors engaged in governance to assert their positions against the hegemonic discourse of neoliberal water governance. Rescaling involves a complex, highly contested reconfiguration of inter-scalar arrangements, including the invention of new scales of action and emancipation (Keil and Mahon, 2009:4). Through my investigation of water governance in South Africa, I look at both scaling and re-scaling processes.

3.7 Conclusion

The hydrosocial landscape is an arena that brings together complex and dynamic biophysical forces of nature along with human use activities, creating a hydrosocial landscape, a waterscape, characterized by intersecting sustainability challenges and overlapping ecological and social scales. As a complex system, when working with the hydrosocial landscape, one must account for different levels and different scales at the same time. However, as Swyngedouw (2004: 130) remind us, 'scalar configurations are an outcome of the perpetual flux of socio-spatial and environmental dynamics and scales are therefore transformed through social conflict and political-economic struggle'. A politics of scaling is part of social relations and this occurs through processes of scaling. Four processes of scaling can be identified as follows: scale framing, scale jumping, scale bending and scale fixing. I use these four processes of scaling to investigate the dialectical relationship between scale and governance. The four processes of scaling thus form part of my analytical framework when analysing my data to identify politics of scaling.

I investigate the politics of scaling in my three cases by focusing on how the processes of scaling are used by different actors. My reasoning behind seeking to use it as my lens onto water governance in South Africa is as a means of engaging with the dialectical

relationship between scale and governance. There is a risk that environmental governance may develop using an unproblematised entrenching of scale as simple institutional realignment. Understanding the politics of scaling may be useful as a means of analysing the politics inherent in water governance.

4. METHODOLOGY

4.1 The Research Framework

I developed my research out of a curiosity to understand more fully of how we think of nature and society in searching for ways to address the many complex sustainability problems we face today. I have focused on three concepts that have received a great deal of attention in the global effort to address the wicked problems of our age, namely, governance, scale and power. In my research, I look at how scale is used in governance, and what it can contribute in terms of understanding and addressing sustainability challenges and power relations in society.

The need for environmental governance is increasing as the complexity and magnitude of challenges such as climate change, biodiversity loss, water scarcity and land degradation grow (Biermann et al., 2009). As our knowledge of these challenges has grown, the linkages across different scales and levels is becoming more evident at the same time the complexity in dealing with cross-scalar dynamics grows. This requires further exploration of how these dynamics operate, what happens to power in social relations and what are the implications for addressing these challenges. My focus on politics of water governance is placed in the research agenda of political ecology. Political ecology seeks to provide a framework for understanding socio-natural relations (Robbins, 2004). It is most suitable to my research as it examines the interrelations of politics and power, structures and discourses, with the environment (Newell, 2012:29). As a theoretical framework, political ecology highlights the way society and social relations are directly embedded in our understanding and use of environmental resources. We cannot think about nature as something independent of human beings. Instead, critical political ecology thinking leads us to question how our engagements shape the world around us, including society, the economy, rivers, lakes and water itself. Our actions are located in space and time and in the process, we produce scales. Using political ecology as a framework has led me to an investigation of the politics that may be present in the selection of scale and the involved scaling processes in my three cases and how these in turn affect other elements such as governance and the social relations embedded in scaling and governance. Political ecology offers an alternative representation of nature-society from apolitical ecology by embedding nature within

society and society within nature (Forsyth, 2008) and this has prompted me to consider how scaling and governing can be political processes.

Political ecology has attracted scholars from many fields, such as anthropology, development studies, environmental sociology, environmental history, forestry, and geography. The broad spectrum of disciplines that work with political ecology makes it amenable to interdisciplinary research as carried out within sustainability science (Paulson and Gezon, 2005). However, there is no strict definition of political ecology and there are different ways it is used with different research focus. Paulson and Gezon (2005) describe the different definitions and methodological approaches. As they summarise, some definitions address political economy and focus on forces of production (Blaikie and Brookfield, 1987) while others investigate formal political institutions (Peet and Watts, 1996). The methods of political ecology may also vary with some focusing on environmental change itself (Watts 1985), while others investigate the narratives or stories about that change (for example Escobar 1996). Gezon and Paulson (2005:2) believe political ecology has broadly developed around four core concepts, which I present below:

1. **'Resource use** is organized and transmitted through **social relations** that may result in the imposition of excessive pressure of production on the environment.
2. There are a **plurality** of positions, perceptions, interests, and rationalities in relation to the environment.
3. There is **global connectedness** through which extra-local political economic processes shape and are influenced by local spaces.
4. The concept of **marginalization** is refined to recognise that political, economic and ecological expressions may be mutually reinforcing'.

In my research, I take these four concepts as starting points in seeking to understand processes of scaling in water governance. The first concept is the notion that social relations between people determine resource use and that our use and management of resources are stressors which put pressure on the resource (people determine resource use). I recognize that water develops meaning and value as a result of social relations. Water is deeply embedded in society and we shape water resources for our purposes. This leads to great pressure on water quality and quantity around the world. The second concept is that there is variability in the ways we think, feel and use the environment (water can be different things to different people). Since people have different ways of relating to water, I begin my explorations from the view that there are many different discourses about water and its relation to society. Some of these may be complementary to each other whilst others may lead to conflicts. For example, some people may see water as sacred whilst others see it as something to be conquered and shaped for their purposes. The third concept stresses how local actions are affected by actions elsewhere

and simultaneously affect broader processes (all actions are connected). Cross-scalar linkages have resulted in an inter-connected system where forces from outside a place may shape it, at the same time that local actions influence other scales and levels. This is quite visible in the case of water since it is a resource that moves through the landscape and for example, upstream users affect downstream users. The fourth concept is a recognition of how marginalization can result from political, economic and environmental conditions (marginalization can be caused by political economic and environmental forces). Economic activities using water, political decisions about property rights, and the state of the water resource can all lead to marginalization of certain actors, contributing to environmental injustice.

These formulations highlight how intertwined people and the environment are. In approaching my research, I find it unhelpful to talk about water or H_2O separately from society. I start from an ontological position where I see nature and society as part of the same whole. Some people approach sustainability from the perspective that there are two separate systems that co-exist side-by-side or as coupled systems. I adopt the stance of Noel Castree (2001) in seeing nature as inescapably social. He argues that "nature is defined, delimited and even physically reconstituted by different societies, often in order to serve specific, and usually dominant, social interests. The social and the natural are seen to intertwine in ways that make their separation – in either thought or practice – impossible" (Castree, 2001:3). In borrowing the term 'hydrosocial landscape' from Swyngedouw (2007) I focus attention on this intertwined character of water with society.

Within this hydrosocial landscape, I consider scale as something that is produced through social interactions (Herod, 2011). Although scale may be constructed, I follow the historical-materialist line of thinking that scale has both discursive and material form (Smith, 1996). Scales are therefore constantly formed and transformed through political, economic and environmental interactions. Instead of thinking of these as separate elements, I use a dialectical reasoning, which situates politics, economy, environment and also scale as parts of a whole where there are constant processes of change. One of the main contributors to dialectics, Bertell Ollman, suggests that dialectics, instead of being a strict methodology, manifests as guidelines or a way of thinking in which the emphasis rests on the flows and flux and the main subject is change: "all change, and interaction, all kinds and degrees of interaction" (Ollman, 1990:27). Ollman (2003:13) suggests that:

> Dialectics restructures our thinking about reality by replacing the commonsense notion of "thing" (as something that has history and has external connections with other things) with notions of "process" (which contains its history and possible futures) and "relation" (which contains as part of what it is its ties with other relations).

In using a dialectical approach, my interest in research is focused on the processes and relations of scaling and governance, taking these not as static things but as 'moments' in the flow of social relations. Harvey describes dialectical thinking as emphasizing an understanding of: '…processes, flows, fluxes and relations over the analysis of elements, things, structures and organized systems' (1996: 49). Taking this approach, I do not think of scales as immovable objects in the landscape but rather part of the constantly changing dynamics. For this reason, I focus on processes of scaling rather than scale itself in my research. This fits with an ontology of 'becoming' rather than 'being' (Chia, 1996).

In examining the interactions of social relations, Harvey (2008) identifies six 'moments' that make up social practices: discourse/language, power, beliefs/values/desires, social relations, institutions/rituals and material practices. These practices are in constant flux and interplay with each other so that they co-evolve. Scaling is not a separate process from governing, they are mutually constitutive and embody power. As Harvey argues, 'all these elements constitute a totality, and we have to understand how the mutual interactions between them work' (Harvey, 2010:193). In this research, I focus on the discoursal moment in an attempt to reveal how processes of scaling are constituted as part of water governance. In my focus on discourse, I do not dismiss the other 'moments' nor do I claim that there is a causal or determinant nature to discourse. It is simply a filter to focus my abstraction and a means to interpret the world (Loftus, 2012). This implies that in my investigation of water governance in South Africa, I focus on the language, interpretations and norms that shape governance instead of, for example, the outcomes of decision making.

In using discourse, I follow Blommaert (2005:3) in his definition of discourse as 'all meaningful semiotic human activity seen in connection with social, cultural, and historical patterns and developments of use'. Many forms of discourse analysis are focused on language use but Blommaert calls for a broader definition of discourse, suggesting that all kinds of semiotic 'flagging' performed by means of objects, attributes, or activities can and should be included (Blommaert, 2005:3). In my analysis of scaling processes, I focus on language, but also the actions related to who and how different actors assert particular discourses. As Strauss and Feiz (2014:3) state, 'nothing in discourse is neutral. Each and every instance of discourse is imbued with some element of stance, it is motivated by a perspective.' Uncovering the different stances and their relations to other 'moments' of social practice reveals the politics of scaling.

4.2 Case Study Selection

Herod (2011) and Swyngedouw (1997) argue that starting from a given geographical scale may be contradictory to trying to understand the world in a dynamic, process-

based manner where everything is connected. In other words, by delimiting a particular scale for investigation, it may constrain one's ability to understand the dynamics across scales and levels. Whilst I am aware of this concern, I situate my analysis in a particular geographical space, South Africa but seek to show that the politics of scaling transcend spatial areas and particular scales or levels. Scales are formed, transformed and transgressed through the everyday politics of production, reproduction and consumption. I have selected South Africa as it offers an interesting study context with strong water legislation hand in hand with deep challenges of equity and justice in water access and allocation. This partly stems from the historical development of water resources in South Africa, which has been a classic example of uneven development along racial lines (Calland, 2006). During apartheid, designated white areas and areas of economic activity formed the core which water was directed towards whilst black areas formed the periphery where water-scarcity was widespread. The transformations of governance over time offers many examples of scalar dynamics. This 'context' that South Africa provides can be viewed as forces or relations which influence the three specific cases studied here.

Similarly, water governance provides a rich research field for addressing questions of scale and scaling. As understood within political ecology, water is a fluid resource that moves across scales and levels of time and space in different forms. It is also imbued with social, economic, cultural and political meaning so that water is used, understood and valued from a human perspective (Strang, 2004). In this research, water governance serves as an example of environmental governance so that many of the issues surrounding environmental governance are investigated in the more specific area of water governance.

Within the broad field of water governance in South Africa, I investigate three cases of water conflicts and my main focus of analysis is how scaling processes affect the decision-making around these conflicts in water access and allocation (Figure 3). The advantage of the case study method is that I have the opportunity to work with a real-life situation (Flyvbjerg, 2011) and test my theories of processes of scaling in relation to descision making processes in practice. Yin (2009:18) suggests that the case study 'investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident'. In my research, using case studies allows me to investigate politics of scaling related to three real-life situations, but also allows to examine the broader context of water governance in South Africa. I adopted a purposive sampling method to identify multiple case studies where water allocation and access decisions were contested and where questions of scale were raised.

This is a purposive sampling method where I looked for cases that had a cross-scalar

Figure 3. Map locating the three cases in South Africa (A=Johannesburg; B=De Hoop Dam; C=Karoo Basin)

element to them. I started my research by reading the various theories on scale and how scale is examined in governance. I was drawn to the questions of politics of scaling and summarised the theoretical ideas of processes of scaling. In selecting my cases, I looked for situations where multiple scales were involved. In this, there were obviously many to choose from so I decided to select cases were there was *conflict* that received attention in *national media coverage*. This increased the likelihood of processes of scaling being present (local project in the national news) and of more actors being involved. This purposive sampling was done so that I had a basis to examine the cases to identify if processes of scaling were taking place and their implications for scale, governance and power. The aim of my research is not to investigate *whether* scale is implicated in water governance but to look at cases where questions of scale arise and examine *how* scale is produced and influences decision-making in the purposively selected cases. Three cases in South Africa were selected on the basis of expectations about their influence over multiple scales. I chose to investigate three cases in line with Flyvbjerg's maximum variation case selection where more than one case allowed me to obtain information

about the significance of various circumstances for case processes and outcomes (Flyvbjerg, 2011:307).

The first case is about the decision to construct De Hoop Dam. It is an example of a water allocation decision by the state and represents a decision that has already been made. In fact, the dam was launched on 14 March 2014 (Tau, 2014). The decisions on how to provide water services to residents of informal settlements in Johannesburg is the second case. It is an example of water access issues and is a decision that is on-going and is constantly being challenged by citizens. The third case addresses hydraulic fracturing for shale gas in the Karoo. In this case I examine a project that is still in its exploratory stage and no hydraulic fracturing has yet been approved in South Africa. However the decision to approve exploration for shale gas has been made and it is this decision process that I investigate. The cases represent bulk water supply; household water consumption; and water as an input into another project respectively. They represent various uses of water and different ways the hydrosocial landscape is being developed and transformed. All three decisions about the access and allocations of water have been subject to many studies through for example, government commissioned investigations; investor-led planning studies and environmental impact studies, and investigative journalism by the media. These investigations usually focused on whether the projects should be approved or not. In my research, I focused attention on the discourses of scale used by the different actors and processes of scaling. There is thus a wealth of material on the cases for analysis including state documents and speeches. The cases also cover both urban (Johannesburg) and rural (De Hoop Dam and Karoo) settings and are located in different provinces of the country. Although I am not attempting a strict comparative analysis (Yin, 2009), the use of three cases reveals similarities and differences in the scaling of water governance in South Africa and can be used to draw some conclusions about politics of scaling.

4.3 Data Collection

I used qualitative research methods to collect data for the research in order to construct the discourses and processes of scaling used in the cases. Qualitative methods are seen as most useful to give voice to different actors, to interpret socially constructed phenomena and to advance theory by an in-depth look at whatever processes of phenomena are being studied (Ragin, 1994:93). In my case it is processes of scaling that are being studied along with dialectically related water governance. Case study evidence can come from many sources and I use documentation, observation and interviews as my three primary sources. The use of multiple sources is in keeping with Blommaert's (2005) idea that discourse analysis can be carried out on different forms

of material. I was able to build up a clearer picture of the discourses present and the scaling processes by drawing from the different sources.

4.3.1 Documents and Texts

Document analysis formed an important part of the research. Through the selection and analysis of documents I was able to understand the strategies used by actors and to carry out an analysis of the discourses of scaling used. The bulk of the documents I analysed were policy and project background documents. In addition, I examined speeches, media briefings and social media communication about the projects. In South Africa, access to information is fairly open (although the Protection of State Information Bill may change this) and planning, assessment and policy documents are easily accessible. In many instances, official documents can be retrieved from the websites of different groups but in some cases, I made direct requests for documents from the relevant organisation or government department and obtained these as hard copies from their offices or via email. No special permissions were required to obtain documents and this made it relatively easy to obtaining documents. The documents used were selected based on their authenticity; credibility; representativeness and meaning (Bryman, 2008). Below I give examples of the type of document sources I have used in my research.

At a national level, I analysed key pieces of legislation including the Constitution, the National Water Act, the Water Services Act, the National Environmental Management Act and related regulations for their discursive content. I also reviewed policy documents setting out the strategic development plans for the country including the Reconstruction and Development Plan (RDP), the Growth, Employment and Redistribution (GEAR) strategy, the Accelerated and Shared Growth Initiative for South Africa (AGISA), the National Water Resource Strategy for South Africa 2, 2013 and all the State of the Nation addresses of the President of the country since 2009. International documents such as the Dublin Statement on Water and the Environment from the International Conference on Water and the Environmental were also analysed (ICWE, 1992). These documents were useful in constructing some of the large discourses that influence water governance in the three cases.

For each of the cases, I reviewed reports on the projects in details including the planning reports for De Hoop Dam, the environmental impact statement and environmental manangement plan as well as the record of decision for the dam approval by DEAT. In addition, speeches made by various Ministers and decisions made by the department and parliament were analysed. For the Johannesburg case, annual reports from the City of Johannesburg and Johannesburg Water from 2005 when the pre-paid meter case developed. In addition, legal documents from the legal case: *Mazibuko & Others v the City of Johannesburg & Others* were studied. The development plans of the Alexandra Development Project were analysed along with reports on progress, lodged with the

City of Johannesburg. Documentary, speeches and web-based material produced by the Anti Privatisation Forum and Abahlali base Mjondolo, the shackdwellers movement in South Africa were analysed. The third case of hydraulic fracturing is currently under investigation and I focused my data collection on national level debates in parliament and cabinet, statements from the various departments involved, especially Mineral Resources, as well as the investigative studies that have been produced by the task team and working group tasked by the Minister of Mineral Resources. As the case with the most internet-based material, I also analysed the material on several websites by social groups working to stop hydraulic fracturing in the Karoo which contained text, reports, poetry and video clips. This included Treasure Karoo Action Group, Karoo Space and Centre for Environmental Rights. For all three cases, media sources including newspaper articles were invaluable for capturing the voices of different actors such government officials, multinational corporations and activists who used the media as a lobbying platform. These were used carefully, recognising that as secondary sources, they are more difficult to verify. None of the documents or texts were produced for the purposes of social research but provided a goldmine of material for my analysis, which is explained in section 5.3.4 below.

4.3.2 Field Observations

Observations formed an important element of the research and in this study I drew on both direct observation and participant-observation. Direct observations were used mainly to verify the conditions that people mentioned in interviews or were documented in texts. For example, in Alexandra I was able to count the number of households sharing a single tap and in Soweto, I was able to experience the reduced water pressure of taps with pre-paid meters. Direct observations took place at the project sites for the De Hoop Dam and Johannesburg case studies. As there has not been an physical development for the hydraulic fracturing of the Karoo, no specific site visits were carried out. However, I had previously worked in the Karoo as a researcher for the Council for Scientific and Industrial Research (CSIR) and as a consultant preparing State of the Environment Reports for the provincial governments and therefore I am knowledgeable of the hydrosocial landscape there. I visited various sites in Alexandra to compare the different types of water access available to residents. In Soweto, I observed the pre-paid meters and was able to see disconnections being carried out by Johannesburg Water. In the Greater Sekhukhune Municipality, I observed the standard of living and water services available to residents. I walked through the community with an interpreter, someone who was not from the community but was from a neighbouring town and had undertaken research there before. I was also given a tour of the dam development by DWAF during the construction phase to observe the processes involved in construction and some of the impacts on the biophysical and social environment. Direct observations were made at a meeting at the Community Centre built at the dam site. Some of the direct observations were combined with

narrative walks with people directly involved in the projects, for example employees of the Alexandra Development Project in Alexandra and DWAF site at the construction site for De Hoop Dam. During these narrative walks, people shared their knowledge and experiences (Jerneck and Olsson, 2013). Yin (2009) includes both formal and casual collection activities in observation. In this regard, my regular travel in and around the project sites have served to provide informal observation to support the more formal visits to sites. The direct observation was useful for the research in allowing me to understand the ways water is used in South Africa, to understand the magnitude of the De Hoop Dam construction and to see the technologies of water service delivery at work in Johannesburg. Observations also allowed me to understand the contexts, social relations, material practices and institutions and rituals involved in the different cases.

As a researcher from South Africa, I have a role as an insider to water governance in South Africa which gave me an opportunity to carry out participant-observation. In addition, having worked in the water sector in South Africa previously, my position as a recognised water researcher in South Africa allowed me access to workshops and meetings regarding water governance convened by different actors, including DWA. In this role, I was not simply a passive observer but had a role as an expert; a facilitator; and a resident at various times through my research. As I resided in Johannesburg for part of my research period, I was a resident of one of the case study areas. In my work with the CSIR, a research institution in South Africa, prior to starting my PhD, I was involved in many research projects for DWAF on water governance, including a study of De Hoop Dam. My personal history of having lived in South Africa through apartheid and within the democratic dispensation, also allowed me to actively participate and observe struggles over water service delivery, for example, participating in the community-led march at the World Summit on Sustainable Development in Johannesburg in 2002. In this way, I have been able to bring an intimate historical perspective to the study. Yin (2009) notes some of the biases of the role of participant-observer, especially as they relate to biases and support for particular group. As a researcher, it is important for me to be self-reflexive (Wittmayer and Schäpke, 2012). As a South African citizen, who has lived through apartheid and worked in water governance I am part of the dynamic that I seek to research and to change through my research (Wittmayer and Schäpke, 2012:7). I bring my own norms, knowledge sets and beliefs to my research. I acknowledge that my positionality with regard to my research has an influence which cannot be removed. Instead, I place myself within the context and acknowledge my normative position in wanting to foster sustainability in South Africa in a manner which is fair and just. Questions of power, justice and sustainability have thus shaped my research. In my view, there is a trade-off in being an insider or outsider and all positions carry their own subjectivities and biases. I have tried to be aware of my position and potential biases whilst working to allow my data to speak for itself.

4.3.3 Interviews

Two types of interviews were carried out during the study. The first involved in-depth semi-structured interviews with key informants selected through purposive sampling methods. These respondents were identified as playing an important role in water governance in South Africa more generally or one of the two projects. Five interviews were carried out with water sector stakeholders in South Africa, four interviews were carried out with stakeholders in the De Hoop Dam project and five interviews with stakeholders in water service delivery in Johannesburg (Appendix 1). As an insider, I had access to respondents that may not have been possible otherwise and was able to gain trust in interviews fairly quickly so that respondents may have felt comfortable to be honest rather than politically correct. All of these interviews were carried out in English. The interviews themselves were guided conversations rather than strucured queries and lasted approximately one and a half to two hours each. I used an interview guide that included questions about the interviewee themselves and their role in water governance, how they saw water governance changing in South Africa and in the case study, and what role they gave to water and their own work in the hydrosocial landscape. I also asked interviewees to describe the projects themselves to capture the language they used in the descripton. For the interviews, an interview guide was prepared to pursue a consistent line of inquiry, but the stream of questions developed in the course of the dialogue which tended to focus on particular themes such as sustainability, rights to water and the economics of the projects. Consistent with the in-depth interview method (Yin, 2009), the experts were asked facts about water governance in South Africa and the specific cases as well as their opinion about events.

The second type of interview was coupled with field observations and these were more narrative stories from people living around De Hoop Dam, in Alexandra and in Soweto. The selection of these respondents was carried out with more random sampling and was largely based on available and willingness of discussants to talk to me during my visits to the various areas. These interviews were carried out with the aid of a translator as most of the respondents spoke Sepedi or isiXhosa. During the interviews in Alexandra in 2010 I was accompanied by my fellow doctoral researcher, Maryam Nastar with whom I wote the article about power in transitions in water governance (Nastar and Ramasar, 2012). During my interviews in the Greater Sekhukhune Municipality in 2009; 2010 and 2012 I was accompanied by researchers from the CSIR, a research institute in South Africa. The purpose of these interviews was to understand the lived experience of individuals (Silverman, 2010) and to hear their personal opinions about water service delivery and the dam construction.

4.4 Data Analysis

In analysing the data, I followed the theoretical propositions that led to my case studies (Yin, 2009). My analytical frame for interpretation was built on theoretical concepts of processes of scaling. Using the different scaling processes, which I described in the theoretical chapter, I analysed the cases to identify where, how and why these processes took place and what have been the implications thereof. Processes of scaling were most often articulated through different discourses. Bryman (2008) has argued that discourse analysis can be applied to different forms of communication other than talk. I carried out discourse analysis of the data collected including the documents, interviews and observed actions of different actors. In taking a dialectical approach to discourse analysis, I applied discourse as one 'moment' in the social practices (Harvey, 2008) through which scale and governance are constituted and transformed. To a lesser extent, I also considered material practices as an additional moment in processes of scaling. I analysed my data with a constructionist approach to understand the version of reality propounded by different actors and actor groups (Bryman, 2008) and how they render this reality through scaling processes, for example, in the fracking case, an energy security discourse situated the project at the national level. I took this further to consider the way power is manifest through the production of knowledge, norms, language and scales.

To begin my analysis, I first drew from the theory to develop an understanding of how processes of scaling are manifested. Scaling can happen through framing discourses, language tools and actions in processes of scale framing, jumping, bending and fixing. I constructed four key discourses that are prevalent in South Africa through a reading of the various documents produced by actors operating at the national and international levels, particularly policy documents. The four main discourses relate to sustainability, human rights, neoliberalism and redressing past racial inequalities. I looked for the influence of these discourses in various ways in order to answer questions about processes of scaling. Three basic questions were used to relate discourses to processes of scaling, namely, what is this discourse doing to the scale of the project, how it this discourse constructed to make this scaling happen, and what resources are available to perform this activity (adapted from Potter cited in Bryman, 2008:500).

In analysing documents and texts such as speech acts, I carried out a text analysis to see how often certain words such as rights, growth, race and environment were brought up. I looked at ties and connections in the language used (Yule, 1996) such as the word dam being associated with words such as key and opening, and the word mining being associated with the words jobs and poverty. When working with statements and speeches, I examined which forum the speaker was talking at and who the intended audience was, for example State of the Nation addresses were held in parliament and addressed all citizens of South Africa as well as the international community (including

international organisations and multinational corporations). When examining written reports, I noted the literature that was referenced in the text to see if arguments were drawn from particular sources or types of resources (scientific articles, newspapers, private sector reports).

In a similar way, I analysed the language, arguments and the sources that interviewees used to understand how the different discourses were being produced and reproduced. It was important to understand where and how actors situated meaning, for example whether they spoke or wrote of water as life, water as key or water as identity. I constructed scalar implications embedded in the situated meanings, for example water as key situated the De Hoop Dam as an asset of the national economy. I used Gee's (2011) seven building tasks of language to adapt seven discourse analysis questions that I used in my analysis including: (1) what the discourse made significant and insignificant (e.g., for Johannesburg Water, water services are more important than actual water access by citizens); (2) what practice(s) are being recognised through this discourse (e.g., development of a dam creates jobs); (3) what identities were claimed for the speaker and others (e.g., for some activists against fracking, they claim an identity as guardians of resources for future generations); (4) what relations were enacted (e.g., the dam enacted a close relationship between the South African government and the mining companies); (5) what perspective of what is right/good/proper/high status is being communicated (e.g., paying for water in advance is responsible behaviour for poor people); (6) how does the discourse connect or disconnect actors and things (e.g. neoliberal growth connects government to mining companies in unlocking platinum resources); and (7) how does this discourse and language privilege or disprivilege specific sign systems or claims to knowledge or beliefs (e.g., in the investigation of fracking, scientific knowledge is more valuable than indigenous knowledge). I grouped actors into different groups based on their interest and compared how their dominant discourse compared with others within the group. I also tagged the level at which each actor saw their interest and sphere of influence, be it local, global or national and the different scales they referred to.

Next, I examined how scalar elements were brought into the discourses, for example many actors or texts that drew on a neoliberal discourse often referred to the national interest or globalisation whilst the rights discourse was addressed in connection with the individual and legal instruments such as the Constitution. In analysing the actions of different actors, I looked for the ways they included or excluded themselves in certain arenas and how they used discourses to do so. Although discourse was my main focus, I also examined material practices. I considered the practices and resources that different actors relied on such as social media, legal instruments, and supportive networks and examined which scales and levels were implicated.

I carried out the analysis by deconstructing and re-constructing the data to construct discourses, to investigate where and how processes of scaling were carried out in relation

to the decision-making process and their implications for access and allocation. From my reading of the literature and my own pre-knowledge, I also noted how discourses have evolved over time. Once I developed a map of the actors, scales and levels and discourses, I analysed the role of power. I did this by examining who benefited and who was marginalised in terms of participation and voice, the changing material benefits and costs experienced by different actors such as deprivation, ill-health and expansions of capital as well as the implications of the decisions in shaping water resource. I did this by evaluating the material consequences of water service delivery decisions in Johannesburg and the predicted consequences of De Hoop Dam and the Karoo. I analysed each case separately and then identified patterns and built explanations about the broader context of water governance in South Africa.

4.4 Limitations

The three cases chosen for this study brought unique circumstances and findings and other cases may bring different relations to the research. I do not consider this a problem as the case studies serve a particular purpose of uncovering processes of scaling and additional empirical work can only add to the richness of our understanding of politics of scaling.

In all three cases, there is on-going development in the governance of water and significant changes likely in the case of water service delivery in Johannesburg and hydraulic fracturing in the Karoo. As my interest is in the processes of scaling related to these decisions, it may be the case that additional discourses and processes of scaling will be introduced. As scales are constantly formed and transformed, I view this as an inevitable part of water governance and recognise that my work captures what has been fixed and what is in flow with respect to a particular moment in history.

4.5 Conclusion

Using a dialectical approach to discourse analysis, I was able to focus on how scaling and governance co-evolve in South Africa. I focused on processes of scaling rather than scales, which is in keeping with the idea of flows and flux. In this way, I could also shed light on the forces that led to certain 'moments' such as discourses, beliefs or material practices being relatively stable. For example, the Minerals-Energy Complex has had and continues to have a significant impact on the South African economy and this is being perpetuated through discourses about mining wealth, beliefs that mining is the best option for job creation and material practices such as the building of De Hoop

Dam. Discourses are powerful means of scale framing, bending, fixing and scale jumping and a discourse analysis thus provided me with a useful method to examine how these processes were carried out, by whom, for what purposes and with what implications. I also assessed those material practices, which were commonly used in scale fixing and scale jumping.

This methodological framework allowed me to analyse my data in a manner that opened up opportunities to focus on the questions about processes of scaling and the politics of scaling that are the focus of my research (section 1.2). The analyses of the three cases are presented in chapters six, seven and eight before some common conclusions about the politics of scaling in water governance in South Africa are discussed in chapter nine.

5. WATER GOVERNANCE IN SOUTH AFRICA

5.1 Introduction

This chapter presents the background to the historical and institutional context of water governance in South Africa. The purpose of this chapter is to lay out the context in which I have chosen to examine the politics of scaling. There are a number of reasons for the choice of South Africa as a study context and many of these are detailed in chapter four, the methodology chapter. Two particular aspects which make it an interesting choice for such a study are that firstly, South Africa is a water scarce country and secondly, that twenty years ago, the Republic of South Africa made the transition to democracy introducing new water governance strategies that are meant to strive for a more just and fair society where basic water rights are provided for all citizens. The chapter begins with an overview of the historical political economy of water in South Africa, tracing key events in the country's history that have shaped the hydrosocial landscape. This is followed by a description of the post-apartheid approach to reconstruction and development of the nation, including the main concerns of the democratic dispensation in addressing the water access and allocation concerns of all citizens. I then present the strategy of water governance that has been adopted in the context of international trends and describe the institutions that have established to achieve the goals of integrated water resources management. Finally, I describe the current status of the hydrosocial landscape in South Africa. These elements provide a context for the current socio-political environment that shapes the three case studies further on and describes how the material reality as well as the discursive representation of water in South Africa has changed over time in line with politics in the country.

5.2 A historical perspective on the political economy of water in South Africa

Peter Newell (2012) describes historical blocs as a historical congruence between material forces, institutions, and ideologies. Historical blocs represent the dialectical link between the economic structure and the ideological superstructure. In tracing the history of South Africa, I focus on the forms of regulation and authority over water that developed as a result of the hegemony of historical blocs. In considering the history of South Africa, five historical blocs can be identified, namely, pre-colonial African customary rule; Dutch rule; British rule; Apartheid and the present day post-apartheid democratic dispensation (Tewari, 2005). Each of the historical blocs reflects the interests of the dominant actors and shape how people understood what water is and what it is for (Swatuk, 2010). This in turn resulted in laws, policies and infrastructure that were developed to harness water for different social practices over time. The political-economy driving water use in the four earlier historical blocs have shaped and continues to shape the hydrosocial landscape of present day South Africa and a recounting of this past is a useful to the research.

Within the land area of South Africa, pre-colonial water rights were governed by African customary law. Water was generally considered free and who had water rights was a question only considered when there was a conflict. Water rights were closely tied to land rights and in this, tribal authorities such as chiefs controlled ownership. In the early days of European settlers, water was a common property resource and African tribes and settlers tended to leave each other alone (Tewari, 2005). With the Dutch settlement in the Cape of Good Hope in 1652, Roman-Dutch law was introduced. During the same process of settlement, local tribes were subjugated and their land and water rights taken away. Through Roman-Dutch law, the state had control over all rivers and water bodies of the Cape and rivers were considered public property (Conca, 2006). The Dutch East Indian Company, acting on behalf of the Dutch crown, controlled the waters of the southern parts of South Africa. Those with access to the land had better access to water resources but did not control the water bodies. As agricultural production was the main focus of the Dutch company, water for irrigation was prioritised. The Dutch and the British occupied the Cape until the Anglo-Dutch treaty of 1814, when the British authority was conceded (Calland, 2006). When the British took control of the Cape Colony, water rights were more closely linked to land tenure. When water flowed over land, the owners of the land had rights to use it. Individual rights to water were granted over time. This was later extended to the rest of the country. Under Dutch and British control, African customary law was ignored and tribal control of land and water was systematically destroyed.

With the Union of South Africa in 1910, the country was ruled by Afrikaaner nationalists. In 1948, the National Party, a minority Afrikaner party, instituted the policy of apartheid with separate and differentiated development according to racial categories. Water legislation in the form of the Water Act 54 was introduced in 1956 and remained in force until new legislation was developed after the end of apartheid (Swatuk, 2010). Water use which was earlier focused on irrigation needs for agriculture were shifted to support mining and secondary industries (Kidd, 2009). During this period, the mining sector boomed and new urban centres such as Johannesburg were established. Water for urban use also became a priority, especially in mineral-rich but water-scarce areas. Through the new legislation, water reverted to being a public good and water resource development was carried out in the interest of white South Africans and to the exclusion of black South Africans. This created a highly uneven hydrosocial landscape where water was directed towards meeting the needs of white urban centres and agriculture, mining and industrial elite interests. A complex inter-basin transfer scheme was designed to create water balances at the national rather than the river basin-level (Turton et al., 2008). South Africa's black population was relocated, usually to arid rural locations with limited water resources including the four independent states and the six self-governing territories (Francis, 2005). Those people living within the regulatory areas of the apartheid government remained under-serviced with water infrastructure and in many cases water was diverted from these areas into 'white' areas. As part of the South African Hydraulic Mission of the apartheid state, the hydrosocial landscape was totally transformed with large engineering works including dams and transfer pipelines as well as the artificial creation of water-rich and water-poor areas in the formation of a white core and a black periphery in South Africa. As Naidoo and Constantinides (2000:155) summarise, the formal apartheid years (1948-94) and the preceding 250 years have left a legacy of inequitable access and development of water resources in South Africa.

5.3 Post-apartheid water governance in South Africa

At the start of the 1990's, following an extended period of armed struggle and conflicts between the ruling party, the National Party and the liberation movement led by the African National Congress (ANC), South Africa was at a political stalemate. The country faced international sanctions at a time when the corporate sector was ready to engage in the global economy, following the collapse of the Soviet Union and the globalisation and integration of production processes around the world (Habib et al., 1998). This led to pressure by economic actors for the National Party to find a political resolution which would allow the economy to continue to grow and expand (Calland, 2006). A period of reforms by the apartheid government began including the un-banning of the ANC on 02 February 1990 and the release of Nelson Mandela from

prison on 11 February 1990. Early negotiations between political parties and economic actors began using the platform of the Convention for a Democratic South Africa (CODESA) in 1991. These formal negotiations alongside conflicts within and between political parties, trade unions and corporate actors as well as civil strife continued through a transition period until the first democratic elections in 1994 when a government of national unity was voted into power through the first democratic election in South Africa (Calland, 2006). The government of national unity represented a coalition between the National Party, the ANC and the Inkatha Freedom Party (IFP) as well as representatives from other smaller political groups. A proportional system of representation based on the party list was used and through this system, the ANC received the majority representation in all constituent assemblies (Habib, 2013). Nelson Mandela became the first democratically elected president of the country with FW De Klerk of the National Party, the deputy president.

Linked to democracy and the re-introduction of South Africa into the global community, so to speak, there came expectations regarding environmental protection, social development and economic growth in the country (Woodhouse, 2012). In 1994, the newly democratic South Africa emerged onto the global scene in a period of great environmental consciousness following the 1992 Rio Earth Summit. At the same time, neoliberal development was entrenched as economic actors sought to position the country in rapidly integrating global markets. The economic development of the country, shaped by the Growth, Employment and Redistribution Strategy (GEAR) was firmly a neoliberal agenda coupled with good governance driven by the dictates of the Washington and post-Washington Consensus (Habib and Padayachee, 2000; Fine, 2009; Peet, 2002). The international community looked to South Africa to become a role model in Africa and for the Global South by being both environmentally progressive as well as advocating neoliberalism (Fallon and Pereira de Silva, 1994).

Within South Africa, there was a sense of hopefulness that the new government would redress to the many of the injustices and inequalities established through colonialism and perpetuated during the apartheid era (Robins, 2008). As a water scarce country where water was seen as a tool to be engineered to meet the purposes of the Total Security Strategy, water access and allocation had led to deprivation for millions of South Africans (Turton, 2000). The institutions of water service delivery during apartheid were skewed to meet the needs and wants of the economy, led by the minerals and energy sector as well as the white population of the country (Fine and Rustomjee, 1996). The water needs of the so-called Black, Indian and Coloured populations as well as concerns for the state of rivers and environmental conservation where low priorities delegated to secondary administrative units such as homeland authorities. The new ANC-led Government faced significant challenges of water service provision, with approximately 15 million people without access to safe water and 20 million without access to adequate sanitation (Nastar and Ramasar, 2012). There was thus a need to provide basic water and sanitation services to large parts of the population, re-organise

the architecture of water institutions to cater for all citizens in a democratic nation, as well as implement a sustainable development mandate for water in accordance with chapter 18 of Agenda 21: Protection of the quality and supply of freshwater resources (UNCED, 1992).

Although a coalition government was formed to some extent in 1994, the tripartite alliance of the ANC, the South African Communist Party and the Congress of South African Trade Unions has been the ruling party in South Africa and continues to be so, garnering 65.9% and 62.1% of the votes in the 2009 and 2014 national elections respectively (IEC, 2014). The ANC's Manifesto as well as the Reconstruction and Development Programme (RDP) put forward by the party became the guiding policy instruments in the democratic dispensation. The RDP was based on six principles, namely: to address the whole problem, not just part of it; to be based on the needs and energies of all our people; to provide peace and security for all; to build the nation; to link reconstruction and development; and to build and strengthen democracy (GSA,1994). One of the five key programmes of the RDP was meeting basic needs and in terms of water, the RDP planned to supply 20 to 30 litres of clean water each day to every person within two years, and 50 to 60 litres a day within five years from a point no more than 200 metres from their dwelling. A commitment was made that all homes must have sanitation and household waste collection within two years (GSA, 1994:80). A further programme of the RDP was centred on developing the economy. It should be emphasised that the environment and sustainability challenges where not explicitly recognised in the anthropocentric, human development-oriented RDP.

In summary, post-apartheid water resources management in South Africa has been focused over the last twenty years on redressing imbalances of the past in terms of water access, creating a new architecture and institutions of resource management as well as remaining internationally competitive through the economy and globally progressive in terms of sustainable development. In meeting national needs whilst adhering to international standards, South Africa has tried to position itself as a developing country leader (GSA, 1994). Already established as a global political and social leader following the successful liberation movement and transition to democracy, South Africa also sought to find favour with the international economic community as an economic powerhouse on the African continent and within emerging economies as part of BRICS (the association of five emerging national economies, namely, Brazil, Russia, India, China and South Africa) (Besada, Tok and Winters, 2013). In order to be accepted as a stable and trusted economic partner and to create an investor-friendly environment, good governance principles and neoliberal practices where encouraged. The decision by the Government of National Unity to accept the apartheid debt stands as an example of a strategy to secure the credit rating of the country, ensure future borrowing potential and encourage direct foreign investment (Gibson, 2011). When it came to the water sector, global environmental governance discourses provided the foundation for new

water institutions in the country so that South Africa aligned with international discourses.

5.4 The hegemonic reign of water governance

Drawing heavily on the international discourse on water governance and guided by international organisations such as the World Bank and the Global Water Partnership, the ANC-led Government of National Unity developed the new institutions and architecture for water resources management in the early 90s (Schreiner and Hassan, 2010). The influence of global water governance norms is clear in the way water policy and legislation has been drafted.

The Constitution for the Republic of South Africa (Act 108 of 1996), as the supreme law of the country set the guiding principles for water use and in effect also shaped notions of the hydrosocial landscape (GSA, 1996). In section 24 of the Bill of Rights, ecological sustainability and protection of the environment for human well-being is captured in the right to an environment that is not harmful to their health or well-being; and to have the environment protected, for the benefit of present and future generations. Section 27 of the Bill of Rights states that everyone has the right to sufficient food and water (GSA, 1996). This right to water and the responsibility it places on government is however tempered by a caveat stating that the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights.

The translation of these rights into legislation and water management strategies followed the enactment of the Constitution. The Constitution also provided guidance through the call for Co-operative Government (see Chapter five). Through the Constitution, the formal structures of government were divided into three jurisdictional levels namely, national, provincial and local spheres, which are distinctive, interdependent and interrelated (GSA, 1996, 1267). The main authority for water sits at the national level and is the Department of Water and Sanitation (DWA) (since 2014), formerly the Department of Water Affairs and Forestry (DWAF). As per the mandate for co-operative government, other government departments have shared responsibility for water services and resource management.

The different roles, responsibilities and institutions are laid out in the National Water Act 36 of 1998 (GSA, 1998a) and the Water Services Act 108 of 1997 (GSA, 1997). The Water Services Act, which was promulgated first, adopts decentralisation as a key element. Local and district municipalities are responsible for water service provision while national government has an oversight and standard setting role. The Act delineates the provisions for regulating the activities of water service providers, focusing

on the roles and functions of the various water and sanitation services institutions (GSA, 1997). The key objective is to ensure the effective partnerships between various water institutions to ensure sustainable water use in the country (Tewari, 2005). The preamble to the Act makes two noteworthy claims regarding the right to water and the need for cross-scalar governance by "recognizing the rights of access to basic water supply and basic sanitation necessary to ensure sufficient water and an environment not harmful to health or well-being; and acknowledging that there is a duty on all spheres of Government to ensure that water supply services and sanitation are provided in a manner which is efficient, equitable and sustainable" (GSA, 1997, Preamble).

The National Water Act codified the overarching framework policy for water resources management in South Africa. The law repealed more than 100 prior water laws dating to 1914 (Conca, 2006). Considered one of the most progressive pieces of water legislation in the world, the Act reiterates the intention of the then-new government to meet basic needs, promote equitable access, redress historical discrimination, facilitate development, protect the environment, and meet international obligations (Conca, 2006). In keeping with international norms of IWRM, the Act addresses the four Dublin Principles as follows:

Principle 1 - Freshwater is a finite and vulnerable resource: The Act provides a classification system for different levels of environmental protection based on the vulnerability of the system and defines a Reserve which is the minimum quantity and quality of water required to meet human needs for drinking water, food preparation and hygiene (the basic human needs reserve) and to protect aquatic ecosystems (the ecological reserve) (GSA, 1997). A permit system for water use is also meant to address the finite nature of water by allocating finite resources in a sustainable manner.

Principle 2 – Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels: In order to foster participation in water management in South Africa, catchment management agencies and water user associations are to be established under the Act to delegate responsibilities to regional, catchment and local levels and to involve a wide range of stakeholders in the process. The Act also recognises the need for participation in transboundary waters by authorising the establishment of bodies to address international water management (Mirumachi and van Wyk, 2010).

Principle 3 – Women play a central part in the provision, management and safeguarding of water: This principle is not as specifically addressed in the National Water Act although there is a broad call for recognising women as previously disadvantaged as well as a vulnerable groups requiring special attention in participatory processes. Studies have shown that when women participate in formal processes, they are unable to influence decisions within unequal power relations of ownership and control of resources (Mjoli, Nenzhelele and Njiro, 2009).

Principle 4 – Water has an economic value in all its competing uses and should be recognized as an economic good: The Act created a system for water-use charges which included user pays and polluter pays mechanisms. The Minister has the authority to set fees and to differentiate them across geographic areas, categories of users, or even individual users to promote social equity. The permit system used to license bulk water user is also operated on a user pays system to accrue revenue for the state.

In practice, the National Water Act led to new implementation strategies for water access and allocation. Water marketization norms have gained a strong foothold with efficiency and effective use of water being promoted (Swatuk, 2010). Full-cost recovery, privatization of water services and assessment and re-consideration of permits with fees were quickly instituted. One exception was the agreement on a free basic water provision for all citizens. In 2000, Minister of Water Affairs and Forestry, Kader Asmal announced the policy of free basic water for all South Africa. Starting in 2001 an amount of 6000 litres per household per month was recommended based on 25 litres per person per day for a household of eight (DWAF, 2002). However, no additional financial support was allocated to municipalities to meet this demand and thus financial constraints have affected the implementation of this policy (DWAF, 2002). The implementation of participation strategies has been much less successful than the marketization drive (Schulze, 2004). Few Catchment Management Agencies have been established and very few legitimate Water User Associations affect decision-making in their catchments. The role of women is still reduced to domestic water users and subsistence producers and women's active role in decision-making institutions is limited in quantity as well as influence (Ngorima, pers.comm., 2010). Mehta et al. (2014) suggest that 15 years down the line from the National Water Act, the implementation of IWRM has proved a tough challenge in South Africa.

5.5 The current state of water resource use

In the decade and a half under the National Water Act, the hydrosocial landscape of South Africa has changed through the reform process. South Africa continues to be a water scarce country (Figure 4) and likely to grow more so with climate change (DWA, 2013). Average annual precipitation is 480mm and it is part of the region that has the lowest conversion of mean annual precipitation to mean annual runoff (approximately 10-15%) which means that most of the precipitation is not captured in useable forms in bodies of freshwater (Turton et al., 2008). The sites of all three of the case studies are in the drier parts of the country. South Africa's water usage typically comprises 77% surface water, 9% groundwater and 14% re-use of return flows (DWAF, 2013b).

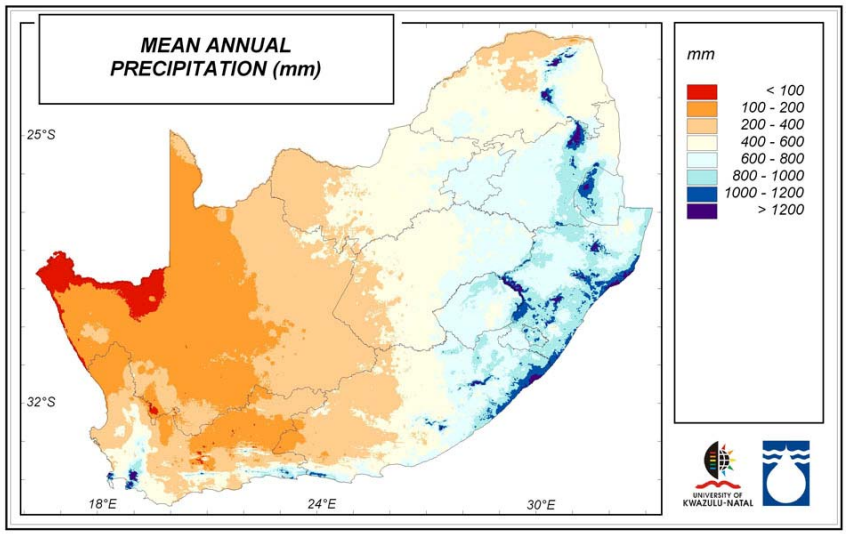

Figure 4. Mean annual precipitation across South Africa (SARVA, 2011)

Water management is divided into nine water management areas and there are 44 district municipalities and 226 local municipalities responsible for water services. In order to provide water across the country there are currently 28 inter-basin transfer schemes with a total transfer capacity of 7 billion m^3 of water per annum (DWA, 2013b). Basson et al., (cited in van Koppen and Schreiner, 2014) suggests that in seven of the nine provinces more than 50% of water is provided by inter-basin transfers. This has significant implications for water allocation and infrastructure projects such as the De Hoop Dam, which is a case investigated in this research.

Van Koppen and Schreiner (2014) provide a useful picture of the effects of the water governance transition on water access and allocation in South Africa. They note that between 1994 and March 2004, the government invested a total of ZAR 14.8 billion in water and sanitation services (equivalent to approximately USD 1.3 billion). This resulted in an improvement in access to basic water supply services from 59% of the population in 1994 to 83% in 2005. In 2013, the then Minister of Water and Environment, Edna Molewa claimed that this figure had risen to 94% however this claim is disputed (Cunliffe-Jones, 2013). This claim is further investigated in the research and discussed in the case study of water service delivery in chapter 7. Cost recovery strategies for water use have had more limited success with only 43% of the amount due collected in 2012 (Van Koppen and Schreiner, 2014). In terms of ecological sustainability, an exercise was carried out to determine the ecological reserve of South Africa's rivers. An average of 20% of mean annual runoff was considered necessary environmental flow. Given the usage in most rivers, almost all basins are now considered stressed. Enforcing this flow requirement has proven difficult (Van Koppen

and Schreiner, 2014). The issue of the ecological reserve will be considered again in chapter 6 where it is raised as an issue in the environmental conflict over De Hoop Dam. In terms of water-use authorisations and re-allocation of permits according to the National Water Act, the progress by government on addressing historical inequities is dismal. Out of the 4284 water-licenses issued between 1998 and 2012 for new water uptake, only 1518 were for historically disadvantaged individuals. A historically disadvantaged individual is someone who, due to the apartheid policy that was in place, had no voting rights in the national elections prior to the introduction of the Constitution of the Republic of South Africa, 1983 (Act No. 100 of 1983) or the Constitution of the Republic of South Africa, 1993 (Act No. 200 of 1993) ("the interim Constitution"), and/or who is a woman, and/or who has a disability. The total volumes allocated to historically disadvantaged individuals were very low: just 1.6% of the total water allocated through licenses (DWA, 2013c). The establishment of participatory fora such as Catchment Management Agencies (CMAs) also stalled with only two out of 19 being functional in 2012. A subsequent decision was made to establish only nine CMAs instead of the 19 envisaged in the National Water Act (Van Koppen and Schreiner, 2014).

5.6 Conclusion

South Africa's social, economic, political and ecological history has created a hydrosocial landscape that is one of winners and losers in terms of water access and allocation. Changes in water governance, post-apartheid, are meant to address many of the inequalities that were established in the past. However, the past continues to affect the present and the future. In addition, processes of globalisation are strongly influential on the current models of development in the country, notably neoliberalisation and IWRM. The internalisation of IWRM and global water governance norms into national policy in South Africa, the shift from national to regional bodies for transbounday waters and the decentralisation of water service delivery to local municipalities in South Africa illustrate that there can be movement up and down the administrative or jurisdictional scale. There are thus a range of scales and levels influenced by and influencing water governance (Gupta, 2014). How scales and levels are formed, transformed and contested through the everyday processes of water governance may be used as a lens to understand the workings of scalar politics embedded in environmental governance.

6. FOR WHOM THE WATER FLOWS: THE CASE OF DE HOOP DAM DEVELOPMENT

6.1 Introduction

In this chapter I present the first of the empirical cases of scaling in water governance. I look at the contestation associated with the decision to approve the De Hoop Dam development on the Steelport River. I begin by describing the project and highlighting the conflict over the decision to approve the project. This is followed by a discussion of the different forms of scaling that were used in the conflict by different actors and actor coalitions in an attempt to manipulate scale. In promoting or contesting the dam development, numerous actor groups were involved. The main promoters of the dam were the Department of Minerals and Energy (DME) (now the Department of Mineral Resources (DMR)) and a coalition of platinum mining companies. The main critics of the project came from environmental groups such as Endangered Wildlife Trust, Geasphere and representatives of the Kruger National Park. Less vocal but most directly affected by the project are the residents who live at and around the site of the dam. The provincial and national environmental departments were the decision-makers in the approval process. In analysing processes of scaling in this case, I drew from numerous sources including documents, in-depth interviews with key informants, interviews with local residents and observation. Important documents included project planning documents, and those related to the decision making process including all of the environmental assesment reports, the record of decision and the appeal statements. Statements and speeches made by government officials were useful for highlighting the main discourses of the promoters of the De Hoop Dam.

6.2 Context of the De Hoop Dam project

The De Hoop Dam project was to be built as a national priority, as announced in the President's State of the Nation Address in 2005. In conjunction with the DME, DWAF took the responsibility for the implementation of the De Hoop Dam project. Eskom also plans to build a new hydropower station that will be supported by the dam. The dam was conceived as part of the Accelerated and Shared Growth Initiative for South Africa (ASGISA) (Mlambo-Ngcuka, 2006). ASGISA is the strategy by the national government to half unemployment and poverty by 2014 (something which has not been achieved). Accomplishing this depended on achieving a 6-percent growth per year by 2010. A strong neoliberal capitalist programme was put in place with projects to maximise capital development (Habib and Padayachee, 2000; Peet, 2002).

On 26 May 2008 the Minister of Water Affairs and Forestry, Mrs Lindiwe Hendricks, signed a Memorandum of Agreement (MOA) with mining companies, the arrangement forming the founding agreement for the funding and implementation of new water infrastructure to meet the needs of mining, commercial and social users located in the project (DWA, 2014). This new scheme would assist the mines in exploring the mineral resources of the eastern bushveld area of the Limpopo Province (DWAF, 2004a).

De Hoop Dam, is a bulk water supply project of the DWAF, situated on the Steelpoort River, a tributary of the Olifants River, in the Limpopo Province of the Republic of South Africa (Figure 5). The De Hoop Dam covers an area of about 1 690 hectares and is able to store 347 million cubic metres of water (Heinsohn, 2005). The Steelport River may not be considered a major river in South Africa but the Olifants River is an important water body in the region. Further downstream, the Olifants River flows through the Kruger National Park and across national borders into Mozambique making it a transboundary river.

Work started on the De Hoop Dam in July 2007. Delivery of the first water from the dam was expected by April 2011, but was delayed until March this year due to various problems including worker strikes (Tau, 2014). A large part (approximately 60%) of the water from the dam is expected to supply newly established mining companies (platinum mines) while the rest will supply Burgersfort and some parts of Polokwane. The surrounding communities will also benefit with a potable supply of water from the dam. Other users will include Eskom and a host of water supply authorities who will be responsible for the treatment and distribution of water to the domestic sector.

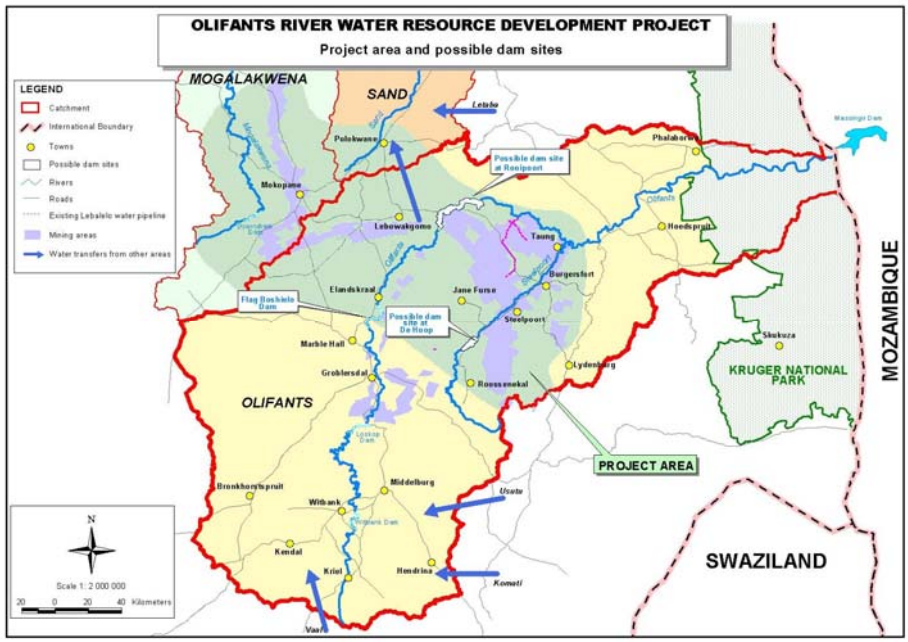

Figure 5. Site of the De Hoop Dam (ACER Environment Management Consultants /CSIR Environmentek, 2004)

The dam is located in a rural part of South Africa. The dam lies within Elias Motswaledi Local Municipality (LM), part of the Greater Sekhukhune District Municipality (DM). According to the Greater Sekhukhune DM 2004/2005 IDR Review (2004) the DM is made up of five municipalities with a population of about 1 125 000. Of the total population, 95% live in rural areas. Much of the area was formerly part of the Lebowa homeland for the Pedi people and the legacy of the apartheid lack of investment in homeland areas is evident. About 66% of the people have no formal education. The largest of the local municipalities, the Greater Tubatse LM (a largely black community), has a population of between 500 000 to 800 000 (Greater Sekhukhune DM, 2004). It is a cross-border municipality with Burgersfort (a mainly white community) as its seat. The contrasts between the living standards of the two areas is a stark reflection of the patterns of development and deprivation that have formed in South Africa.

The main economic sectors are mining, tourism, small business, irrigated commercial agriculture and livestock farming. Mining is one of the major sources for employment even though skills are limited within the area. Platinum, chrome, vanadium, andalusite, silica and magnetite are all mined in the area (Makara and Motebang, 2005). However, even though there are all these economic activities in Greater Tubatse, unemployment is about 69% and 84% of the population is defined as poor i.e. a household earns less than R1500 a month (Greater Sekhukhune District Municipality 2005). The bulk of businesses are owned by white and black (due to black economic empowerment

projects in the region) elite while many of the black working class lack jobs. Subsistence farming in the study site is threatened by sparse rainfall and high evaporation rates (Ziervogel and Taylor, 2008).

Water is scarce. Water for the bigger towns is pumped from the rivers and is then treated (Claassen, 2005). However Ohrigstad and the rural areas have relied on boreholes some of which I observed to be not operational. There are scattered communities between the two towns of Roossenekal and Steelpoort. Some of these were farm workers on the properties bought by the Government, and who are still to be re-settled. In the past many of them were provided with borehole water by the farmers, but, since the farmers left, these boreholes no longer provide water, and the former farm workers now rely directly on local rivers and nearby streams (Claassen, 2005).

6.3 Controversies of the De Hoop Dam project

Any project that affects the flow of a river, such as the construction of a dam, has to be subject to an Environmental Impact Assessment (EIA) according to the National Environmental Management Act (Heinshon RD et al., 2005). According to co-operative government policies, the Ministry of Environmental Affairs and Tourism was responsible for EIA legislation. The authority to approve EIAs is delegated down to provincial environmental departments.

An EIA was performed, and a positive Record of Decision (RoD) was handed down by the Department of Environmental Affairs and Tourism (DEAT) on 22 November 2005 (DEAT, 2005). This was despite there having been six objections against the development lodged with DEAT – these being from South African National Parks (SANParks) and from five NGOs and private individuals (DEAT, 2006a; Couzens and Dent, 2006).

The building of the dam was to go ahead. The six parties lodged an appeal against the RoD however the Minister upheld the original decision (DEAT, 2006b). He concluded that the need for the dam had been demonstrated, with there being 'no viable alternative to a supply-side solution for the demands envisaged on the system' (DEAT, 2006b:6). He also concluded that the construction and operation of the dam will, however, '…have definite and substantial detrimental impacts on the environment'; and that the 'substantial impacts cannot, therefore, be avoided, but measures must be put in place to mitigate the potential impacts to acceptable levels'(DEAT, 2006b:6).

A number of legitimate concerns were raised through the EIA process as well as the appeal. Key concerns related to loss of stream flow for downstream water users such as the Kruger National Park and Mozambique; relocation of people and cultural sites; loss

of endemic species; potential indirect impacts of the increased mining on water quality; and quality of the participation process (Acer (Africa), 2004; DEAT, 2006a).

One of the main concerns raised by a coalition of NGOs was the risk that the dam posed to the Kruger National Park, South Africa's premier nature reserve, (Tempelhoff and Tempelhoff, 2007). By daming and diverting river flows, there is a risk that the river flow in the Park could stop completely as occurred during drought periods in 2005 and 2007. The concern was that this would have significant detrimental affects on the riverine ecosystem as well as plant and animal life in the park that depend on the river for water (Heinsohn et al., 2005). The Endangered Wildlife Trust (EWT), the National Parks Support Group (NPSGT), the South African Water Caucus (SAWC) and Geasphere of Mozambique all predicted that the proposed development would cause irreparable environmental damage and raised their concerns during the EIA process as well as through appeals against the decision to go–ahead with the dam (DEAT, 2006b).

DWAF identified the land necessary for the construction of the dam during the planning phase of the project. The site of the dam was selected because of three rivers, the Steelpoort River, the Masegedi River and the Klip River, flowing into the area. The land identified belonged to the community of the Tsehla Trust, requiring government to purchase the land from the Trust (DWAF, 2004a).

One of the necessary activities during the construction of the dam has been the identification and relocation of graves belonging to the local communities (Murimbika, 2005). Relocation was carried out by the government in consultation with the community leaders. In addition, a number of gravesites will have to be relocated. A total of 109 archaeological sites, dating back to the Stone Age and Iron Age, will vanish to the bottom of the dam (Heinsohn et al., 2005).

The dam will cover a surface area of 1690ha and 295 endemic plant species will be jeopardised in the process. Five of the species, in the Sekhukhuneland region, are on the endangered red data list. Some 50 000 tonnes of plant material will disappear under the water (Palmer and Engelbrecht, 2005). DWAF officials have offered to relocate plants to the eastern parts of the dam site however in my interview with Dr King former head of the Endangered Wildlife Trust, he said that forty-three experts do not consider this feasible (King, pers. comm., 2009).

NGOs remain concerned that the Government has not discounted all the proposed mining activities in its planning for the region (King, pers.comm., 2009). It implies that sustainability is shifted to the backburner in favour of short-term economic growth. There is consensus, among the NGOs, that the Government has been over-hasty in accepting the environmental impact assessment study. According to Tempelhoff and Tempelhoff (2007) NGOs claim it is because the mining companies put pressure on the Government.

Although the government insist that the dam will benefit local residents through access to safe water supply and jobs, opposition parties and a few communities argued that mining companies would benefit the most from the De Hoop Dam.

In nearby communities, residents are adopting a "wait-and-see" attitude. During my interviews with residents in Kutung village in 2013, about 3km from the dam, some residents expressed the view that they were glad some of them had found jobs during the construction phase, but that their work was now done.

A young female resident of the area said: 'The last time we had water coming from taps here was late last year. Now all we see are big [bulk supply] pipes being laid past our village. We ask ourselves why the water is now going towards Steelpoort mining areas. We have become used to fetching water from the nearby river and people get sick from that water. Until we see regular water supply, we remain without much hope', she added (Field notes, 2013).

Although Zitholele Consulting in conjunction with Golder Associates were appointed to undertake public participation in support of the environmental investigations and authorisation process as part of the EIA team, both local and international stakeholders felt there were not adequately involved in the process. During field visits to the communities surrounding the dam many people said they had not participated in any public meetings. A site visit of the dam did include a visit to the De Hoop Dam community centre – this was built to promote community involvement in the dam development however it was empty at the time of my visit. During the appeal process of the EIA, an evaluation of the public participation process was carried out by two experts who found that the South African government did not have proper deliberations with its Mozambiquen counterparts (Seaman and Bruwer, 2006). It would seem that transboundary water concerns were ignored during the EIA and approval process for the dam.

In terms of transboundary impacts, the dam could have an effect on the downstream users of the Olifants River in Mozambique. Mozambique's Massingir Dam is currently experiencing problems filling and this would be exacerbated by the De Hoop Dam restricting water flows upstream. During our interview, Philip Owens, the South African representative of Geasphere, a Mozambiquen NGO raised concerns about what this would mean for political relations between the two countries (Owens, pers.comm., 2009).

A telling point regarding the EIA process and its status in government is that during a report from the economic cluster of national ministries, Minister of Public Enterprises Alec Erwin said "there has been progress on environmental authorisation to the satisfaction of relevant parties" - despite the fact that the EIA process has not been completed. It was suggested that the dam 'would be completed by 2010' (Morrill, 1999:10). This demonstrates that the development was seen as a fait accompli and

DWAF was only paying lip-service to the environmental regulations as there was the assumption that an approval would be given regardless of the outcomes of the assessment.

6.4 Scaling dam development

In this section, I look at how processes of scaling were used during the approval process for the dam and subsequently to justify the development despite the potential negative impacts. Discursive tools were used as part of scale framing to create a discoure about the dam and its meaning for South Africa as a whole and for the region more specifically. Scale bending was used to create an enabling environment to ensure the dam development was realized and at moments of direct conflict, scale jumping was used to appeal to actors and institutions at different scales.

6.4.1 Scale framing

In advocating and justifying the dam, a number of scale frames were created. The dominant frames put forward by the government were around national economic interest. A supplementary framing of the dam was around poverty alleviation. The dam was seen as being able to achieve economic growth stimulation as well as poverty alleviation in the region. During a Water Week event in Sekhukhune in 2012, Water and Environmental Affairs Minister Edna Molewa said De Hoop 'will help to transform the lives of the people' in the region (DWAF, 2013d:1). In using the language of transformation, this statement reflects the discourse of redressing historical inequalities.

A related frame advocated by the Department of Minerals and Energy was the linking of water to platinum wealth. Water was connected to mining and seen as essential to mobilize the platinum resources in the province. Hendricks (2008:3) said that 'Through the public sector investment and development of the water resources in the Limpopo region, we are unlocking significant potential in the mining industry that will create sustainable jobs and contribute to economic growth'. Executive committee chairperson of the water management association of 23 mining houses stated that 'Without working jointly and collectively we could not unlock the resources in the province. Industry has taken hands to ensure these dreams will materialise', commented Pelser (cited in De Bruyn, 2008:1). The langauge of these two statements reflects the significance of the dam as a catalyst or key with the repeated use of the word 'unlock'. The two statements also enact the relationship between the public and private sectors as well as making the connection between them a requirement for fulfilling the 'dream' of economic growth. This serves to build the neoliberal governance discourse in South Africa.

The image of national development was used to push through an idea of what is appropriate and necessary in the province. In line with the shift from the RDP towards GEAR and a more neoliberal growth strategy for the country, there was a strong call for high economic growth to end poverty (Habib, 2013). For a developing nation faced with redressing the inequalities of the past, this formed a powerful vision. However the understanding of development is tied very strongly to a neoliberal capitalist expansion vision and ignores the foundations of sustainable development enshrined in the Constitution. The then Minister of Water Affairs and Forestry, Minister Lindiwe Hendricks, during the signing of a memorandum of agreement for the Olifants River Water Development Plan stated that 'By addressing key risks through ensuring suitable project design, legal arrangements and appropriate financing instruments we have yet another "bankable" water infrastructure project which the financial sector can participate in' (Hendricks, 2008:1). The language is not about sustainability but about financial costs and benefits and appropriate technological and financial solutions. The very use of the word bankable situates the meaning of the dam as one of economic value. This can serve to exclude ecological and social values. The lack of consideration of sustainability in development in South Africa was further emphasized by this quote from President Thabo Mbeki who attacked green laws, saying they were causing development delays that had contributed to 'a quite considerable slowing down of economic activity' (Macleod, 2006:8). This can be viewed as a counter-discourse to the sustainability discourse of the National Environmental Management Act (NEMA) (GSA, 1998). At the opening of the dam, President Zuma said that 'The opening of this dam confirms the good story of our country, the story of development and progress that our country has achieved since 1994' (Zuma cited in Tau, 2014:4).

Counter-scale frame used by environmentalists appealed to environmental concerns. Drawing on the National Water Act, they raised objections to the dam because of the effect on the Ecological Reserve. The dam was seen as a barrier that would lead rivers into the Kruger National Park. In doing so, the man-made construction of the dam was likened to the 'natural' droughts of 2005 and 2007 (Tempelhoff and Tempelhoff, 2007). This deliberate coupling called on people to remember the devastating effects of these droughts and use these to envision the future scenarios for the river with the dam in operation. Relating to the lived experience of people connects the dam with past bad experiences. This environmental counter-scale was however pitted against economic and social development needs of the province and thus lost out despite the predicted loss of endemic species and the Kruger National Park being of international biodiversity value. Echoes of an apartheid history made it easy to negate the concerns of mainly white environmentalists in favour of development that would supposedly benefit poor, black people.

6.4.2 Scale bending

When the United Democratic Movement (UDM), a political party in South Africa, raised concerns about the dam development and the benefits to local communities, the response from DWA spokesperson Mava Scott was to shift the focus from the local issues surrounding the dam and refer rather to the larger catchment-level development plans. 'The UDM is advised to study the entire Olifants River water resources development programme to understand the main purpose of the regional scheme, which in essence seeks to provide water for rural domestic purposes and urban use' (Scott cited in City Press, 2013:1). In this instance, it suited the department to suggest that critics think on the broader scale of the overall Olifants catchment, thus raising the IWRM discourse of catchment basin-level governance. However, it must be noted that no strategic assessment of the Olifants River Basin was carried out before the approval of the De Hoop Dam or the decision to stimulate mining activities in the region. Indeed, in 1992 Dr Neels Kleynhans, at the Institute for Water Quality Studies at DWAF noted:

'Met inagneming van al sy probleme is die Olifantsrivierstelsel seker een van die beste voorbeelde, indien nie die beste nie, van 'n opvanggebied wat gebruik, verbruik en amper opgebruik is' (Kleynhans cited in Tempelhoff and Tempelhoff, 2007:152).

[Translation by Tempelhoff and Tempelhoff (2007:152): Given all its problems the Olifants River system is perhaps one of the best examples – if not the best – of a river catchment that has been used, consumed and almost depleted.]

Thus the scale for consideration of the costs and benefits of the project were contracted and expanded in different ways to justify the project. This is an example of scale bending where the scale under consideration is sometimes considered local to the Steelpoort River and at other times to the catchment of the Olifants River.

6.4.3 Scale jumping

In the first instance of scale jumping we see a shift in the jurisdictional scale of decision-making. According to the National Environmental Management Act, EIAs are usually approved at the provincial tier of government (GSA, 1998b). The decision on whether a project should go ahead (and under what conditions) or not, is seen to be appropriately handled by provincial bureaucrats who have sufficient expertise, a strategic perspective on development approvals in the area, as well as local knowledge of the socio-economic and biophysical environments in which the project will be developed (GSA, 1998b).

Elevating the De Hoop Dam EIA to the national DEAT for a decision can be seen as an example of scale jumping. The review and decision-making on the EIA could have been raised to the national level for two reasons. Firstly, the magnitude of the dam warrants evaluation by specialized experts and secondly, the framing of the dam as a

national project meant that it required national approval. Both can be seen as legitimate reasons for scaling up the decision-making process.

However, if one considers the impact of this move, it could be argued that the national department, DEAT has a more direct mandate to act in the national interest than provincial government. The Minister of Environmental Affairs and Forestry also has more direct engagement with DWAF, DME and the Department of Public Enterprises, as well as their respective Ministers who were championing the project (DEAT, 2005a). Both these factors create an environment were it would have been far more difficult to stop the project completely. The relationships between the national departments elevates the significance of the dam to the national level. A further perspective communicated by the practice of shifting the decision-making to the national level is that there is an underlying assumption that the national juridictional level of environmental affairs is more capable or appropriate to make a decision on this matter than the provincial level. This potentially enacts a dynamic in the relationship between the national and the provincial that the national knows better.

In a second instance, we see scale jumping evident in the project. In the planning stages of the dam development, the Minister of Water Affairs and Forestry signed an agreement with 23 private mining companies to invest in the construction of the dam and its supporting infrastructure (Hendricks, 2008). Bulk infrastructure such as dams is the domain of the government who has responsibility for water resources, a public good. By creating a public-private partnership to finance the dam, private sector actors behaved as state actors and this can be seen to cross jurisdictional scales and levels. This MoA serves to strengthen the neoliberal discourse as well the as the view of the South African government as a neoliberal state. The mining companies operated in a national space instead of the space of their physical operations as well as taking responsibility for financing that would normally be outside their domain. This coalition of government and mining companies served to further build the scale frame of water as essential to unlocking the mineral wealth of the region. It also reinforces the relationship between the public and private sectors. In addition, the two funding streams may have given more financial stability to the project. Interestingly, it has been reported in the media (Tau, 2014) at the launch of the dam in March 2014 that none of the private actors had contributed to the ZAR 4 billion costs of the De Hoop Dam project.

Another case of scale jumping related to financing is the offer by DWAF to contribute to the infrastructure costs for water service delivery to households in the area. Without this support, it may have been impossible for the poor municipalities to realize the goal of drinking water provision to poor households around the dam. Allocating money to support these municipalities is a commendable and necessary commitment if the dam is to make any difference to the water needs of local people. However, there are many municipalities across the country who face similar problems of budgetary constraints preventing water service delivery, especially in rural areas. The choice to make a special

financial arrangement to support the local and district municipalities around De Hoop Dam cannot be seen simply as an act of generosity. This support certainly makes the dam more acceptable to local stakeholders.

6.5 Conclusion

The case study of the De Hoop Dam development shows how different interest groups use processes of scaling to influence the decision-making on the Environmental Impact Assessment for the dam. Most powerfully, scale framing was used to create a discourse of development in the national and local interest. In the process, alternative options such as use of groudnwater resources for local drinking supply and the concerns raised by actors representing environmental and transboundary interests about the ecological reserve and downstream user rights were dismissed. Processes of scaling were pervasive throughout the project and continue to be so, shaping water governance discursively and materially and changing the hydrosocial landscape in favour of mineral interests.

7. SERVICING THE 'POORS': WATER SERVICE DELIVERY IN INFORMAL SETTLEMENTS IN JOHANNESBURG

7.1 Introduction

In this chapter I present the second case which deals with water service delivery in informal settlements. I chose informal settlements to understand how people with low incomes in former black townships, self-titled as 'the poors', are supported with water services by the state and its related institutions such as privatised water service delivery companies (Desai, 2002). People living in informal settlements have historically been some of the most disadvantaged and therefore issues of rights and addressing historical inequalities arise. Looking across spatial, jurisdictional and policy scales, I provide an overview of water service delivery in democratic South Africa and how the vision of meeting basic human water needs has been realised in the city of Johannesburg. Two specific examples of disparate water service delivery within the city are highlighted as examples where scaling processes are active in what is recognized as a multi-scalar urban setting. These are the installation of pre-paid water meters in the Phiri neighbourhood of Soweto and the initiation of the Alexandra Renewal Project (ARP) in Alexandra. I began my data analysis process of the case by first examining the national legislation related to water from relevant national government department in South Africa. In examining the data for this case, I used in-depth interviews in Johannesburg as well as interviews with residents of Alexandra and Soweto. I examined important documents from the City of Johannesburg and Johannesburg on their water programmes as well as the Water Services Act. For the legal case in Phiri, I explored the legal documents, media coverage of the case as well as secondary data from research projects on the legal case. In the analysis I identified discourses and material practices to show how scaling has been used to manipulate water service delivery with resultant inequalities across the city.

7.2 Post-apartheid water service delivery

In keeping with the shifts in policy in the 'new' South Africa, many of the water experts that I interviewed acknowledged that IWRM-influenced water governance has shaped the delivery of water services to individuals and households (Bhagwan, pers.comm., 2011; Muller, pers.comm., 2009; van Koppen, pers.comm., 2009). Stemming from IWRM thinking, the two principles of water as a human right and water as an economic good have shaped the approach to providing water to citizens, sometimes in conflict with each other (ICWE, 1992). The ANC-led government made commitments to ensure that basic water needs were realized for all South Africans and that the injustices of the apartheid state would be rectified to ensure a fair and equitable system across different places (Gowlland-Gualtieri, 2007). At the same time, service delivery is occurring within the context of cost-recovery (McDonald and Pape, 2002). In keeping with the neoliberalizing shift in South Africa as exhibited by the shift from RDP to GEAR, market-driven influences have dominated water service delivery (Department of Finance, 1996; GSA, 1994). This has taken the form of commodification of water, privatization of water entities, marketization of water service delivery, and shifts from treatment of citizens as water users to water customers (Bond, 2006; Loftus, 2007; Narsaih, 2002; Narsiah and Ahmed, 2012; Smith, 2012). Water is thus seen as both a scarce (environmental perspective) and a valuable (economic perspective) resource and this is at times in conflict with treating water as a human right (social perspective).

In a water-scarce country such as South Africa, water demand management has been used as an argument to reduce water use and ensure responsible water use through the Water Conservation and Demand Management Strategy (DWAF, 2004b). Domestic water use is the second largest consumption sector (27%) and is growing fastest of all categories of water use (Yako, 2008). Cost-recovery principles are being used to mediate who and how low-income households can access water and this has led to a market-based disciplinary society (Ruiters, 2007) where higher water use is penalised through higher costs, the installation of pre-paid water meters, and cut-offs for those who cannot pay. Although the free basic water allowance is in place, most households require and use additional water amounts. Costs of water use are expected to be recouped through charging for water on a sliding scale with water costs increasing with increasing water use (CoJ, 2014).

Decentralisation through co-operative governance in the Constitution makes provisions for water services to be delivered by DMs and LMs (GSA, 1996). This is expanded upon in the Water Services Act (GSA, 1997). At the municipal level, water is a source of revenue rather than simply a public service through charges for water service delivery (GSA, 2000). The Department of Cooperative Governance and Traditional Affairs (formerly the Department of Provincial and Local Government) provides municipalities with financial support to provide infrastructure for water

service delivery. The Municipal Infrastructure Grant is one of the largest sources of financing for water infrastructure at the local government level (DPLG, 2006). Municipalities are however required to recover the costs of water services from citizens through payment for water services (CoJ, 2014). In this way, people become customers of the municipal water services rather than citizens benefiting from water rights. Where people are unable to pay for water, their access is limited even if the infrastructure is provided (Kasrils, 2001). This makes a mockery of the claim that 94% of people in South Africa have access to safe drinking water (Rademeyer, 2013). In essence, we see that 94% of the population may have access to water infrastructure in some form or other but access piped water is restricted by the ability to pay for it. Bond (2010) suggests that during the late 1990's, as many as ten million water disconnections occurred. As early as 2002, Khosa (2002:43) noted that several tens of thousands of communal taps that were installed by the ANC-led government quickly broke; municipal water cut-offs increased (tens of thousands per quarter since 1997), with only a small proportion of disconnected households being able to afford reconnection; and municipal capital budgets shrunk and urban informal shack-settlement populations grew rapidly. During fieldwork in Johannesburg between 2009-2014 I was able to confirm these findings through observations in Alexandra and Soweto and in interviews with residents of these areas as well as representatives from Alexandra Renewal Project, City of Johannesburg, and Johannesburg Water (see Appendix 1). In parts of Johannesburg, there may be water in the taps, but you can't drink it unless you can pay for it.

7.3 Water service delivery in the city of Johannesburg

Johannesburg is the economic centre of South Africa, having the largest economy of any metropolitan area in sub-Saharan Africa. Informally called iGoli (Place of Gold), its existence and economy is owed to the mining of gold within the Witwatersrand Reefs (Robinson, 2008). It is also one of the largest cities in the world not situated near a lake, navigable river or by the coast and is 100% dependent on inter-basin transfer for water (Turton et al., 2008). The backbone of the gold mining industry was a migrant pool of unskilled black labour and water to make underground mining possible (Murray, 2011). Large transfers of water as well as constant shuffling of water allocations has been necessary to engineer a hydrosocial landscape to sustain a thriving economy and population (Turton, 2000). Historically, the focus on mining and water provision for white communities led to a planned programme of water provision that intentionally downplayed the needs of poor urban blacks living in township and informal settlements (Zuern, 2011). This created a particular scaling of the landscape with a water footprint extending beyond the city, across the country and encompassing Lesotho through the Lesotho Highlands Water Scheme.

During the apartheid period, Johannesburg was governed as 13 separate administrative units divided along racial lines. These were combined under the Greater Johannesburg Metropolitan Council with the administrative body known as the City of Johannesburg (Murray, 2011). The City of Johannesburg has a form that includes political and bureaucratic personnel which are headed by the Executive Mayor and the City Manager respectively. Water service delivery is under the portfolio of the Mayoral Committee on Environment and Infrastructure Services and managed by the Department of Environment and Infrastructural Services (Manus, pers.comm., 2011).

In Johannesburg, water services are provided through a particular form of marketization that developed under the iGoli plan (SALGA, 2011). The City of Johannesburg fulfills its water services mandate through a private water body called Johannesburg Water. Johannesburg Water was established in 2000 as a private company with the City of Johannesburg as the sole shareholder. In keeping with global IWRM principles of managing water as an economic good (Dublin Principles), Johannesburg Water operates under a neoliberal corporate model and provides services along business principles, with the aim of ensuring customer satisfaction and cost recovery (Johannesburg Water, 2011). In order to ensure that international principles of water marketization were instilled in the new structures for water service delivery, Johannesburg Water Management (JOWAM) was set-up to oversee the establishment and operation of Johannesburg Water in its first years. JOWAM involved a contract between the City of Johannesburg and the French multinational water corporation, Suez and its UK and South African subsidiaries to ensure that the market model of water services was developed (Smith, 2006). In this way, the international market regime of water service delivery was entrenched in Johannesburg. Annual turnover of Johannesburg Water exceeds ZAR1.6 billion (approximately USD144 million) (City of Johannesburg, 2009). Full cost-recovery mechanisms are endorsed by municipalities as they have been under tight fiscal pressure imposed by national government to be self-sufficient. This pressure is the result of withdrawing central financial support based on advice from internaitonal organisations, especially the World Bank and IMF, on decreasing grants and subsidies to local governments (Dugard, 2010). The impact of following this advice has impacted directly on municipalities' basic service delivery including water and electricity (Nastar and Ramasar, 2012). McDonald (2002:18) has defined cost recovery as: '(T)he recovery of all, or most, of the cost associated with providing a particular service by a service provider. For publicly owned service providers, this may not include a surplus above and beyond the cost of production, whereas for private sector providers it necessarily includes a surplus (i.e. profit). In either case, the objective is to recoup the full cost of production'.

As mentioned earlier, water service delivery and infrastructure for different population groups varies across the city of Johannesburg (Figure 6). Although Johannesburg Water operates as an independent company, the plan for payments for water services is varied according to the needs of residents (City of Johannesburg, 2010, Johannesburg Water, Date unknown).

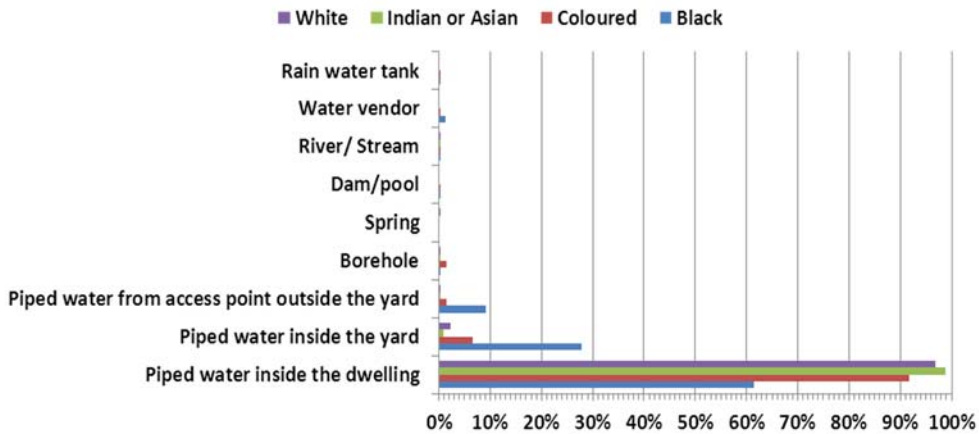

Figure 6. Access to water by population group of head of household in Johannesburg (Statsa, 2010 cited in Nastar and Ramasar, 2012).

Four service levels are determined in the City of Johannesburg's water by-laws (Johannesburg Water, 2008) as shown below:

An emergency supply below basics (LOS emergency): This is an interim service that provides communal toilets and water tankers to informal settlements.

Level of service (LOS) 1: This level satisfies the minimum standard for basic WSS as required by the Water Services Act, namely communal water supply within 200 meters of the yard and a ventilated improved pit latrine (VIP) located on each site. This is supposed to be the preferred (although interim) service provided in informal settlements which have been identified for upgrade or relocation. LOS 1 and its maintenance are provided free of charge by Johannesburg Water

LOS 2 is the preferred level of service for site-and-service developments and formal low-cost subsidised housing provided by the Provincial Housing Programme. LOS 2 is unique to Johannesburg, and is provided free. It consists of: an unmetered yard water standpipe; a water-borne connection to either a municipal sewer or a shallow communal sewer system; and a pour-flush toilet that is not to be directly connected to the water installation, and is typically outside the house. The idea is that the on-site tap will be used to fetch water to pour in the toilet when flushing is needed. Such manual collection is thought to limit consumption and make a free service financially viable for the utility, while still providing a flush toilet.

LOS 3, the highest level, and the only level that is charged (both for the connection and use), consists of: a metered full pressure water connection to the stand; and a water-borne drainage installation connected to the council's sewer.

Most households in Johannesburg are charged for water on a progressive scale with the cost per kiloliter of water increasing with increasing volumes consumed per month (JW, 2013). In all cases, the first 0-6 kilo liters per connection per month are free (City of Johannesburg, 2011). Some households across the city qualify for Expanded Social Package benefits of water and depending on the indigent category they fall into, are able to get an additional allocation of free water per person per day (Johannesburg Water, 2008). Leftist scholars have argued that offering free basic services shielded proponents of commercialisation from many accusations of inhumanity and profiting from the very poor whilst allowing capital to strengthen its march on the less poor because the economic fundamentals remained unchanged (McDonald, 2002; Pape, 2002; Loftus, 2005 cited in Smith, 2012).

7.3.1 Controversies of the approaches to water service delivery in informal settlements

During the course of my fieldwork in Alexandra and Soweto, it became evident to me that there are great disparities inherent in water service delivery across Johannesburg. There are stark contrasts between the water services in wealthy versus poor areas. People living in informal settlements and former township areas are still waiting for government to fulfil its promise of access to safe drinking water (Zuern, 2011). Although progress has been made, the privatization and commodification of water service delivery has led to poor households being unable to access water beyond the free basic allowance and often in difficult circumstances. This has led to service delivery protests across Johannesburg and South Africa as a whole (Veriava and Naidoo, 2013). Central to the protests are the recognition that inequalities still occur along class and racial lines. Further concerns relate to the disempowerment and lost voice of communities in the drive of local municipalities to profit from the commodification of water (Zuern, 2011). In different ways, the politics of scaling becomes evident in the conflicts over water service delivery in Johannesburg.

7.4 Special initiatives for water service delivery in informal settlements

Within former township areas and informal settlements within the city of Johannesburg, there is a great deal of variability on how water services are allocated and

how the pricing for water services is carried out. In this section, I discuss two illustrative cases where there have been controversies in the way Johannesburg Water has addressed water pricing and service delivery.

As part of the commodification of water, Johannesburg Water is focused on reducing unaccounted for water (UAW), which deals with both commercial losses due to non-payment and unbilled water (metered but not billed), as well as water losses stemming from infrastructure and household leakages (Smith, 2012). Informal settlements and former township areas are targeted as sites of financial loss for Johannesburg Water where they blame a 'culture of non-payment' (Louw, 2003). This notion of a 'culture of non-payment' stems from the boycotts against paying for services during the apartheid era when services were highly variable across different racial groups. This constituted a tactic in the struggle against apartheid (Louw, 2003). In the current dispensation, non-payment, especially in informal settlements occurs because people lack the income to pay for services in a country with approximately 29% unemployment; households are unfairly penalized for old and malfunctioning infrastructure; and in some instances, non-payment is still used as a tactic of protest against the neoliberal policies of the state (Veriava and Naidoo, 2013). There is a great deal of inequality and injustice embedded in the targeting of poor households that raises concerns regarding the realization of the human right to water. In Soweto with the introduction of the pre-paid water meters and in Alexandra where I found discrepancies in the treatment of households, water as a human right seems to be taking a back seat to water as an economic good.

In presenting the two cases of water service delivery in Alexandra, I draw from the journal article I co-authored with Maryam Nastar titled *Transitions in South African water governance: Insights from a perspective on power* (Nastar and Ramasar, 2012).

7.4.1 Water services in Alexandra

Alexandra is characterized by high population density, fast population growth, a young population, elevated levels of unemployment, relatively low levels of education, and low incomes (De Wet et al.., 2001). The physical area of Alexandra is divided into 10 unofficial areas for purposes of development initiatives. These areas represent different forms of housing in Alexandra and include formal houses, yards with numerous houses, apartment blocks and informal shacks (De Wet et al.., 2001).

A representative of the Alexandra Renewal Project said that all of Alexandra has access to water and the entire area has water infrastructure connections (Fenn, 2010). However there are major differences in water infrastructure amongst different areas. During site visits, we found that households in flats, East Bank and River Park have piped internal water. Those in Setswetla, hostels and Transit Camp share communal taps. In Tsutsumani, households have internal and yard taps. On paper it seems as if

the requirements of water service delivery are being met however the disparity between service levels is significant (Figure 7).

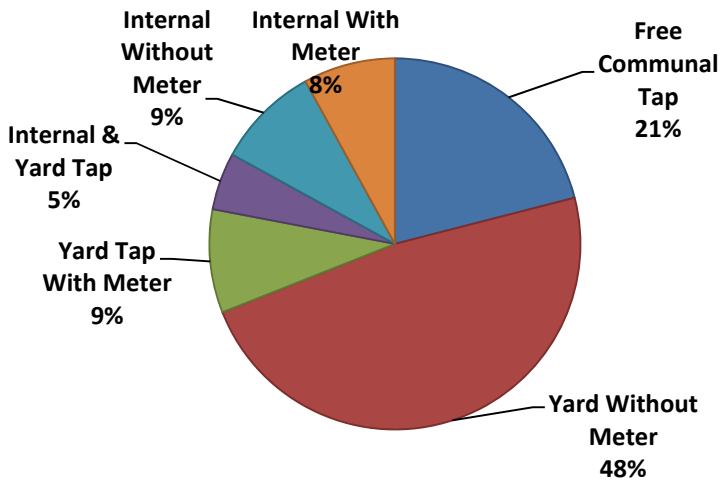

Figure 7. Water infrastructure in Alexandra (Alexandra Benchmark Survey, 2006)

One-fifth of people still rely on free communal taps which require walking from houses to collect water in buckets. A significant improvement was made post-1994 in providing water services by including a tap and toilet on each stand in Alexandra. However, the Alexandra Benchmark Survey in 2006 as well as our own numeration during fieldwork in 2010 showed that on average there are 19 households per stand in Old Alex. This translates to approximately 133 people sharing the same tap and toilet as compared to 7 people per house in the East Bank or less than 5 in houses in Sandton the adjacent middle/upper class neighbourhood (where additionally, each house is likely to have more than two taps and toilets).

In Alexandra, we found the full range of payment schemes used by Johannesburg Water with the exception of the pre-paid meters. Some interview respondents paid for water services according to the progressive scale, others benefited from the free water allocation under the Expanded Social Package whilst still others used communal taps. People in the informal settlement of Setswetla were also observed to be using the Jukskei River for washing needs. This is in keeping with the Alexandra Benchmarking Survey which found that household expenditure on water and electricity varied significantly across the different housing areas with only 4% of people living in Marlboro warehouses spending money on water and electricity (average expenditure of ZAR 6 per month) while over 99% of households in East Bank included expenditure on water and electricity (average expenditure of ZAR 251 per month) despite over 90% of households in Alexandra being connected (ARP, 2005). Interestingly, only 14% of households had ever had their water or electricity disconnected for non-payment.

Overall, our findings suggest that water service delivery has improved in Alexandra but the improvement is unevenly distributed across the former township. Payment for services is not consistent in Alexandra.

7.4.2 Water services in Soweto

Soweto, the second area is also a township that was once established on the borders of the city of Johannesburg. It has 15% of the city's informal settlements with an approximate total of 12 809 shacks and 1 300 000 people (City of Johannesburg, 2009). Johannesburg Water is responsible for the provision of water and sanitation to Soweto, ranked as one of the highest water consumption areas in Greater Johannesburg (City of Johannesburg, 2009). The situation in Soweto and particularly within the neighborhood of Phiri is used here as a comparison to Alexandra. The management of water service delivery in Soweto contrasts sharply to Alexandra especially in terms of payment for water services.

Although the situations vary greatly between the two areas, a comparison is appropriate given that both lie within Johannesburg and share similar socio-economic characteristics. In theory, they should therefore be managed according to the same strategy and policies of water service delivery by the City of Johannesburg and Johannesburg Water.

In Soweto, similar to Alexandra, water services have historically been of a low standard and efforts were made from the mid-1990s to upgrade and improve water infrastructure. Problems with economic cost recovery arose for Johannesburg Water due to the inability of residents to pay for their water use. Cost recovery was exacerbated by water losses due to old infrastructure in the area. An over-riding market logic to ensure cost recovery led Johannesburg Water to introduce a different approach to managing water service delivery. The Operation Gcin' Amanzi pilot project was introduced in mid-2001, to physically restrict water consumption in Phiri, one of the poorest suburbs in Soweto through the use of pre-paid water meters (City of Johannesburg, 2008b; Dugard, 2010; Smith, 2012). Based on the project objectives, a household could purchase additional water credit by means of pre-paid meters if the water consumption exceeded the obligatory free basic water allocation (6 000 liters of water per household per month or 25 litres per person per day of free water) (Johannesburg Water, 2006). Pre-paid water meters constituted a fifth level of service offered in Johannesburg, specifically targeting people in poor areas.

Johannesburg Water introduced the pre-paid meters in all the communities in Soweto through a participatory process that was perceived as flawed (Barnes, 2009). Council employees were the main participants in stakeholder meetings and the majority of households were not consulted at all about the pre-paid meters (Bond and Dugard, 2008). The residents in Soweto were informed that the only way of receiving their free basic water allowance and having their debt written off, is through pre-paid meters

while the normal credit meters (promoted in rest of Johannesburg) or the diverse subsidized options available in Alexandra weren't offered as viable alternatives (Ruiters, 2007). Following this process, pre-paid meters were installed across Phiri.

As with Alexandra, Soweto residents were active and vocal during the apartheid era as well as during the formation of the new government in demanding their rights to services and infrastructure. Where the inability to pay for water in Alexandra resulted in various packages which allow people to access water for free, in Soweto, the inability to pay became a threat to accessing water at all (Dugard, 2010). Residents that lagged behind with their payments had a weak bargaining position to resist the installation of the meters (Desai and Pithouse, 2004). Citizens living in Phiri were no longer treated the same as residents in other former township areas who had a similar system in terms of water provision (unlimited access) and water charges (pay post-use) (Loftus, 2006). Instead Phiri residents now had controlled access and a pre-paid system. The residents in this system were perceived as irresponsible and not able to manage their water use themselves (Ruiters, 2007). The neoliberal corporate model of water service delivery in effect worked to marginalize Phiri residents by treating them differently from other residents of Johannesburg (Bond and Dugard, 2008).

Local citizens responded by mobilizing to resist the new system of water service delivery. Members of the Phiri community took the City of Johannesburg to court in December 2007 to challenge its installation of pre-paid water meters, and in April 2008, the South African High Court found this practice unconstitutional and wrote that denying the poor access to adequate water "is to deny them the rights to health and to lead a dignified lifestyle" (City of Johannesburg, 2008b, Dugard, 2010). Further, limiting free basic water to 25 liters per person was reviewed and changed to 50 liters of free water per person per day provided by the option of an ordinary credit-metered water supply (instead of pre-paid) for more use (Dugard, 2010).

The City of Johannesburg appealed the decision in the Supreme Court of Appeal, and in October 2009 the court overturned the ruling of the High Court and declared pre-paid meters lawful (Dlamini, 2009). It also ordered that account holders in Phiri, registered as indigent, should receive 42 liters of water per day per resident (Dlamini, 2009).

The residents constructed a legitimate case for the reconsideration of pre-paid meters as a device of restricting human rights. Van Rooyen et al., (2009) in their Water Dialogues study of Johannesburg show how the use of meters and other market tools has allowed the local government to distance itself from dealing with normal customer relations, to allow silent water disconnections without procedural redress and ultimately used technology to solve social and political problems. Through the course of engagement with the City of Johannesburg, the power exercise by residents of Phiri was weakened through delays, conflict and a legal process (Clark, 2011). In August 2003 any obstruction of the installation project was banned and many activists and 14

residents of Phiri were charged in a court of law with malicious damage to property. Consequently, the campaign by the Anti Privatisation Forum and its affiliate organizations was weakened since they had to divert their energy to defeat those charges (Dugard, 2010). In the end, the citizen resistance before 2005 only delayed the process of pre-paid meter installations. The final decision of the South African Constitutional Court, handed down in 2009, was in favor of City of Johannesburg. Pre-paid meters continue to be used in Phiri and there are plans for roll-out of the system across targeted areas of non-payment across Johannesburg (Methula, pers.comm., 2010).

The manner in which water services are provided across informal settlements within Johannesburg and the stark contrast in the payment schemes raises questions of fairness and justice. This has led to conflicts between civil society and the state across the city. There are similar protests and community-based protests across South Africa as social movements challenge the state on water rights (Friedman, 2012; McInnes, 2003; Nyar and Wray, 2012; Pithouse, 2008).

7.5 Scaling water service delivery in Johannesburg

The actions of the state as well as those of community actors can be explored as processes of scaling in order to challenge and empower or discipline and disempower different groups. The mechanisms of scale framing, jumping and scale fixing are active (whether hidden or visible) in the interaction around water service delivery in Johannesburg.

Murray (2011: 3) describes 'Johannesburg after apartheid as leading a "double life" being on the one hand a luxurious city of trendy cosmopolitan vitality composed of fortified enclaves, and on the other hand, the miasmal city, composed of those residual, peripheral and stigmatized zones' that are characterized by what Wacquant (1996) has called advanced marginality. Within informal settlements and former township areas, marginalization of the black urban poor is being advanced through seperatist and exclusionary policies surrounding water service delivery. A politics of scaling is evident in the decision making surrounding who accesses and pays for water, how they access and pay for water and how counter-movements function. Through my research, I uncovered four instances where processes of scaling are evident in influencing the decision-making around water access within informal settlements in Johannesburg.

The first is the shift in jurisdictional scale from public sector water provision to public-private partnership through the creation of Johannesburg Water (privatisation). The second is the way cross-level dynamics have played out in privileging of Alexandra, as a result of its identification as a Presidential Initiative, in contrast to the Phiri community which was restricted despite both being similar types of communities with similar needs

and constraints (up-scaling Alexandra). The first two processes of scaling are primarily led by state actors. In response, processes of scaling are also used in counter-movements led by citizens of the affected communities. The third is the jumping of scales by the Phiri community through their legal action at the Constitutional Court – taking a municipal issue to the national level in order to make claims of what is constitutional (contesting pre-paid water meters). The fourth instance of politics of scaling responds directly to marketization processes exhibited in the first instance of scaling. In contesting the marketization of water service delivery in Johannesburg, there have been protests across many of the informal settlements. This is also replicated in the protests that are playing out across South Africa on a daily basis. The fourth instance of scaling draws attention to the problem of why these similar protests and social movements have not been able to join forces to create a national response (identity and rights). I argue that through processes that include scale framing and a scalar fix, the market model of water service delivery has turned citizens into consumers with individual responses to problems. In addition, the decentralisation of water service delivery has focused the attention of protestors on the local tier of government, their municipality rather than on tackling the issue as a national concern.

7.5.1 Scale framing

There are two instances where scale framing has been used as a powerful tool to ensure a market-driven disciplining of society around water services. The establishment of Johannesburg Water to implement water service delivery on behalf of the local government created the opportunity for the City of Johannesburg to introduce strongly neoliberal policies from a distance (privatision). By shifting the scale of jurisdictional responsibility, water service delivery has been moved from a public good into the market. Johannesburg Water was established under the guidance of Suez, a private water company and is based on market principles of full cost recovery, thereby embedding the neoliberal discourse (SALGA, 2011). For Johannesburg Water, water is an economic good with value that can generate income and profit. As a private company, Johannesburg Water is not strictly responsible for upholding the constitutional right to water, a matter for the state. By transferring water service delivery to a private company, the City of Johannesburg has created a mechanism to introduce marketization and privatization in perhaps a stronger form than would be considered acceptable for a municipal body to do. As the sole shareholder of Johannesburg Water, the City of Johannesburg still retains control of the company but creating a separate entity has allowed the municipality to embrace the neoliberal discourse with lower accountability for fulfilling basic water rights. One expects a private company to act according to the market and it is held to less stringent rights requirements. At the end of the day, economic motivations can override rights and as such, we have seen massive disconnections across the city (Desai, 2002; Ruiters, 2007). The jurisdictional scale

framing thus shifts water services into the market and has allowed for more stringent treatment of water users who cannot afford to pay for services (Ruiters, 2007).

The second instance of scale framing is the scaling of space according to different consumption areas and indigent households (identity and rights). The City of Johannesburg has created a category of water users who do not have income that allows them to pay for their basic water needs. The Expanded Social Package as well as the different levels of service are used as mechanisms to assist those people who cannot pay for water to still obtain water (CoJ, 2008a). However, framing of citizens into different categories is highly contentious as it carries with it assumptions about who people are, how they they behave and what they deserve and in the process shape identities of citizens. The City of Johannesburg has organized social space according to different consumption areas. Indigent groups in informal settlements are subject to different rules and different types of water access than the rest of society (CoJ, 2008a). In this situation, spatial scales are produced within the city of Johannesburg and social relations are governed according to the frames for the spaces. Scale framing of the poor individual and the indigent household are used in a powerful form of social and political disciplining of society (Smith, 1990). In the High Court ruling in the pre-paid water meters case, Judge Tsoka (cited in O'Callaghan, 2008:4) sided with the residents, saying 'To argue…that the applicants will not be able to afford water on credit and therefore it is 'good' for applicants to go on prepayment meters is patronizing. That patronization sustained apartheid: its foundational basis was discrimination based on colour and decisions taken on behalf of the majority of the people of the country as 'big brother' felt it was good for them'.

7.5.2 Scale jumping

Scale jumping occurs when one informal settlement in Johannesburg is elevated in status to a national concern (up-scaling Alexandra). Alexandra occupies a privileged position as a result of the presidential initiative for the ARP. The ARP, is an urban renewal project in Alexandra. The project is one of eight urban nodes of the Integrated Sustainable Rural Development and Urban Renewal Programme announced by President Thabo Mbeki in his State of the Nation Address to Parliament on 9 February 2001. This programme is a key component of the Government's approach to addressing urbanisation and housing challenges in South Africa and fits with the discourse of redressing historical inequalities. The estimated budget in 2001 for the Alexandra Renewal Project to re-develop Alexandra was ZAR 1,3 billion (approximately USD 110 000 million) over 7 years but this has been extended (ARP, 2014). It is a joint urban project amongst all three tiers of government, the private sector, NGO's and community-based organisations (ARP, 2005). By identifying Alexandra as an urban node for special attention, there has been a jumping of scales so Alexandra is in a sense scaled up and water service delivery in the area has become a matter of national importance and not just local interest. The conscious framing of the

township as being of national significance is reinforced by the channeling of resources for its development. Financing for water service delivery in Alexandra is provided by both the local government and a special provincial fund (ARP, 2014). According to the director of the ARP (Fenn, pers.comm., 2010), the people working within the ARP report to both the City of Johannesburg and the Gauteng Department of Housing and also contribute to the national Urban Renewal Programme. The process of scaling and re-scaling have given Alexandra a privileged position with respect to other informal settlements and township areas of Johannesburg. Such urban renewal programmes are not unusual and the intentions of creating urban regeneration in nodes is a common practice (Peyroux, 2006). A politics of scaling occurs by bestowing special attention to Alexandra. There is a jumping of scales which places higher importance to water service delivery in this area than in other parts of Johannesburg. The selection of Alexandra, as opposed to another former township in Johannesburg, as the recipient of urban renewal is not clear (Vogel, 1996). What does stand out is Alexandra's central location close to the site for Johannesburg's presently expanding capitalism, the northern suburbs of the Sandton precinct which are sites where governance is used to maintain privileged control of the dominantly white occupied elite classes (Dirsuweit and Wafer, 2006) whereas most other informal settlements in Johannesburg are on the periphery of the city.

Scale jumping was clearly exhibited in Soweto when the residents of Phiri raised their issues to the national level (contesting pre-paid water meters). By instituting a legal contest against the pre-paid meters, the community shifted the jurisdictional scale of the decision from the hands of the bureaucrats at the local municipality and Johannesburg Water into the legal system of the courts of justice of South Africa. Arguing that the pre-paid meters constituted an infringement against basic human rights, the decision on whether the meters were legal was taken out of the hands of the municipality and into the legal system. In doing so, residents invoked the human rights discourse. As the case progressed into the Supreme Court and finally the Constitutional Court, social action against pre-paid meters jumped spatial levels from the local to the provincial and national. Scale jumping was also exhibited in the way actors from outside the community engaged in the struggle thus changing the issue from that of non-payment by the individual consumer to a broader struggle against privatization (Bond and Mottiar, 2013) – a process that could be seen as crossing institutional scales from focusing on the rules of the market to institutions of rights such as a courts of law.

7.5.3 Scale fixing

Water service delivery in Johannesburg and in South Africa more generally has been influenced by three scalar fixes which have affected how people are treated as consumers, the level of services that is considered acceptable and the ability of social movements to mobilize against inequalities in the former areas (identity and rights). By treating water as an economic good, we have seen the emergence of water as a

resource of the market rather than a public good in line with neoliberal and IWRM discourses. Through the marketization of water service delivery in Johannesburg, people are treated as individual consumers. Williams (1999) in his examination of the politics of scaling on environmental injustice in America, has shown how market-based explanations tend to emphasize the local scale, while simutaneously ignoring how social processes like class and racial oppression are constituted across many scales and levels. In the process, struggles over water access are localised. Instead of thinking of citizens as having equal rights to a national resource, there is a scalar fix that shapes everyday life and turns humans into consumers, serving to shape their identities. In this formulation, people's identity is related to their income. Popke (2011:243) suggests that one of neoliberalism's defining features 'has been to instill an increasingly narrow and individualised sense of responsibility and ethical agency'. This has allowed the state to introduce pre-paid meters in Phiri and disconnet households where individual consumers are not behaving according to market rules (non-payment) (Desai, 2002). Defining individuals as consumers has also led to the roll-out of the indigent policies that fundamentally define people and how they are treated according to their income.

The second scalar fix is the standard set on acceptable water service (identity and rights). In South Africa the minimum standard is set at having access to a standpipe within 200m of a household (GSA, 2004). In Alexandra I counted that this can translate to a single standpipe and toilet in a yard with over 15 homes and thus over 100 people using one water source. By setting the standard of water service delivery at such a low level, this created opportunities for the City of Johannesburg to establish a scale for service provision with different levels of service based on ability to pay for services. The relatively stable norm of access through a standpipe 200m from a household produces a scalar fix that has allowed the state to claim success in water service delivery even when the actually reality of water access is questionable (Rademeyer, 2013).

Finally, we see a scalar fix that has arisen out of the decentralization of water service delivery to the level of the local government (identity and rights). The constitutional right to water is enshrined at the national level (GSA, 1996) but realization of this right is the responsibility of local and district municipalities (GSA, 1997). The focus at the local level of government has meant that social movements to address problems of water services and water rights have also been focused on the local level. Most protests are organised and contain local community members and the focus of their attention is their local municipal authorities (Zuern, 2011). Similar water protests have occurred in different regions across Johannesburg and even across the country as a whole but the social movements have not coalesced into a national movement (Alexander, 2010; Zuern, 2011). There seems to be a strong path dependency to tackle water concerns locally rather than jump scales to the national level (Alexander, 2010; Friedman, 2012). Bond (2011) describes this as having a popcorn character, in that protests rise quickly in all directions but then immediately subside. This has reduced the effectiveness of the protests and led to dependence on the municipalities to realize the constitutional right,

that should be the responsibility of all tiers of government. More concerning, this could lead to the dismantling of the collective identity forged during struggles against apartheid.

7.6 Conclusion

In the case of water service delivery in Johannesburg, we see different processes of scaling operating. There are cross-level and cross-scalar interactions as different actors seek to set the agenda for what is possible, what is acceptable and who gets to decide water services to people living in informal settlements. The government operating with private sector actors have dominated the choices in terms of who gets free water, who gets pre-paid meters and who pays. In doing so, identities are being actively created for individuals, householders and neighbourhoods, either as careless water users (in Soweto), communities with potential requiring support (in Alexandra) or the many anonymous citizens whose communities do not merit particular attention (in Orange Farm for instance). Community actors have responded to this through service delivery protests, illegal connections and in the case of Phiri, a legal challenge. A dynamic politics of scaling is evident and transforms social interactions as well as water governance in Johannesburg and South Africa.

8. SCALING THE WATER-ENERGY NEXUS

8.1 Introduction

The third case in my research concerns extraction of shale gas in South Africa. Shale gas is a natural gas found within shale formations. Shale gas and the mechanism for its extraction, hydraulic fracturing or fracking is a controversial process due to the impacts on land and water resources. Hydraulic fracturing of shale to release the gases within, requires a great deal of water and as a consequence, it has impacts on water quantity. Water quality is also affected as the waste water from the process contains chemicals that are added to the water to facilitate fracking. At present, the shale gas industry is still in the development and planning phase in South Africa. This case investigates the politics of scaling in the decision making process to allow shale gas retrieval in the Karoo region of South Africa. The main actors promoting fracking in the Karoo are energy companies, with Shell being the most vocal. The DMR is the responsible authority for approving fracking applications although DWA will be responsible for issuing permits for water use in the future. Those actors against fracking have formed organisations, mostly representing the interests of the people living in the Karoo but also drawing on people who visit the Karoo from elsewhere in South Africa and activists in the global fight against fracking. Other significant voices include parliamentarians and the President of RSA. For this case I relied mainly on documents and internet-based sources of material as well as articles published by the media. The main documents were investigative studies produced in South Africa, including government commissioned studies and media statements and speeches by government representatives. Internet-based sources were used as many of the activist groups against fracking had sophisticated websites, which they used to communicate their positions. For logistical reasons I was unable to visit the Karoo during the period of my research however I have worked in the Karoo in the past, including participating in State of the Environment reporting in the region. This gave me pre-knowledge into the hydrosocial landscape of the Karoo. Although this is a limitation of my study, this case was different from the first two in that a great part of the debate took place in the South African media (online

newpapersfacebook groups, videoclips and blogs) and through webi-sites set up by South African actors involved in the debate, which I was able to follow on a daily basis.

8.2 Hydraulic fracturing in the Karoo

As conventional fossil fuels such as oil and coal are being depleted, exploration is underway of so-called unconventional fuels. Natural gas from coalbed methane, shale and tight gas sands as well as oil from tar sands and deep ocean wells are being explored as potential energy sources (Charman, 2010). The greatest concerns relate to the extraction process that is currently available to produce these fuels, namely, hydraulic fracturing. Fracking is a drilling technique that improves access to unconventional natural gas stored within the miniscule pores of shale deposits (Soeder, 2010). It is also used during the exploration phase when looking to identify potential shale gas reserves. The technique was developed in the late 1940s and was at first thought to be costly and inefficient but has experienced a surge in interest once fracking became a mainstream process in the USA (Rogers, 2011; Turner, 2012). The process of fracking involves drilling a vertical or horizontal well into shale or coal deposits and then fracturing the rock by injecting large volumes of water, sand, proppants and lubricants into the well (Finewood and Stroup, 2012). Each fracking event creates small cracks in shale deposits, forcing previously inaccessible natural gas to the surface (Soeder, 2010). Each well can be fracked approximately 18 times (Soeder, 2010). In the process of fracking, large tracts of land are required for the fracking wells, substantial volumes of water are used and fracking liquids must be removed and stored in a safe manner, usually in ponds created for this purpose. Land, water, noise and air pollution are some of the impacts associated with the process and these will be discussed further in section 8.3.

On February 2011, the Minister of Mineral Resources, Ms Susan Shabangu announced a moratorium on all shale gas exploration in South Africa. In a media statement released by DMR, Minister Shabangu (DMR, 2011:1) is quoted as saying

> Given the intensity and scale of the issue and the fact that this (shale gas exploration) has never been done before on our shores, my department will conduct a comprehensive study which will assist us to formulate our approach after which we will go back to cabinet.

The Cabinet of South Africa (most senior level of the executive branch of government) endorsed the moratorium stating that "clean environment together with all the ecological aspects will not be compromised" (GSA, 2011:2). In deciding to no longer accept or finalise current or new applications for shale gas exploration, South Africa joined France, Bulgaria, Germany, New York State and other territories which have banned or placed a moratorium on fracking (Chivers, 2013). A year and a half later, on

18 September 2012, Minister Shabangu announced that Cabinet had decided to lift the moratorium, making South Africa the first country to reverse a moratorium on fracking (Shabangu, 2012), making the case particularly interesting to analyse.

The decision to place a moratorium on fracking and later to anyway move forward with shale gas exploration speaks to the complexity and controversy surrounding this process. The growing attention to shale gas also highlights the expansion of the fossil fuel sector to deposits that were not previously considered viable.

The drive for shale gas production and hydraulic fracturing has been growing globally following the large-scale operations that have been established on the Marcellus Shales in the USA. The International Energy Agency predicts that production of natural gas from unconventional sources will increase by more than 40 % by the year 2035 (IEA, 2012). Advocates of shale gas argue that it is a far better energy option for countries because shale gas has lower greenhouse gas emissions than coal thereby reducing climate change; accessing shale gas within national territories reduces dependence on other countries for oil and gas imports thus improving energy security; and that relying on shale gas will allow countries to make the transition to renewable energy (EGAF, 2011; Galicki and Goldwyn, 2005). Hilary Clinton, in her capacity as secretary of state in the USA stated that shale gas could rewrite global energy politics with greater national energy security, less reliance on the Organisation of the Petroleum Exporting Countries (OPEC) and lower greenhouse gas emissions (cited in Blake, 2014).

However, researchers have refuted some of these claims. Methane's lifetime in the atmosphere is much shorter than carbon dioxide but methane is more efficient at trapping radiation than CO_2. Howarth et al. (2011) show that compared to coal, the footprint of shale gas is at least 20% greater and perhaps more than twice as great on the 20-year horizon and is comparable when compared over 100 years. Although Howarth's methodology has been criticised, the total emissions including transport of water to the site and post-production management likely mean that the reduction in emissions should be more conservatively estimated (Botha and Yelland, 2011). This call for a more precautionary approach in the face of uncertain science has been highlighted in recent publications in a special issues of Science journal on Gas Revolution published on 27 June 2014 (Kintisch, 2014; Malakoff, 2014; Stokstad, 2014). With regards to the transition to renewable energy, critics have argued that directing resources to shale gas extraction will take away resources from renewable energy and actually delay the energy transition, especially in developing countries (Clarke, 2014; Fig, 2013; Finewood and Stroup, 2012). The predicted benefits of shale gas production are thus questionable and when considered alongside the predicted negative impacts, this has opened the door for debate over the development of this new area.

Shale gas production is currently under investigation in South Africa. Exploration of natural gas resources on land in South Africa was conducted by the company Soekor

between 1965 to 1977 but no viable exploitable resource was located (Vermeulen, 2012). The United States Energy Information Adminstration has estimated a technically recoverable resource of 485 trillion cubic feet (Tcf) of gas in the Karoo Basin although the Department of Mineral Resources will only commit to saying it is potentially a very large reserve (DMR, 2012). If it is as large as estimated, this would make the shale gas reserve in South Africa the fifth largest shale gas field in the world (Twine et al., 2012). The gas is found within the shale formations of the Ecca Group at an approximate depth of 2000 – 4000 metres below the surface. The Ecca Group is part of the Karoo supergroup geological sequence, which consists of sedimentary and igneous rocks approximately 100-320 million years old (Steyl and Tonder, 2013). The Great Karoo has an area of more than 600 000km^2 and shale gas is predicted to be found across Karoo-type formations. The Karoo (possibly from the Khoi word garo meaning desert) is a semi-desert region of South Africa. The Karoo is partly defined by its topography, partly by its geology, but, above all, its low rainfall, arid air, and extremes of heat and cold. It is divided into the Great Karoo and the Little Karoo with the Cape Fold Mountains forming the border of the Great Karoo on the south and south-western edge but no clear border on the northern and eastern sides. At present, a great deal of attention is being focused on shale gas exploration in the Karoo region of South Africa although it must be noted that the area with potential for natural gas development is substantially larger than the Karoo, with exploration areas covering six of the nine provinces (Steyl et al., 2012). There are currently five pending applications related to exploration in South Africa extending over the Karoo and beyond on the northern and eastern sides (Figure 8)

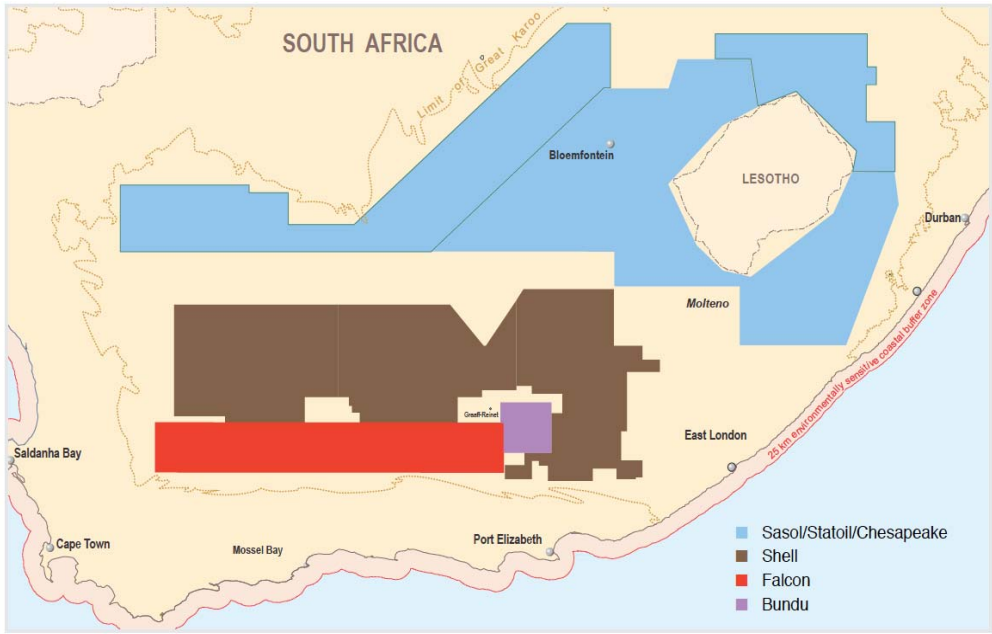

Figure 8. Regional map of South Africa, showing exploration rights and companies with these permits (Fig, 2013)

Now that the moratorium has been lifted, it is likely that permits may soon be given to begin exploration for shale gas. Under the Mineral and Petroleum Resources Development act 28 of 2002, the regulator (Department of Mineral Resources) first allocates technical co-operation permit. The applicant has a year in which to conduct desk-top studies on the feasibility of extracting the shale gas, and an exclusive right to apply for an exploration right. If successful, the applicant can undertake exploration (using fracking) for three years, renewable for another six years. During that time, if the deposits of gas are found to be economically viable, the company can apply for an exclusive production right lasting 30 years, which is also renewable (Fig, 2013:180).

In my research, I focus on the conflicts surrounding fracking in the Karoo and the politics of scaling associated. This is because the most attention is currently focused on this area as the most promising site for shale gas extraction. The conflict that is playing out within the area of the Karoo, could well be played out in other areas of South Africa in the future.

The Karoo is ecologically rich in plants and wildlife unique to the area. The Succulent Karoo biome is a biodiversity hotspot and has the largest concentration of succulent plants in the world (Martin and Muir, 2004). However, it is one of the country's poorest regions economically. Hore (2013) reports that in some of the small towns unemployment is as high as 90%, with welfare grants often the main source of income. Approximately one million people live in the Karoo on farms and spread over 100

towns and settlements. The main economic activity in the region is farming, mainly of sheep. Both farming and households depend on groundwater for their water supplies. A study commissioned by Shell and undertaken by Econometrix suggests that the process of producing natural gas, and its associated activities like distribution will increase South Africa's GDP by ZAR80-200 billion and employ 700 000 people per year for 25 years (Twine et al., 2012). David Fig (2013:28) questions these projected economic benefits, particularly for local people living in the Karoo. He shows that during the exploration phase, which can last up to nine years, very few jobs (about 100) will be created on site. The operations themselves require very skilled operators and the oil companies acknowledge that they outsource these tasks to experienced subcontractors from foreign companies. He quotes figures from the USA, which indicate that over 400 wells can be managed by 66 employees. It is unlikely that many, if any of these jobs will go to local Karoo residents, many of whom are unskilled. Even where jobs are created in associated activities such as truck driving and security, these will only last as long as a well can be fracked (18 times) leading to potential 'boom and bust' cycles in local communities.

8.3 Controversies of the proposed hydraulic fracturing project

The exploration and extraction of unconventional fuels have been called an energy revolution by some and a toxic threat by others. It has been hailed as the dawn of a new energy era and condemned as the final deadly fossil rush that will carry us over the climate cliff (Chivers, 2013). Fracking has become a deeply emotive topic across the globe. The 2010 American documentary, Gas Lands by Josh Fox was nominated for an Academy Award for best documentary in 2011. It offered a critical voice on fracking, one that received widespread reception in the USA and elsewhere in the world. The documentary along with many of the social movements that have arisen against fracking all highlight concerns regarding the impacts of fracking on land, air, culture and water, especially within local communities were fracking wells are located. Such concerns are present in South Africa and as no fracking application for exploration purposes has been approved, these concerns relate to potential impacts based on impacts experienced elsewhere in the world, not actual experienced impacts in South Africa.

In many places around the world where fracking takes place, water resources are plentiful. In South Africa, the Karoo is one of the most arid areas of the country and the Water Research Commission reports that 94% of Karoo towns are totally dependent on groundwater (Greef, 2012:8-9). The fracking process requires large volumes of water, nearly 24 000 m^3 per borehole (Warren, 2013). This water could be

drawn from local groundwater supplies; transporting surface water from elsewhere; piping seawater or desalinated seawater from the coast; or taking water from the Orange River, which is already over-allocated. In none of the investigations of fracking has there been a detailed study of the different water alternatives.

Clearly, abstracting from the groundwater resources in the Karoo will significantly affect local water users (Steyl and Tonder, 2013). Shell has said that it will not draw from this water source, but has not indicated where it intends to get its water from (Shell, no date). Even if one of the other options for water is considered, there will be inevitably consequences for water users in other areas where the water is taken from. In addition, the transport of water to the fracking wells, whether by pipes, trucks or trains, will alter the hydrosocial landscape of the Karoo. Even where water is not taken directly for fracking purposes, a strategic consideration is still the increased water needs for activities associated with the shale gas production. Any additional activities in the Karoo will place a strain on overloaded water resources and may lead to water conflicts. Farmers and other water users who are unable to pay for increased water, risk losing their water source as well as their livelihoods. Access to and equitable sharing of this scarce resource raises legitimate concerns in the drought-prone Karoo (De Wit, 2011).

Alongside the question of water availability, there is also a question of water pollution due to the chemicals added to the fracking fluid. The chemicals added to fracking fluids tend to be kept as industry secrets by each company which has its own cocktail of chemicals. In the USA, companies are not required by law to share the chemicals they use during fracking although many are now starting to share this information voluntarily. A recent investigation by the House of Representatives in the USA found a list of 750 chemical compounds that were used from 2005 to 2009 (USHR, 2011). According to the report, a number of the chemical compounds (29 of which are known human carcinogens) are regulated under the Safe Drinking Water Act or listed as hazardous air pollution under the Clean Air Act (Waxman et al., 2011). It is important to note that the additives represent 0.49% of the total volume (the rest being water and sand) but can be as high as 5% in some instances (Steyl and Tonder, 2013).

After the fracking fluid has been pushed underground under extreme pressure, the average flowback from vertical and horizontal wells are 43.7% and 25.3% respectively. This means that 50-70% of the fluid injected has been absored by the formation. There is limited knowledge about the structure of deep dolerite sills and associated deep groundwater and water strikes in the Karoo lithostratigraphic formations (Steyl and Tonder, 2013). As a result, it is difficult to predict whether, how and to what extent pollution of groundwater resources could occur; the same groundwater resources that farmers and households depend on for their water supply. Vermeulen (2012) cautions against the extrapolation of knowledge from elsewhere to the South African situation because of the presence of the dolerite dykes.

Gerrit van Tonder, at the Institute for Groundwater Studies at the University of the Free State, was previously dismissive of the environmental impacts of fracking but in 2012 had the following to say in an interview with du Toit (2012:1):

> The Karoo is an artesian basin meaning water deep in the rocks is stored at relatively high pressure. This means that if drilling were to occur, water and gas will flow upwards along preferential pathways like faulty well casings and along dolerite dykes which are numerous in the Karoo basin. In the event of a leaking gas well, contaminated water far below the ground could appear on the surface in a matter of months. Thousands and thousands of hectares of groundwater may be contaminated.

Although water is the main concern in the Karoo, there are other negative impacts which raise concerns for the Karoo. The impact of fracking on the cultural heritage of the Karoo is a further concern for residents of the region. The Karoo landscape is viewed by many to be a special blend of ecological and social richness with a strong link to the Afrikaner culture (Jorritsma, 2012). Images of wide-open spaces, a simple life on rural farms, windmills against the landscape depict a romantic conception of the Karoo. The introduction of fracking is seen as a threat to this lifestyle and cultural heritage. Jorritsma (2012: 388) suggests that 'the threat of fracking in this area not only throws the cyclical nature of people, place and power into relief, but also demonstrates how this delicate balance would be disturbed by this degree of interference from the outside'. As a biodiversity hotspot with many rare and endemic species, the Karoo is a sensitive biome that could easily be damaged by fracking and its associated infrastructure (de Wit, 2011). In addition to the living biodiversity, the Karoo Supergroup is home to an extensive fossil record and fracking could destroy many, as yet undiscovered fossils. In addition, concerns over problems such as earthquakes cannot be excluded despite the fact that they are unlikely in the relatively stable Karoo (Fig, 2013).

Shell, one of the companies who has submitted exploration applications has tried to downplay the impacts of fracking. Graham Tiley, the general manager for new venture and international exploration at Shell told the media in Johannesburg that once the drilling was done, all that would be 'left would be a "Christmas tree" the size of a garden chair' (cited in Jones, 2011:2), referring to the device that is used on site to control well flow and is closed and left behind when fracking is complete.

8.4 Scaling hydraulic fracturing

As with the first two case studies of the development of De Hoop Dam and water service delivery in Johannesburg, processes of scaling are constantly played out during the decision-making over hydraulic fracturing. Scale framing, scale jumping and scale

fixing are being used by different actors to justify for their concerns over the governance of fracking in South Africa generally and in the Karoo specifically.

8.4.1 Scale framing

In analysing scale framing, I drew on the speeches made by different actors and documents produced by government, anti-fracking groups and private companies such as Shell. At the national level, the government has invested a great deal of resources into the investigation of fracking in South Africa. Although the process has been cautious with the issuing of the moratorium, scale framing has been used intentionally to highlight the importance of fracking for the national interest by government officials as well as oil companies. Fracking of the Karoo has been framed as important in order to access shale gas as an energy resource as seen in the USA with the Marcellus Shale (Finewood and Stroup, 2012). Introducing shale gas into the energy mix of South Africa is viewed as critical in order to address the current energy shortages experienced as a result of old and failing infrastructure; reduce greenhouse gas emission which are currently unacceptably high due to a reliance on coal; and to stimulate the economy through fracking and associated activities, having a stable electricity supply and low-prices for electricity for the country (DMR, 2012). This framing of fracking connects to discourses of sustainability, security and futurity. In the process, fracking is scaled up to a national issue.

The national importance of shale gas in the Karoo was expressed by Minister of Energy, Dipuo Peters in claiming it as a gift from God to the people of South Africa thus endowing shale gas with a sacred nature. Prior to the findings of the task team investigation being delivered, the then Minister, Peters is alleged to have told parliament that 'It would be wrong for us to not use the resources that God left us with. This is a blessing that God gives us, and we need to exploit for the benefit of the people (cited in Fakir, 2012:2). The use of the words "us" and "we" are not clarified but seem to suggest a collective beneficiary of shale gas, most likely speaking to the national interest. This reference to 'God' in relation to shale gas establishes a sign system where claims are made to privilege a particular belief system (belief in God) and the listener is being persuaded to have faith in a higher power (God) and that recognising shale gas as a gift from 'God' makes it something right/holy/good. The significance of shale gas is elevated as a result of the connection with 'God'.

As with the case of De Hoop Dam being a catalyst to economic development of the region and the nation, similar scale framings have been produced for fracking the Karoo. Shale gas is constructed as essential to the energy future of South Africa and indirectly to the economic development of the country. This is in keeping with the neoliberal growth discourse of the country. President Jacob Zuma, during his 2014 State of the Nation address said that shale gas 'is recognised as a game changer for our economy' (Zuma, 2014). By raising shale gas in the State of the Nation address, the

President signaled that it is a national matter. Similarly African National Congress secretary general Gwede Mantashe showed his support for fracking in the Karoo at a breakfast meeting of the South African Chamber of Commerce and Industry (SACCI) in Johannesburg. By addressing the issue of fracking with the SACCI, Mantashe could be seen as establishing relationships with private sector actors and including them in the debate. He argued that moving ahead with fracking was non-negotiable for a government keen to kick-start the stagnating economy. He is cited as saying 'We are going to do hydraulic fracturing in the Karoo. I know many people resist it, but it must be done. We need it'. (cited in de Ryhove, 2014:2). In focusing on the significance of shale gas for the national economy, little mention was made of the environmental impacts and these were thus made less significant through the discourse.

On the other side of the argument over fracking, activists fighting against fracking have framed the local Karoo environment as being important to the national and the global interest, culturally and biologically. In trying to encourage people from across the country to visit the Karoo, the Karoo Development Foundation (KDF) says the 'The Karoo offers nothingness, which is increasingly valuable, in terms of space, silence and solitude. Urban people live in stressed societies…and the Karoo offers a healing experience' (KDF, 2012:5). The language used in describing the Karoo situates meaning to the Karoo as a place of natural and cultural beauty, one that is closely tied to the identities of local inhabitants (Jorritsma, 2012). Mentioning the value for urban people builds up the relationship between the Karoo and those who live elsewhere and in the process, connects non-residents to the struggle to protect it. The Karoo is also famous for its geological and palaeontological record and in framing the Karoo, the extensive fossil record is used to argue for the global importance of the region. Fracking is portrayed as a process that will forever change the landscape (Jorritsma, 2012). Framing the heritage of the Karoo as being valuable not just locally but to national and international interests means that the loss will be felt by a far greater group than local residents (TKAG, 2014). Instead of focusing on the shale gas itself, the attention here is given to the site for fracking and the potential losses to this landscape through the situated meaning of the Karoo as a unique and special environment. In the process, the significance and value of the Karoo is elevated and the its value is framed as one of sustainability. This type of scale framing was successfully used in the fight to stop mining of the St Lucia Wetland and eventually led to the area receiving World Heritage status (Tucker, 2010). However, this scale framing can be a double-edged sword. By framing the Karoo as a place of leisure, tourism and Afrikaner culture, local black residents and farm workers may be excluded from this frame. This potential fragmentation has been mediated by active engagement with the Southern Cape Land Committee, supported by the Centre for Environmental Rights and the Western Cape branch of the Wildlife and Environmental Society of South Africa, which works to sensitise farm workers to the likely effects of fracking (Fig, 2013). The practices of sensitisation can be seen as a way to include a larger group involved in the resistance to

fracking. Davison Mudsingwa, who is directing a documentary on fracking in South Africa says that 'if awareness is stepped up, I'm sure the schism of race with regard to fracking will be smoothed out' (cited in Hore, 2013:2). In the process, through discourses of shared experience of the Karoo and practices of engagement, the discourse of redressing the inequalities of the past is being proactively addressed so that it does not become a point of contention that divides residents of the Karoo.

8.4.2 Scale bending

Shell, one of the companies that has applied for a licence to explore fracking in the Karoo uses scale bending in order to operate across and within different scales and levels at the same time (Harvey, 2000). I studied the website and annual and sustainability reports of Shell to analyse how Shell positions itself at the international and national levels of the economy. Shell is a multinational corporation with headquartes in The Hague, Netherlands (Shell, 2014a). The parent company of the Shell group of companies is Royal Dutch Sheel plc. which is incorporated in England and Wales (Shell 2014b). Shell has operations in South Africa and as part of their Upstream International business, investigates oil and natural gas in South Africa. Natural gas reserves in South Africa are the property of the state, in contrast to USA where shale gas is the property of the landowner (Stevens, 2012). As a result, Shell works in corporation with the Petroleum Agency South Africa (PetroSA) in exploring for shale gas. PetroSA is the national oil and gas company that promotes petroleum exploration and exploitation. In order to operate within South Africa, Shell has been able to bend scales to operate as a national and international actor simultaneously. On Shell's public website, there is a special section on the Karoo that I examined to understand how Shell situated itself within the South African context. The first words on the page of the website dedicated to the Karoo (Shell, 2014) read:

> The Karoo is a special place that must be respected - socially and environmentally. We are committed to the sustainable development of clean-burning natural gas in an environmentally sound manner, while working collaboratively with local communities to ensure all concerns are addressed and considered. *Click here to visit our global website and find out more on shale gas* (Italics added).

In this opening paragraph, Shell speaks of working with local communities and the global website illustrating the dual roles it plays in the loca hydrosocial landscape and the global economy. Shell further emphasises its local nature by making Fact Sheets about the Karoo available in English, isiXhosa and Afrikaans, the latter being two local languages of South Africa. Throughout the text on the website, and on the fact sheets, reference is made to South Africa's need for a sustainable energy future. The language and focus of the discourse focuses on sustainability in South Africa and less evident is the company's own interest in expansion of their capitalist production. A short video

on the website is titled *The Karoo: An answer to South Africa's energy needs?* The video further reinforces the idea of Shell working in the national interest with Shell employee, Gheneez Munian being cited as saying that 'We're going to have a serious problem in the future if we don't find alternative ways of creating energy'. In using this language, she, as a respresentative of Shell, identifies as herself as a South African in using the word 'we'. She goes on to speak of shale gas as 'definitely something that could be a game changer in South Africa. The video also identifies three employees, Charmain Vusani, Claude Vanqa and Vuyisile Zenani, who are part of the community liaison team, as growing up in the area thus giving more indication of the local nature of Shell. Through these processes of scale bending, Shell is able to situate itself within the South African hydrosocial landscape.

8.4.3 Scale jumping

In an echo of the public action to protect the St Lucia Wetlands from dune mining activities in the 1990s in South Africa, the civil society response to fracking in the Karoo has been similarly widespread and both locally-rooted and globally-connected. The movement against fracking in the Karoo has successfully jumped scales to connect to resources and people across South Africa as well as to trans-national anti-fracking networks. The opposition to fracking has included a number of material practices including campaigns, marches, websites and CBOs (TKAG, 2014). The main coalition resisting fracking is the Treasure the Karoo Action Group (TKAG) which has its own website, http://www.treasurethekaroo.co.za. Interestingly, its membership extends beyond Karoo residents to also include sympathetic parties from the large cities in South Africa. Apart from extending the membership base of TKAG, the group also makes links to other organisations against fracking such as Fractual (www.fractual.co.za) and the Karoo Anti Hydraulic Fracturing Action Network (kahfan.blogspot.com). Around South Africa and across diverse interests, alliances have been made with the Wilderness Foundation and the Endangered Wildlife Trust, both nation-wide conservation NGOs operating across South Africa. In addition, the group has drawn on local and internationally well-known personalities to give prominence to their campaign. People such as entrepreneur and head of the Swiss-based luxury goods company, Richemont; polar swimmer Lewis Pugh, well-known South African entertainer David Kramer, Dutch princess Irene and Hollywood actor Mark Ruffalo have all been involved in interventions to save the Karoo from fracking. Through Ruffalo, the US campaign Water Defense has also become involved in the campaign in the Karoo. All of these connections across different scales and levels reflect how successfully TKAG and the campaigns against fracking in the Karoo have been able to jump scales. In doing so, the significance of fracking in the Karoo is elevated to a national concern as well as tied to global social movements against fracking, against neoliberalism and promoting sustainability. As Glassman (2001) argues, this process of scale jumping can be used to bypass the nation-state when resisting corporate

globalization. This can serve to validate their actions as well as elevate the significance of their resistance. The play on the word 'frack' has often been used to express the indignation against fracking and this is the case in South Africa as well with slogans such as "Frack Off!" and "What the frack?" being used in campaigns, directed at multinational corporations involved in fracking (TKAG, 2014). By connecting fracking in the Karoo to larger processes of private capital development of national resources such as shale gas, the activists can connect to struggles around the world, such as the struggles over tar sands in Canada and oil production in Nigeria. The use of websites and social media has been a highly effective method of raising awareness of the issues in the Karoo. A quick search on social media application, Facebook showed over 30 groups dedicated against fracking in the Karoo. The widespread campaign has been possible because of the resources that wealthy landowners and farmers (mostly white) have been able to bring to the campaign. In turn, the scaling up of the campaign has given activists access to resources from outside the local region. For example, the former farmers' cooperative BKB (originally known as Boeremakelaars Koöperatief Beperk) funded an investigative trip on fracking to the USA for two farmers, Douglas Stern and Lukie Strydom. BKB Limited is a fully-fledged company. Stern came back from the trip and mobilised the farming community against fracking (Fig, 2013). By jumping scales and connecting to others through global alliance building, this can provide grounds for collaboration around the construction of a variety of possible energy futures quite different from those envisaged by neoliberals (Glassman, 2001).

8.4.4 Scale fixing

When the moratorium on fracking was instituted, Minister Shabangu created a task team to undertake research into fracking to inform a decision on the lifting of the moratorium. There was little transparency in the process or regarding the membership of the task team. Certain government officials were included but others excluded, with no representation from agriculture, economic development, rural development, tourism or health (Fig, 2013). The Working Group which prepared the DMR report, *Report on Investigation of hydraulic fracturing in the Karoo Basin of South Africa* and informed the task team was composed of government officials and scientific experts from national scientific research organisations in South Africa (DMR, 2012). The choice in participants to the task team reflects a privileging of scientific knowledge by the DMR. Through their process, they organised workshops with scientists in South Africa and undertook research visits to scientific organisations in the USA and Canada. The participation in the process was clearly restricted to natural scientists operating at the national and international levels. This attributes the identity of expert to these scientists and privileges the scientific knowledge they produce over for example ethics or indigneous knowledge systems. By restricting the participation to an elite group with a focus on the national interest, the DMR introduced a scalar fix of who is considered qualified to advise on fracking processes in the Karoo Basin. Very little in the way of a

participatory process occurred to involve diverse actors across different groups and levels. In effect, this scalar fixing also serves to constrain South African citizens from engaging in policy discussions on the appropriate energy future for the country (Fig, 2013). New technologies such as fracking seem to be reserved for discussion in the domain of intellectual elites. During a briefing by Shell to local communities in the Karoo, the executive mayor of the Cacadu district municipality, Khunjuzwa Eunice Kekana, criticised Shell for its perceived exclusion of the leadership of the Karoo municipalities from its decisions, saying 'Nothing about us without us' (cited in Janeke, 2012:1). In using this language, Kekana invokes the human rights discourse in claiming the right to be included.

8.5 Conclusion

The case of hydraulic fracturing is not an obvious case of water governance but it is precisely for this reason that it is useful. The case serves to reinforce that water governance is constantly scaled and in this case, the most important decisions affecting water sit with the DMR. Fracking is a process that has significant impacts on water resources: the quantity of water and where it is sourced from as well as the quality of water. Local and provincial actors and their supporters fear that water impacts will destroy the hydrosocial landscape. National actors, particularly government officials, acknowledge water availability is a concern but further investigation for management rather than stopping the proposed developments entirely. International actors belong to two camps, namely: the private companies who will benefit from fracking and the transnational activists fighting against fracking, specifically and non-renewable energy dependence, more generally. Processes of scaling are actively used in the conflict over fracking of the Karoo, sometimes in relation to water and other times not. In all processes of scaling, the interests of particular groups are being legitimated at the expense of other groups. This reflects the social relations that are constantly at work and expressed through discourses and material practices, which seem to foster the neoliberal growth strategy, which puts water in conflict and energy in sustainability arguments.

9. CONCLUSION

With this chapter I conclude my thesis, with some reflections on the findings of the study, the main contributions from my research and a few thoughts on the way forward.

9.1 Summary of the research findings

My aim in this research was to understand how scale is produced and contested in scaling processes over water access and allocation in South Africa and the implications for influencing social relations and material practices in terms of empowerment and disempowerment in decision-making (and how this in turn influences scale). Water access and allocation are two important aspects of water governance and I therefore my context was water governance in South Africa as well as environmental governance more broadly. Three cases were examined to investigate how scaling affects and is affected by decision-making over water access and allocation.

My research was based on the view that scale is produced, contested and transformed through social interactions and processes of production, reproduction and consumption. I took a dialectical approach to the research focusing on two of Harvey's (2008) moments, namely, discourse and material practices. I examined a range of documents including reports, legislation and media statements and used this along with observations I made in the field and interviews carried out with key informants and residents to analyse processes of scaling in the three cases.

Through my analysis, I show that water governance cannot be disentangled from the socio-political and economy landscape of the country. A form of socio-nature is produced, a waterscape, which is not socially or politically neutral but expresses and re-constitutes physical, social, cultural, economic or political power relations (Castree and Braun, 2001).

9.2 Scaling dams, water services and fracking – undercover politics

In this section I will explain how scaling is a political process in water governance by reflecting on the findings of the three cases. My findings show that processes of scaling in water governance are being used to maintain the neoliberal growth discourse and perpetuate descrimination against poor, historically disadvantaged people living in townships and informal settlements and this affects the realisation of sustainability and human rights goals in South Africa and the scaling of water governance. Using the cases, I demonstrate that the discourses of neoliberalism, globalization and IWRM are hegemonic in South Africa. In a time of neoliberalism, social relations become commodity relations and as Swyngedouw and Heynen (2003:900) observe, 'these may veil and hide the multiple socioecological processes of domination/subordination and exploitation/repression that feed the capitalist proces'. By investigating the politics of scaling and understanding the scaling processes at work in water governance decision-making, I have sought to uncover some of these socioecological processes of domination/subordination and exclusion/inclusion through studying discourses and material practices.

In the course of the three cases, I have shown how scaling of discourses, people, decisions, water, and so forth have all taken place through the everyday processes of governing water (Loftus, 2012). At the outset, two points must be borne in mind. Firstly, in looking at scaling processes, I do not assume that the scales that are being transformed were previously established in some natural way. Instead, I focus on the dialectical relationship of scaling with water governance in South Africa, where scale and governance co-evolve. Through practices of scaling, scales are constantly contested and transformed through the influence of different actors operating over different levels and scales. This leads to the second important consideration, which is that processes of scaling are active and often conscious actions of actors but can also be unconscious acts. Although there are structures in place which maintain scales and levels, it is the agency of individuals and groups through social relations that initiate and drive scaling.

The interventions by actors are part of the politics of scaling that is often underplayed or ignored in water governance. In the three cases of decision-making around water access and allocation in South Africa, I have shown how scale and scaling has been used to affect changes to the decision, in favour of or against particular forms of water use. As Swyngedouw (1997:140) argues, 'theoretical and political priority never resides in a particular geographical scale, but rather in the process through which particular scales become (re)constituted'. Being able to command the scaling of decisions, allows actors to make claims for the appropriation of water and water institutions through enacting identities, politics, relationships and knowledge (Gee, 2011). This is done through

giving different or new meanings to water's role in a hydrosocial landscape, shifting politics across scales and levels and transforming scales and levels.

9.2.1 Politics in the approval of De Hoop Dam

In the case of the De Hoop Dam development, I found evidence of scale framing which favoured the national economic interests over potential transboundary impacts on Kruger National Park and Mozambique water users. In addition, economic development was framed as being more important than environmental concerns regarding loss of endemic species and social impacts associated with relocation of people, changes in water quality due to mining and increased risk of accidents during the construction phase of the dam (DEAT, 2006a). The national growth frame was thus used as a powerful mechanism for asserting the interests of actors who operate at the national level over actors whose concerns related more directly to the local or transboundary levels. Although the then Minister of Environmental Affairs and Tourism acknowledged the significance of the impacts, he approved the decision based on a belief in the benefits for the 'greater good' (DEAT, 2006b). The fact that the decision was made by the national department of environmental affairs rather than the provincial level government department was an example of scale jumping were actors crossed jurisdictional levels to take the decision out of the hands of local decision makers and into the national arena where the national framing was most pervasive.

In the process of scaling the De Hoop Dam as a national priority, the meaning of the dam has been transformed. Whilst the material reality may be a lot of cement, some roads and associated infrastructure on the Steelpoort River, the discursive meaning of the dam is that of a key – unlocking the economic potential of the region through mining. Those actors appealing the decision argued that the wealth of the region lay in the rich biodiversity, both endemic to the area as well as the biodiversity at risk in the Kruger National Park, as part of a sustainability discourse. However the focus on economic wealth through mining is a powerful discourse in South Africa. Much of the country's economic growth has been predicated on the minerals-energy complex and this continues to be part of the vision for South Africa's future (Fine and Rustomjee, 1996). In 1997, Fine and Rustomjee put forward the theory that the minerals-energy complex (MEC) is a system of accumulation in South Africa, centred on the core sectors of minerals and mining and energy production. They argued that there is an integral partnership between state and private capital, and an equally integral connection between a core set of activities around mining and energy, straddling the public/private divide (Fine and Rustomjee, 1997). In reviewing South African political economy, Fine (2009) reflected that the MEC continues to have significance in South Africa. The view of mining as essential to the development of the country has precluded other development opportunities being given the same serious consideration. Could, tourism for instance have met the economic needs of the province? Could groundwater have provided the water needs for the local municipalities? These and other similar

alternatives were not given serious consideration in the EIA process, possibly because of the discursive power of mining for wealth creation in South Africa. In terms of ecological scales, the strategic assessment of the Olifants basin was not carried out and the scalar choice to focus only on the Steelport River obfuscated the downstream impacts as well as ignored the already stressed state of the catchment. In the process, the principles underlying the ecological reserve in the National Water Act (GSA, 1998) as well as the Southern African Development Community (SADC) Water Protocol (SADC, 2000) were not brought into consideration.

The elite coalition of the departments of minerals and energy and water affairs along with the 23 private mining companies (Hendricks, 2008) were able to sway the decision-making process so that concerns raised by actors operating at different levels were treated lightly. Through the use of discourse and material practices, water became mobilised and socially appropriated by the mining/government coalition to produce a hydrosocial landscape that embodies and reflects positions of social power (Swyngedouw and Heynen, 2003). In doing so, the protected position of the minerals sector is maintained and those in power within the ANC-led government, who have a stake in mining interests, continue to maintain their privilege as insiders who control the economy and the state (Maimane, 2014).

9.2.2 Politics in water service delivery

In the case of water service delivery, I took the approach of identifying a particular spatial area to investigate. In the process, I am accepting that the Greater Johannesburg Metropolitan Area is a defined spatial and jurisdictional level that has been constructed through the political processes of the South African government. At the same time, this social construction of urban space has a material reality that is formed and transformed through the infrastructure, social interactions and institutions within the city (Harvey, 2006).

Water service delivery is a matter of national priority in the post-apartheid dispensation. Within the highest institutions of the country, access to safe drinking water is enshrined as a basic human right (GSA, 1996 and GSA, 1998a). However, the realization of this right and the responsibility for water service delivery has been delegated down to the local level of government in a case of shared responsibility across jurisdictional levels (GSA, 1997).

The framing of water service delivery in Johannesburg is influenced by discourses of water rights at the national level at the same time as it is influenced by national and international discourses of water as an economic good. This mirrors the international norms of IWRM (ICWE, 1992) and carries the same embedded tensions in practice of reconciling rights and the treatment of water as an economic good. In addition to the international norms of water as an economic good, there is the general neoliberalizing trend in South Africa which has promoted the marketization of the water sector, and

especially water service delivery at the local level (Bond, 2006; Buhlungu, 2004). The vision of everyone having a right of access to safe drinking water is in direct conflict with local programmes of water service delivery marketization and privatization.

In Johannesburg, the business model of Johannesburg Water has led to programmes of cost-recovery where all consumers are required to pay for their water use above the free basic water allowance. However, the practices within the city are not uniform and different scaling frames are utilized to create different water consumption areas where poor people living in informal settlements are managed differently. When looking at water users in Alexandra and Soweto, the contrasts in treatment of different groups is clear (even without making comparisons to high-income areas). Through a process involving scale jumping, Alexandra has gained an elevated status so more resources are provided to support water service delivery as well as financial assistance to households. The website of the Alexandra Renewal Project says that 'The City of Johannesburg has an obligation to ensure that its citizens stay in harmonious environments that promote health, safety, amenity and general welfare' (ARP, 2014:1). Whilst this may be a motivation for the additional efforts to develop and improve quality of life in Alexandra, it is not the same across informal setttlements in Johannesburg. Soweto, with the highest UAW, is framed not as an area in need of support such as Alexandra but instead as an area with reckless consumers in need of disciplining and punishment. In this, we see that the 'contested politics of urban water circulation are simultaneously the arena in which and means through which particular political-economic programmes are pursued and implemented' (Heynen et al., 2006:15).

Pre-paid meters were introduced as a mechanism to reduce UAW. The community protests against these measures was taken up by national stakeholders in a process that saw jumping of scales as well as levels of jurisdiction. By taking their case to the Constitutional Court of South Africa, the community members of Phiri shed their framing as individual consumers in the water market and argued to be treated as citizens with human rights to fair and equal treatment (Dugard, 2010).

The community action by residents of Soweto was not successful despite the fact that scale jumping generated a great deal of support. In the light of the hundreds of service delivery protests that are happening across South Africa, this raises the question of why the valid concerns of poor, predominantly black communities living in former townships and informal settlements have failed to generate a national social movement. Part of the answer might lie in the very practices of scaling, which target indigent households to be treated differently from other citizens. A secondary obstacle may lie in the processes of participation in the neoliberal state, South Africa, where people are treated as individual consumers rather than as collective social groups or communities. In a sense, we have seen a scaling down of civil society in interactions with the state that undermines that strong civil structures that existed during the apartheid era and shaped the struggle for democracy. The neoliberal shift in South Africa and the world

has shaped the forms of participation and influenced the way people relate to each other and the state. The impact of transnational discourses and processes of globalization and neoliberalism are seen even at the level of the individual and household in South Africa.

9.2.3 Politics in the decision to explore hydraulic fracturing

With the case of fracking in the Karoo, I introduce a different dimension from the first two cases. Here, the primary decision is not about water per se but about shale gas production. The impacts on water quality and quantity are side-effects of the decision to allow shale gas exploration and production in South Africa. Given that fracking is a contentious issue in many parts of the world and receives a great deal of media attention, the decision process over whether to consider shale gas as an energy option for the country has been greatly deliberated. In the process, different actors have mobilised to advocate for or against fracking. The decision, as with the other two case studies, rests with government and in this case, it is within the hands of national government and cabinet, advised by the DMR.

Similar to visions of platinum mining stimulating the economy in the Limpopo province and shoring up the foundation of the South African economy, the minerals and mining sector, shale gas is framed by national actors as a boon to the economy. The potential contribution of shale gas to the economic development is highlighted in many speeches of government officials. The investigation into fracking raised a great deal of uncertainty but despite the gaps in knowledge, still advocated fracking to proceed. This is contradictory to the precautionary principle which, according to NEMA, is meant to be used in making decisions over natural resources in South Africa (GSA, 1994). By using scale frames of national economic interest and discourses of neoliberalism, the power of capital within the private sector-led growth strategy of the country is emphasised (it is not the intention of the state to produce shale gas but rather to provide licences to multinational corporations to do so). The MEC, the particular system of capital accumulation of South Africa (Fine and Rustomjee, 1996) is realised through the state and market through fracking. Shale gas provides an opportunity for further development within the MEC. For actors at the national level, linking shale gas to the MEC increases the significance for the country, thus framings such as a 'gift from God.'

An important aspect of this framing within the MEC is that it tends to play a role in constraining the space and setting the borders, that can be occupied by other activities (Fine, 2009). By using scale fixing, participation in the investigation of fracking was limited to an intellectual elite and national government representations. Fig (2013) has raised concerns about the democratic deficit that such processes create however I draw attention to how scale fixing by participants seems to have diminished the discussion of other activities and alternative energy futures that may be better aligned with a long-term sustainability discourse. The role of the MEC is influential at the national level

and this has limited the investigation of alternatives to fracking such as investment in renewable energies for the energy transition (opportunity to address climate change) or tourism and agriculture for the development of the Karoo region (opportunity to grow the economy). In the investigations as well as cabinet discussions of the proposed fracking, the importance of water and the hydrosocial landscape of the Karoo is downplayed (DMR, 2012). The voice of actors at different levels, especially the local level are not included in investigations in a balanced manner.

The case does however highlight the ways local activists and other actors against fracking can find voice through their own processes of scaling. Using their own scale jumping and scale framing, opponents to fracking have successfully managed to connect to solidarity movements around the world against fracking. In addition, activist groups have been able to increase their political presence by firstly, bringing in urban citizens who may occassionally use the Karoo but place value on its natural and cultural heritage and secondly, connecting across race groups in a place where segregation is still entrenched. It remains to be seen if these actors can utilise these networks in the coming years as individual applications for fracking are submitted for investigation and approval, thereby creating opportunities to engage in the assessment process.

9.3 Reflecting on politics of scaling in water governance in South Africa

Using the evidence from the cases of water allocation and access at De Hoop Dam, Johannesburg and in the Karoo, I have shown how processes of scaling are present in different situations of water governance. These processes of scaling are political processes that are used by actors to empower or disempower, to include or exclude and ultimately to transform both the scales of water governance and also the control and access to water resources thus shaping the hydrosocial landscape.

In the three cases, processes of scaling resulted in politics of scaling. Underpinning the politics of scaling are a particular set of social relations and Harvey (1996) suggests that ecological transformations require the reproduction of those relations in order to sustain it. In South Africa, changes in water access and allocation are closely tied to questions of class, race, gender and historical elites. According to Swyngedouw and Heynen (2003: 900), 'social actors strive to defend and create their own environments in a context of class, ethnic, racialised, and/or gender conflicts and power struggles'.

As a scarce and precious resource, water in South Africa is the site of power struggles. As such, water governance is inherently a political process and should be seen as such. Swyngedouw (1999) asserts that natural or ecological processes do not operate

separately from social processes and thus we must understand the hydrosocial landscape as being both natural and social, subject to political influence. Scaling of this landscape is both discursive and material. Processes of scaling have been used to focus on technological solutions as in the case of De Hoop Dam or on market logics as in the case of water service delivery in Johannesburg and thus serve to hide or diminish the political struggles that are an inherent part of decision-making. Ultimately, the scalar configurations developed to justify different programmes of water access and allocation at De Hoop Dam and in Johannesburg produce distinct outcomes with respect to issues of socioenvironmental justice (Heynen, 2003).

In the three cases, I found that scale is actively produced through processes of scale framing, jumping, bending and scale fixing. In doing so, the goals of one group of water users is supported over another group. Through social interaction, actors create discursive narratives of scale. These in turn can take on material form. One of the findings of the study is that scaling by government and elites within a discourse of neoliberal capitalist development has been successful at disempowering some actors. This is an obstacle to realising goals of sustainability and human rights in South Africa. In the case of De Hoop Dam, the needs of the poor majority for jobs can be perverted to push through projects that lead to socio-ecological injustice for people living on the site of the dam, downstream water users and the ecological reserve; structures of participation for water service delivery are manipulated as in the case of pre-paid meters; government has adopted a paternalistic approach to poor households; and in the case of fracking, the value of water in the water-energy nexus is less than energy in the national perspective. In the end, I found that water as an economic good triumphs over water as a human right. This reflects the broader trends in South Africa where we have a shift from reconstruction and development (redress historical inequalities discourse) towards neoliberalism and capitalist economic development (neoliberalism discourse) and the elite holders of water rights continue to have their resources maintained while rights to water by all citizens (human rights discourse) and ecological resources (sustainability discourse) are being eroded.

9.4 Main contributions of the study

In this section, I draw some conclusions regarding the value and contributions of this study. I do so, by focusing on the learning outcomes for water governance; the advancement of theory and sustainability science.

9.4.1 Implications for politics of scaling in water governance

Scale is not neutral and the use of scale in water governance and environmental governance more generally should be treated seriously. In the theoretical review in

chapter three, two different approaches to scale were outlined. On the one hand, scale is seen as a defined part of the landscape in which water governance takes place. On the other hand, scale can be viewed as produced by and stimultaneously, producing water governance. The evidence from the three cases show that the active process of scaling is part of the political contestation over water resources. Scale is not a neutral physical boundary to hold water and social interactions and there is therefore a need to take cognisance of processes of scaling and their implications. By treating scale as neutral, we risk treating decisions about scales and levels as being technical decisions rather than conflictual social interactions. Drawing from this study, I call for a more conscious examination and treatment of scale and scaling in water governance.

9.4.2 Advancing theory through combining disciplinary perspectives

Manson (2008) traces the epistemological continuum of scale research and recognises that the meaning and use of scale is contested across the social, natural and information sciences. If we are to further interdisciplinary and transdisciplinary research on socio-nature, researchers must reach some understanding of the different uses and assumptions embedded in the use of scale. In this study I have drawn from the social science where scale is more likely to be seen as produced through social interactions. The main body of theoretical work has come out of political geography, especially Marxist political geography which seeks to explain the underlying forces of capitalism responsible for producing scale. Other disciplines are less concerned with the capitalist structures and focus instead on how scales and levels are implicated in environmental governance through scalar dynamics. This has led to different languages being used that makes interdisciplinary work difficult. By combining different bodies of literature it is easy to risk inconsistencies in argument. By clarifying my epistemological position and being explicit in the use of different terms as well as their origins, I have brought together learning from across disciplines and used this learning in three empirical cases. More specifically, I have investigated the four processes of scale framing, jumping, bending and fixing (where present) in each of my cases thus making use of a consistent way to examine processes of scaling. In my research, I suggest that it is more productive to talk of scaling rather than scale itself. It is in understanding the processes of scaling that we can find common ground between disciplinary work.

9.4.3 Contributions to Sustainability Science

Combining the two contributions on politics of water governance and theoretical advancement, I suggest that my research does contribute to sustainability science through addressing water scarcity; complexity of scales for sustainability science; critical research on environmental governance; and interdisciplinarity.

At the most basic level, water scarcity is one of the big sustainability challenges of our time (Jerneck et al., 2011). The hydrosocial landscape is one that combines the

ecological, social, economic and political and thus addressing water requires an integrated sustainability perspective.

Clark (2007:1737) suggests that 'sustainability science research is seeking to support the integrative task of managing particular places where multiple efforts to meet multiple human needs interact with multiple life-supporting systems in highly complex and often unexpected ways'. Scales and levels are means of ordering and understanding some of this complexity and it is therefore important to understand the politics of scaling which ultimately has implications of equality and justice.

In addressing sustainability challenges such as water scarcity, environmental governance has been adopted as one of the main pathways to do so. In my research, I offer a critical perspective on water governance to raise some of the complexity inherent in governance processes. There is a risk that in dealing with multiple scales and levels, that governance research focuses on the shifting scales of institutions; scalar mismatches or scale as a tool of observation and measurement without acknowledging the politics embedded in all of this knowledge production. By highlighting the politics of scaling, I provide support for the need for a reflective, political ecology approach to scale in environmental governance, both in research and application.

Finally, my research touches on the difficulties of interdisciplinarity in sustainability research (Schoolman et al., 2012). My analysis of politics of scaling draws on scale research within different disciplines. At present, there is little cross-referencing or shared learning about scalar dynamics and politics of scale in environmental governance. In doing so, it is evident that there is scope for a great deal more sustainability research and empirical data to bridge the disciplinary gaps.

9.5 Concluding Thoughts

Scaling of water governance in South Africa can be seen as a process of socioecological change as a result of social relations and material practices. Water and society are deeply intertwined so that processes of scaling influence the hydrosocial landscape across social, economic, cultural and biophysical elements and this in turn influences scaling. These processes may be active interventions or unconscious acceptance of discourses or the material hydrosocial landscape. In all three of the cases I examined, there were conflicts surrounding decisions on water access and allocation. Different actors had interests in pursuing one avenue of water governance over another – develop the dam or not; install pre-paid meters or not; use water for fracking or not. Power may have been exerted explicitly in the decision making processes such as disconnections for non-payment. However, the cases illustrate that power may be more subtly wielded through scale framing, jumping, bending and fixing. Politics of scaling are thus active parts of

water governance in South Africa and is empowering of some and disempowering of others as shown in the cases of De Hoop Dam development, water service delivery in Johannesburg and hydraulic fracturing plans in the Karoo. These political tools are not always visible in water governance and deserve greater attention as politics of scaling raises questions of justice and fairness in the hydrosocial landscape.

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APPENDIX

List of in-depth interviews

South Africa Water Governance:

1. J Bhagwan, 17 August 2010 and 21 June 2011, Executive Manager: Water Use and Waste Management, Water Research Commission.
2. M Muller, 09 July 2009, Technical Member: Global Water Partnership and visiting adjunct professor: Graduate School of Public and Development Management, University of Witwatersrand.
3. A Turton, 17 December 2013, Private water consultant.
4. B van Koppen, 09 July 2009, Principal Researcher Poverty, Gender, and Water with the International Water Management Institute.
5. F van Zyl, 17 December 2013, Director: Water Services – Planning and Information, Department of Water Affairs and Forestry.

Water Service Delivery in Johannesburg:

1. L Fenn 19 August 2010, Director: Alexandra Renewal Project
2. N Letter, 09 July 2014, Acting Director: Alexandra Renewal Project
3. J Duggard, 21 June 2011, Senior Researcher: Socio-Economic Rights Institute
4. J Metula, 17 June 2010, Executive Manager: Communications and Stakeholder Relations, Johannesburg Water.
5. A Manus, 20 June 2011, Director: Water Directorate, City of Johannesburg.

De Hoop Dam Development:

1. J van Niekerk, 09 June 2009, Contractors' Representative: De Hoop Dam, Department of Water Affairs and Forestry.
2. P Kruger, 06 June 2009, Project Manager: De Hoop Dam, Department of Water Affairs and Forestry.
3. E Ngorima, 17 June 2010, Senior Researcher: CSIR.
4. P Owen, 08 June 2009, South African representative: Geasphere.
5. N King, 18 June 2010, Former Director: Endangered Wildlife Trust.