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# Critiquing Cooperation: The Dynamic Effects of Transboundary Water Regimes

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*Thesis submitted in partial fulfilment of the requirements for  
the Degree of Doctor of Philosophy in Development Studies  
at the University of Oxford*

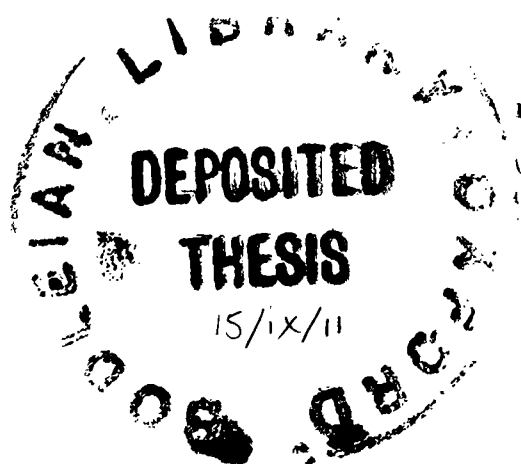
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MICHAELMAS TERM 2010

[i.e. 2011 - UTS = 15/IV/11]



## ABSTRACT

The purpose of this study is to develop a deeper understanding of the formation and performance of the international water management institutions operating in the Orange-Senqu basin shared between Lesotho, South Africa, Botswana, and Namibia. The research examines the influence of interstate interaction on adaptive capacity and the allocation of water and related benefits within the Orange-Senqu basin and provides explanations for how and why particular cooperative arrangements emerged and produce differential effects.

By applying a structure–agent approach to regime analysis, this study draws attention to four key factors underpinning the formation and performance of the Orange-Senqu water governance regime: power asymmetry, problem structure (i.e., the combination of interest asymmetry and uncertainty), expert networks, and political context. The study demonstrates that each of these four factors provides important and complementary insight into the process of interaction of and the positive and negative effects produced by international water management institutions in the basin and opportunities for generating change. Among these factors, the study argues, power asymmetry and problem structure are critical for understanding transboundary water governance dynamics and identifying strategies for challenging the status quo.

## ACKNOWLEDGEMENTS

This thesis would not have been possible without the great wisdom, generosity and support of many people.

In southern Africa, thanks are due to all of the individuals who took time out of their busy schedules to meet with me. I have learnt an immense amount from these conversations, none of which would have been possible without the willingness of respondents to share their time, experiences, and opinions. Additional thanks are due to Pete Ashton, Marius Claassen, Dirk Roux, and Tony Turton who served as excellent hosts, mentors, and collaborators throughout my time at the Council for Scientific and Industrial Research.

At Oxford, I would like to thank my supervisors, Laura Rival and Mike Edmunds, for their support and patience throughout this project. Thanks also to my classmates who have challenged, inspired and supported me over the course of this journey. Special thanks are due to Steph Topp for her unfailing encouragement and assistance that have been absolutely crucial in not only completing this project, but enjoying it as well.

I also want to thank the members of the London Water Research Group for so kindly welcoming me to their rousing roundtable discussions and always leaving me with a multiplicity of ideas to ponder on the bus ride or plane flight back home. I am deeply indebted to Marwa Daoudy, Naho Mirumachi, Dave Phillips, Jeroen Warner, Melvin Woodhouse, and Mark Zeitoun for their constructive feedback on conference papers, journal articles, and draft chapters and their willingness to share and shape new ideas.

Thanks are also due to the Jeanne Sauvé Foundation and my friends and colleagues at McGill and Duke Universities for the resources and support in the final writing stages.

Lastly, tremendous thanks are due to my entire family and my loving fiancé, Tim Keller. Your advice, encouragement, perspective and laughter have made this possible.

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## LIST OF ACRONYMS AND ABBREVIATIONS

ANC	African National Congress
BNP	Basotho National Party
CIA	Central Intelligence Agency
CSIR	Council for Scientific and Industrial Research
DWAF	Department of Water Affairs and Forestry
DFID	Department for International Development
EU	European Union
FCHH	Framework of Counter-Hydrohegemony
FFEM	French Global Environmental Facility
FHH	Framework of Hydrohegemony
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GTZ	German Technical Cooperation Agency
GWP	Global Water Partnership
H1–H7	Hypotheses 1–7
HST	Hegemonic Stability Theorem
ILA	International Law Association
IR	International Relations
IWRM	Integrated Water Resources Management
IWRMP	Integrated Water Resources Management Plan
JIA	Joint Irrigation Authority
JPTC	Joint Permanent Technical Committee
JTC	Joint Technical Commission
LHDA	Lesotho Highlands Development Authority
LHWC	Lesotho Highlands Water Commission
LHWP	Lesotho Highlands Water Project
NGO	Nongovernmental Organisation
OKACOM	Okavango River Basin Water Commission
ORASECOM	Orange-Senqu River Commission
POE	Panel of Experts
PWC	Permanent Water Commission
RDP	Rural Development Programme
SADC	Southern African Development Community
SADCC	Southern African Development Cooperation Community
SAP	Strategic Action Plan
SQ1–7	Sub-question 1–7
TAMS	Tippets-Abbett-McCarthy-Stratton Consortium
TCTA	Trans-Caledon Tunnel Authority
TDA	Transboundary Diagnostic Analysis
TRC	Transformation Resources Centre
UN	United Nations
US	United States
UNDP	United Nations Development Programme
USD	United States' Dollar
VNJIS	Violsdrift/Noordower Joint Irrigation Scheme

WCD  
WWAP  
WWC

World Commission on Dams  
World Water Assessment Programme  
World Water Council

## **CHAPTER 1: INTRODUCTION**

### **Introduction**

Adequate water is one of the world's most pressing developmental concerns. Water is essential for sustaining human health, economic vitality, and environmental processes. Consequently, the successful management, protection and allocation of water resources are central to agendas for public health, poverty reduction, economic growth, and political stability (Overseas Development Institute 2002). Recent calculations estimate that over 1 billion people lack access to safe and affordable water for domestic use (World Health Organisation 2003). Although localised water scarcity and water stress may be climatically driven, this shortfall in water availability reflects governance deficiencies more than physical limits of Earth's finite resources (Mehta 2000; Warner 2003).

Transboundary basins, or basins that extend across national boundaries and are shared by two or more states, pose particularly complex governance challenges. Where international boundaries bisect river basins or aquifers, they separate sovereign nations with distinct interests, management policies, legal frameworks, and political practices. This creates potential barriers to the coherent regulation and management of water resources as a whole. The complexity of governing shared waters is compounded by continuous climatic, demographic, and economic changes affecting patterns of water flow and utilisation (McCaffrey 2003).

Worldwide, there are 263 transboundary river basins and 273 transboundary aquifers (Wolf, Yoffe, and Giordano 2003; United Nations Educational, Scientific, and Cultural Organisation's Internationally Shared Aquifer Resources Management 2004). On the continent of Africa alone, transboundary river basins account for 93% of freshwater resources and encompass 61% of the land area, providing water for 77% of the population (Ashton and Turton 2008). Consequently, addressing the challenges of transboundary water governance on the African continent is critical for confronting related challenges of poverty reduction and public health.

In the last fifteen years, forecasts of looming water wars have flooded media reports, academic literature, and policy briefs (Starr 1991; Bullock and Darwish 1993; Shiva 2002). Recent empirical work, however, has demonstrated that countries are more likely to cooperate than fight over internationally shared waters (Wolf, Yoffe, and Giordano 2003). This finding helped to shift both academic research and policy dialogues towards questions about how to increase cooperation over transboundary waters and contributed to a significant push by bilateral and multilateral donor organisations for the creation and expansion of international water treaties and river basin organisations throughout Africa, Asia, and Latin America (World Water Council [WWC] 2003).

While the importance of international cooperation in transboundary basins has quickly become accepted as conventional wisdom within the international development community, questions about how to expand cooperation for transboundary water governance overlook crucial intermediate inquiries about its processes, effects, and

determinants. That is, who shapes the patterns of water cooperation and to what effect? What influences does cooperation have on riparian states' behaviours, water allocation, or ecosystem protection? Does cooperation fulfil explicit and implicit expectations or does it hinder parties from solving problems and meeting goals? Only when these key questions are addressed can we adequately engage with the more commonly posed questions about how cooperation can be expanded and improved. Without rigorous research into the past performance and positive and negative effects of interstate water management institutions, efforts to promote and expand cooperation may have detrimental and unintended consequences.

The purpose of this study is to develop a deeper understanding of the formation and performance of the international water management institutions comprising the Orange-Senqu water regime. The research aims to expose key determinants driving the emergence and effects of transboundary water governance arrangements in the basin. The study examines the influence of interstate interaction on adaptive capacity and the allocation of water and related benefits within the Orange-Senqu basin and provides explanations for how and why particular cooperative arrangements emerged and produce differential effects. The primary aim of this work is to serve as a building block study through which the understanding of causal mechanisms in the case of the Orange-Senqu water regime will have implications for understanding causal mechanisms in other cases.

By applying a structure–agent approach to regime analysis, this study draws attention to four key factors underpinning the formation and performance of the transboundary

water governance regime in the Orange-Senqu basin: power asymmetry, problem structure (i.e., the combination of interest asymmetry and uncertainty), expert networks, and political context. The study provides an in-depth examination of the historical and contemporary significance of the four factors in shaping the emergence and outcomes of cooperative arrangements. The study demonstrates that each of these four factors provides important and complementary insight into the process of interstate interaction, the positive and negative effects produced by international water management institutions in the basin, and opportunities for generating change. Among these factors, the study argues, power asymmetry and problem structure are most critical for understanding the dynamics of transboundary water governance and opportunities for crafting strategies to challenge the status quo.

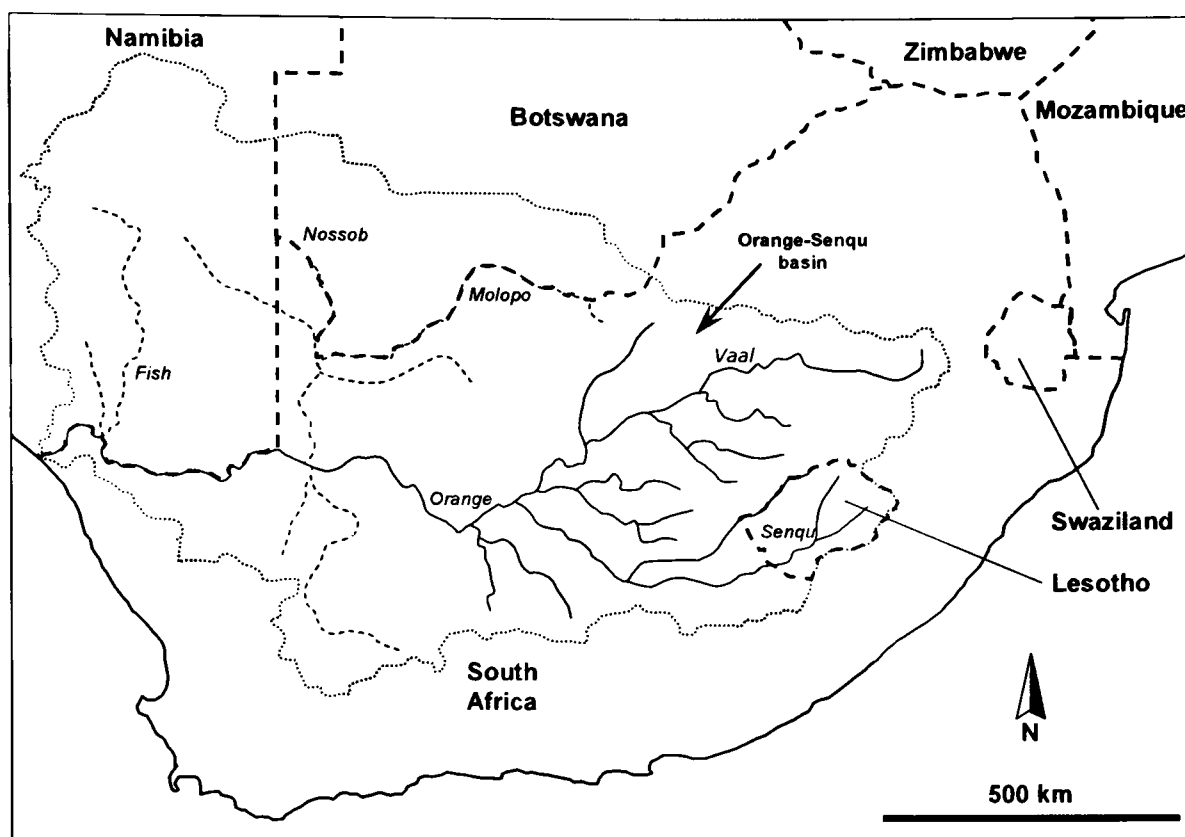
This work intends to enrich the existing literature on the hydro politics of the Orange-Senqu basin. By rejecting the notion that international water cooperation is inherently positive, this study takes a critical look at the process and outcomes of transboundary water governance. It bridges the analyses of regime formation and regime effects, which are often handled separately in existing studies, and provides a systematic evaluation of key determinants shaping the emergence and performance of the multiple international water management institutions comprising the wider basin regime. The critical analysis of donor engagement in the basin also makes an important and original contribution.

The remainder of this chapter outlines the scope and structure of this study and identifies the core policy problems and research gaps motivating this research. Section

1.1 clarifies the geographical and temporal scope of the study. Section 1.2 examines the discourses of water scarcity, water conflict, and integrated water resources management (IWRM) and illustrates the growing emphasis on transboundary water cooperation as a key strategy for adapting to changing circumstances, mitigating conflict, reducing poverty, and protecting ecosystems. Section 1.3 provides a preliminary discussion of research gaps and presents the approach and contributions made by the present study. Finally, section 1.4 outlines the research questions and hypotheses guiding this study, and section 1.5 presents the thesis's structure and summarises subsequent chapters.

### **1.1 Scope of the Study**

The scope of this research is bound by both geography and time. The study takes an in-depth look at transboundary water governance in the Orange-Senqu River basin, shared between Lesotho, South Africa, Botswana, and Namibia (figure 1.1). The primary focus of the analysis is on interstate interactions contributing to the formation, implementation, and effects of four core international water management institutions operating at the bilateral and basin-wide scales. Beyond the state level, the study also considers how certain nonstate actors operating above and below the basin scale influence and are affected by governance arrangements. Particular attention is paid to communities displaced by the binational Lesotho Highlands Water Project (LHWP) and the cluster of bilateral and multilateral donor organisations engaged in supporting transboundary water governance in the basin.



**Figure 1.1** Map showing the location and extent of the Orange-Senqu River basin and the major tributaries in the basin. *Source:* Previously published in Kistin and Ashton 2008.

The temporal focus of the study is on the hydropolitical relations between riparian states from the mid-1960s through 2008. The starting point of the study marks the period in which South Africa first formally approached Lesotho with the proposal for constructing the LHWP. Background information prior to the mid-1960s is provided, however, to illustrate the patterns of early basin development by colonial powers and riparian states. The regime formation analysis extends from the mid-1960s through 2000 when riparian parties established the Orange-Senqu River Commission (ORASECOM), the newest international water management institution pertaining to the basin. The assessment of regime performance stretches from 1986, when the treaty establishing the LHWP was signed by South Africa and Lesotho, to 2008, when field research into the four core, international, water management institutions operating simultaneously in the basin was completed.

## **1.2 Discourses of Water Cooperation**

Over the last few decades, international cooperation in transboundary basins for water governance has emerged as a key issue in developmental policy and a critical strategy for addressing water scarcity, mitigating conflict, protecting ecosystems, and enabling sustainable development. Desires to increase transboundary water cooperation have fuelled a significant push by bilateral and multilateral donor organisations towards the creation and expansion of international water treaties and river basin organisations throughout Africa, Asia, and Latin America (WWC 2003).

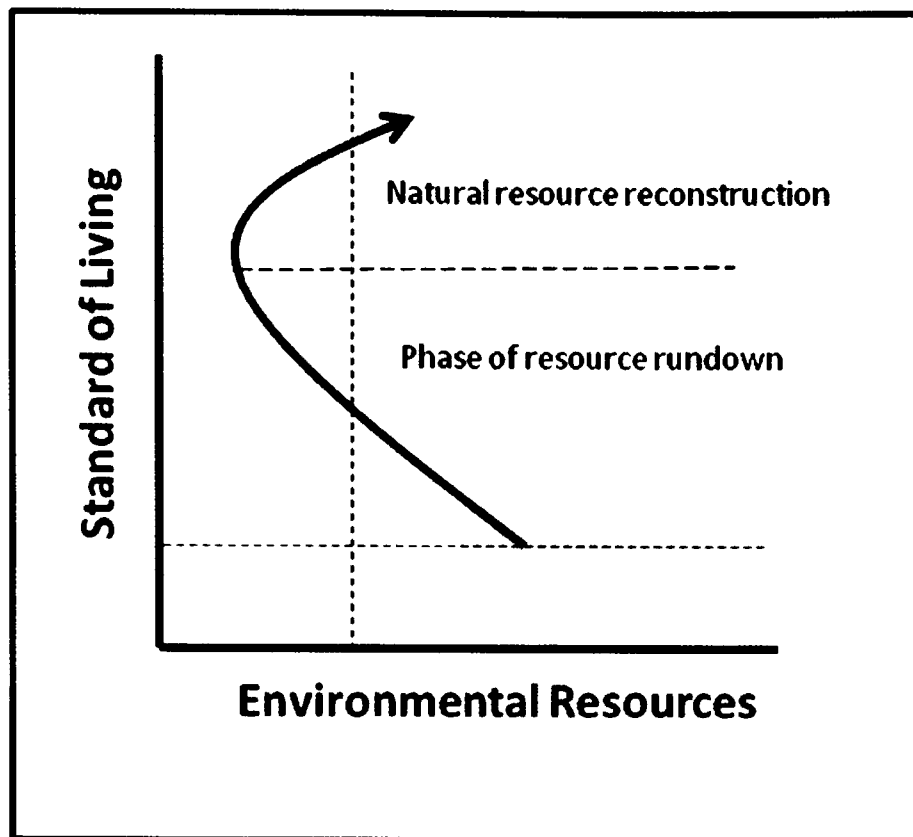
This section examines three related discourses—scarcity, conflict, and IWRM—contributing to the endorsement and promotion of international cooperation in shared basins. It illustrates the important role and potential benefits of transboundary water cooperation but argues that more work is required to understand the effects and determinants of existing arrangements before pushing ahead with efforts to expand and improve water cooperation throughout the developing world.

### ***1.2.1 Water Scarcity***

With global population expected to increase from 6 to 9 billion people over the next fifty years, increasing demand and the uncertainties brought by global climate change have heightened concerns about the availability of a sufficient quantity and acceptable quality of water to meet society's many needs. This has generated warnings about a water crisis of global proportions (United Nations Development Programme [UNDP] 2006; Pearce 2007; Barlow 2008).

The term *water scarcity*, frequently invoked to describe the global water crisis, is commonly misunderstood as describing a physical lack of water resources. Analysts and practitioners increasingly recognise, however, that the global crisis is not about having too little water to satisfy needs, but rather, is “a crisis of managing water so badly that billions of people and the environment suffer” (WWC 2000, 3–4). This characterisation of the global water crisis recognises that while localised water scarcity and water stress may be climatically driven, they are reinforced by political, technological, and economic barriers to water use (Mehta 2000; Warner 2003).

Such recognition pegs adaptive capacity and international cooperation as critical responses to water scarcity. According to Karshenas and Allan (1996), in the initial stages of development, societies commonly reduce their stock of environmental capital to meet immediate needs. This process often leads to a resource depletion phase in which water resources are used at an unsustainable rate. This initial trajectory, however, does not represent an inevitable or unavoidable negative outcome for long-term water use. As Karshenas and Allan (1996) observed, nation-states are able to avoid the debilitating effects of water scarcity, both on ecology and humanity, by adapting their patterns of resource consumption. Through this adjustment, countries are capable of altering the trajectory of resource consumption to achieve an outcome of long-term sustainability in which overall levels of water demand coincide with the amount of water supplied (Allan 1999; Turton 2000; figure 1.2).



**Figure 1.2** The Karshenas' Curve: a theory of resource rundown and sustainable use. *Source:* Derived from Karshenas and Allan 1996 and Turton 2000, 6.

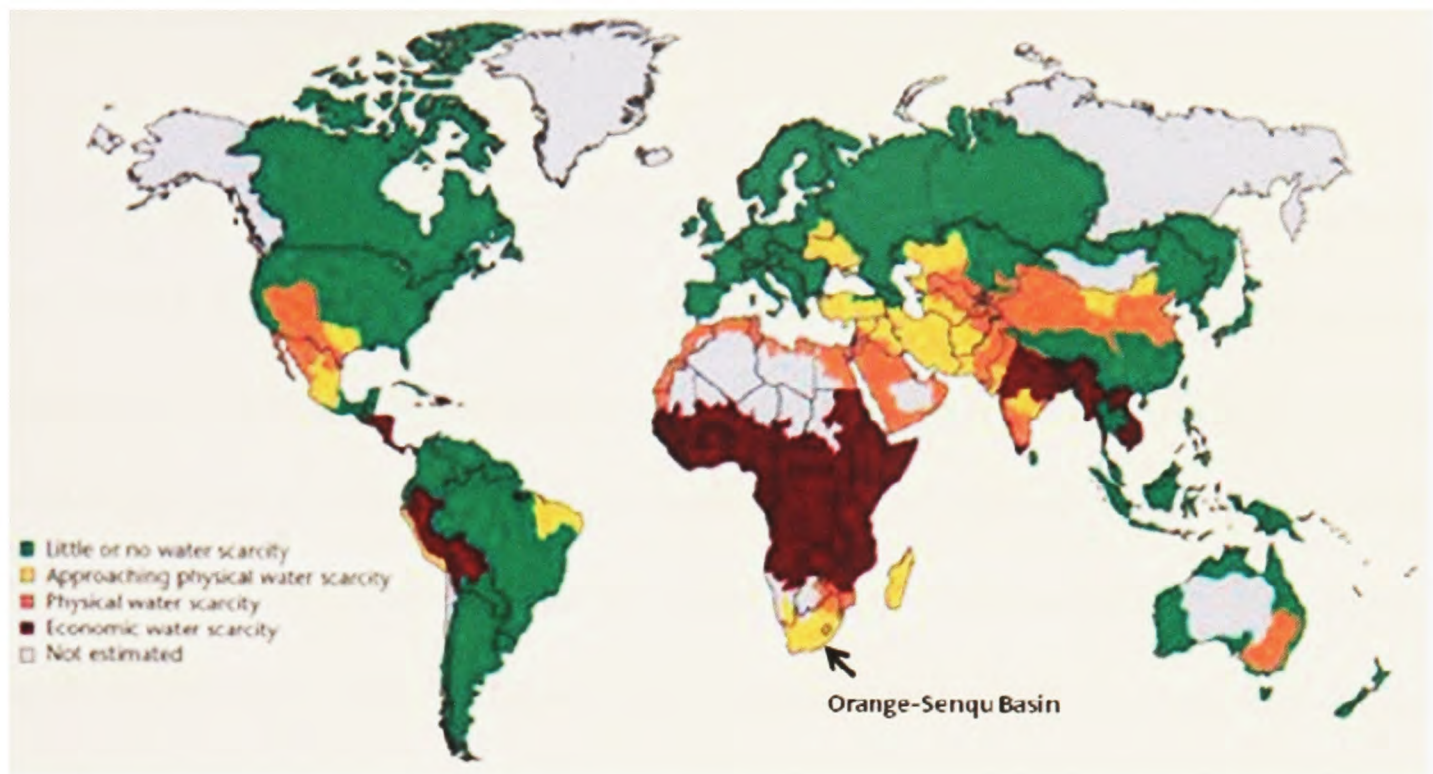
*What is Required to Turn the Curve?*

According to Turton (2003), *reflexivity*, or the ability to recognise that the current patterns of resource use are unsustainable over the long run, constitutes the first step in turning the water consumption curve from a trajectory of resource rundown to a trajectory of sustainable use. Acting on this reflective desire requires information and understanding about what needs to be changed, strategies for how to change it, and mechanisms to implement and enforce the desired change. The capacity to meet these requirements—collecting data, devising plans, and implementing policy—and adjust to increasing levels of water scarcity requires the mobilisation of intellectual, institutional, financial, and technical capital within a society (Ohlsson 1999). Several analysts have tried to capture the relevance of adaptive capacity in measurements and indicators of water scarcity (Rijsberman 2005; table 1.1).

**Table 1.1** Measurements and indicators of water scarcity that account for adaptive capacity.

<b>Indicator/Approach</b>	<b>Authors</b>	<b>Description</b>
Social Water Stress Index	Ohlsson 1998	Weighs calculations of water availability per capita per year with the United Nation's Development Program's Human Development Index to capture society's stress-adaption capacity through economic, technologic, and other means.
Physical and Economic Scarcity	International Water Management Institute 2000	Combines calculations of renewable resources available to meet human needs minus total consumptive needs with the adaptive capacity of nations. <i>Capacity</i> is defined as potential infrastructure development and enhanced irrigation efficiency through improved water management policy to distinguish between <i>economic scarcity</i> (where resources exist but require investment to access and manage) and <i>physical scarcity</i> (where forecasted demand cannot be met even with adaptation).
Water Poverty Index	Sullivan et al. 2003	Measures the physical availability of water, the degree to which humans are served by water, and the maintenance of ecological integrity. The index clusters components in five dimensions: access to water; water quantity, quality and variability; water uses for domestic, food, and productive purposes; capacity for water management; and environmental aspects.

Drawing on the physical and economic scarcity approach developed by the International Water Management Institute (2000), the World Water Assessment Programme (WWAP) analysed present levels of water scarcity in transboundary basins worldwide (WWAP 2009). As figure 1.3 shows, the Orange-Senqu basin is approaching physical water scarcity: forecasted demand is quickly outpacing the level of supply and adaptation. While countries within the basin continue to pursue supply-side solutions to extract, dam, and distribute water, pure engineering efforts are increasingly coupled with a range of technical, social, and economic strategies to increase the end-use efficiency of water resources and decrease demand (Kistin and Ashton 2008). As demand continues to grow, riparian states are likely to face continued and contentious challenges for adjusting levels of demand to coincide with sustainable levels of supply (Orange-Senqu River Commission [ORASECOM] 2000).



**Figure 1.3** Map depicting physical and economic water scarcities in transboundary river basins worldwide. *Source:* Adapted and reproduced with permission from World Water Assessment Programme 2009.

At the global level, water scarcity projections show that up to two-thirds of the world's population will be affected by either economic or physical water scarcities by 2025. Significant increases in African and Asian water scarcities are expected to turn them into a key limiting factor in food production and livelihood generation (Rijsberman 2005). Water scarcity and adaptation are thus significant components of the water challenges facing the globe.

### *Linking Adaptive Capacity and International Water Cooperation*

Where water resources cross national boundaries and are shared by two or more states, international cooperation to adapt to increasing levels of water scarcity is required. Enabling the reflexivity described earlier, for example, requires information about water resources in the region (e.g., where the water is located, how much is

available, what the quality is, and how it moves and changes over time) and how these resources are currently being used.

Obtaining this basic information is complicated where water resources are crosscut by international boundaries. Although the water flows freely from one country to another irrespective of political boundaries, the movement of data and information concerning these water resources and how they are used is rarely so fluid. Given the urgent nature of water shortages, sovereign nations mistrustful of their neighbours may tightly guard information about national water supplies and water use patterns (Good Neighbor Environmental Board 2005, 26).

In addition, data sharing between riparian nations within an international basin can be complicated by issues of data incompatibility. That stems from a lack of consensus regarding approaches to investigations, data collection protocols, variability in laboratory methodologies, database management and reporting systems, and data interpretation methods (Kistin and Phillips 2007). Developing an information foundation on shared water resources and national water use patterns thus requires international cooperation to facilitate not only the exchange but also the collection of data (Ohlsson and Turton 1999).

International cooperation also plays an important role in the formation and implementation of adaptation strategies. Due to the international interconnectivity created by shared watercourses, it is difficult for nations to gauge outcomes or devise action plans without knowing the intentions of riparian nations.

This section illustrated that water scarcity is a socially defined concept influenced by natural, water resources endowments but also heavily influenced by political decisions about resources allocation, access, and use (Jairath 2006). The central challenge presented by rising levels of water scarcity is one of adapting societal levels of water demand to coincide with arrangements for water supply. Responding to this challenge requires the mobilisation of a range of capital endowments—intellectual, institutional, technological, and financial—to activate core components of the adaptive process: reflexivity, knowledge, strategies, and policy. In the context of transboundary water management, each of these elements requires some degree of international cooperation.

### ***1.2.2 Water Conflict***

Throughout the early 1990s, concerns about water scarcity and resource competition in transboundary basins sparked forecasts of looming water wars in media reports, academic literature, and policy briefs (Irani 1991; Bullock and Darwish 1993; Swain 2001; Shiva 2002; Reid 2006). In an article entitled “Water Wars,” Starr (1991, 17) reported that the U.S. intelligence service hypothesised that dwindling supplies of shared water could lead to wars, particularly in the Middle East. Prominent leaders in the United Nations (UN) and the World Bank reinforced predictions of violent clashes over water resources.

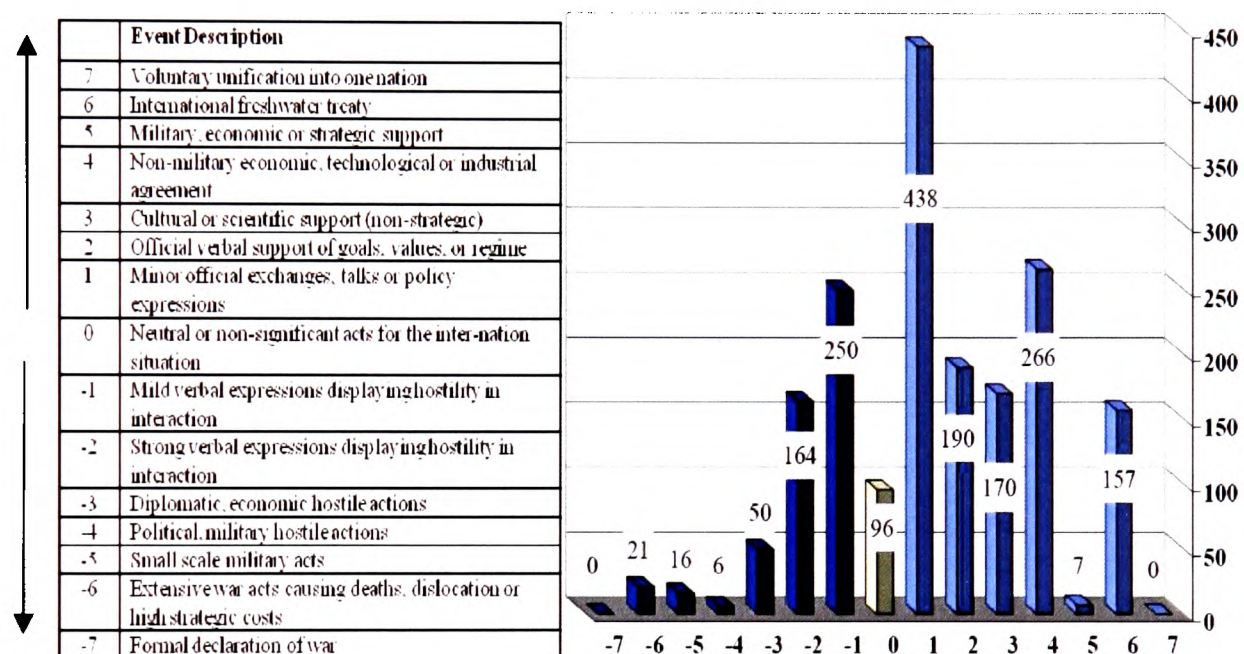
In 1991, UN Secretary General Boutros Boutros-Ghali argued that the next war would be fought over water, not politics (*Middle East Quarterly* 1997). In 1995, Ismail

Serageldin (1995), then the World Bank's President for Environmentally Sustainable Development, said that "the wars of the next century would be over water, not oil." Six years later, UN Secretary General Kofi Annan told the Association of American Geographers that "fierce competition over freshwater may become a source of conflict and wars in the future" (UN 2001). In 2007, his successor, Ban Ki-Moon, argued in a *Washington Post* editorial that "Darfur is an environmental crisis—a conflict that grew at least in part from desertification, ecological degradation and a scarcity of resources, foremost among them water" (Ki-Moon 2007).

In academic literature, Gleick (1993) argued that increasing demand for scarce water supplies may lead to increased tensions and the possibility of violent conflict. Homer-Dixon (1994, 19) suggested that the renewable resource most likely to stimulate violent conflicts was water. Together, these forecasts of water wars and violent conflicts were rooted in observations of increasing water demand and diminishing water supplies and fuelled by the assumption that increasing competition over these resources would lead to severe interstate conflicts.

Numerous authors countered these forecasts with empirical analyses. Allan (1996) showed that global trade in *virtual water*—the water used in the production of goods—allowed water-scarce countries such as Israel and Egypt to alleviate water deficits without defaulting to more costly, violent means. Turton (2000, 116) argued that water was not a necessary and sufficient cause for going to war, but it did often become a target when conflicts started.

Most significantly, empirical work spearheaded by Wolf, Yoffe, and Giordano demonstrated that throughout history, countries were more likely to cooperate than fight over shared water resources (2003). An analysis of over 1,800 recorded transboundary events about international watercourses between 1950 and 2000 showed that more than two-thirds of the events were cooperative in nature. Of the less than one-third of events coded as conflictive, the majority fell at the mild end of the scale (figure 1.4).



**Figure 1.4** Distribution of transboundary events on the Water Events Intensity Scale. *Source:* Adapted from Yoffe, Shira, and Larson 2001.

Wolf, Yoffe, and Giordano’s findings (2003) further contributed to the debate by demonstrating that conflictive events were not strongly correlated with water scarcity. Instead, the major variables associated with water conflict events were the occurrence of significant physical and political changes within a basin and low levels of institutional capacity to prevent and adapt to changing circumstances (Postel and Wolf 2001). Thus, one of the key policy recommendations taken from their work was the importance of promoting and strengthening institutional capacity in the form of

international water treaties, agreements, and river basin organisations as a means of conflict mitigation.

### ***1.2.3 Integrated Water Resources Management***

The concept of IWRM has been broadly endorsed as a framework for addressing water scarcity and conflict and as the key for sustainably managing water resources. As Hepworth (2009, 19) described it, IWRM represents “a discursive response to the knowledge that the interconnectedness of the water cycle, particularly at river catchment and aquifer scale, requires that the full range of water uses and their needs be considered together to avoid conflicts and negative impacts and to optimize the benefits of water use.”

The framework calls for management integration at the resource level (e.g., between water quantity and quality, surface water and groundwater, and water and land resources) and the user level (e.g., between socioeconomic sectors, human and ecological uses, and upstream and downstream users). A commonly cited definition from the Global Water Partnership (GWP 2000, 22) describes IWRM as

a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

One of the key concepts underpinning the IWRM approach is that water resources should be managed at the basin level by river basin organisations created to facilitate the integration of management across sectors and geographic scales (GWP 2000).

Thus at the international level, *IWRM* and *international water cooperation* are often regarded as synonymous terms.

Over the last two decades, IWRM has been widely adopted as the mainstream approach to water management (Lankford et al. 2004). Prominent international summits have endorsed IWRM approaches. That illustrates the global diffusion of the framework and its adoption as best practice at the national and international level (Hepworth 2009; Dombrowsky 2007). International cooperation for the coherent management of transboundary basins is commonly sanctioned within the broader context of IWRM (table 1.2).

**Table 1.2** Endorsements of international water resources management by the international water community.

<b>Conference</b>	<b>Documents' Location, Year</b>	<b>Endorsement, Policy Recommendations</b>
International Conference on Water and the Environment	Conference Report Action Agenda, Dublin, 1992	Recognises the need for international cooperation to facilitate agreements on the coordination of water management. Calls for the elaboration of "integrated management plans, endorsed by all affected governments and backed by international agreements" (1992, 5)
UN Conference on Environment and Development	Agenda 21, Rio de Janeiro, 1992	Calls on riparian states to "formulate water resource strategies, prepare water resources action programmes and consider, where appropriate, the harmonization of those strategies and action programmes" (1992, ch. 18, sec.10)
International Conference on Water and Sustainable Development	Ministerial Declaration, Paris, 1998	Emphasises the importance of international cooperation for integrating the development, management, use, and protection of water resources
2nd World Water Forum	Ministerial Declaration, The Hague, 2000	Recognises the need for international policies and institutions to achieve IWRM. Encourages states "to promote peaceful cooperation and develop synergies between different uses of water at all levels, whenever possible, within and, in the case of boundary and transboundary water resources between states concerned through sustainable river basin management" (2000, 1)
International Conference on Freshwater	Bonn Keys, Bonn, 2001	Acknowledges the challenge of designing adequate agreements and institutions for transboundary river basin management. Encourages efforts to "make existing agreements more vital and valid" (2001, 1)
World Summit	Ministerial	Sets a target for all countries to have formulated IWRM plans

on Sustainable Development	Declaration, Johannesburg, 2002	at the national and regional level by 2005
3rd World Water Forum	Ministerial Declaration, Kyoto, 2003	Affirms support for enabling developing countries to develop IWRM at the local, national, and international levels

*Note:* IWRM = Integrated Water Resources Management, UN = United Nations, WWC = World Water Commission.

At the transboundary level, the benefits of integrated management and international cooperation have been conceptualised theoretically as benefits *to* the river (e.g., improved water quality, enhanced biodiversity), benefits *from* the river (e.g., improved management for agriculture, industrial, hydropower, and domestic uses), reducing costs *because of* the river (e.g., flood and drought management), and increasing benefits *beyond* the river (e.g., integration of local markets; Sadoff and Grey 2002, 2005).

Inspired by the potential for achieving such benefits, nongovernmental organisations (NGOs) and a multitude of donor organisations have embraced the concept as a critical response to global water challenges and a means for mitigating conflict and sustainably managing water resources (WWC 2003; Southern African Development Community [SADC] 2008). As a result, a “new and thriving IWRM industry” has emerged within the international development community (Biswas 2008, 275). The IWRM industry has been bolstered by enormous levels of funding primarily from the developed and developing world in the form of capacity building and financial support. It has reshaped the way water policy and related development assistance are conceived and delivered (Mostert 2005; Hepworth 2009).

In sum, the related discourses of water scarcity, water conflict, and IWRM have placed transboundary water cooperation at the centre of strategies for adaptation and sustainable development of water resources. Yet little work has been done thus far to understand the extent to which existing arrangements for transboundary water governance are achieving anticipated benefits and why they have been either successful or unsuccessful. As international momentum for the expansion and promotion of transboundary cooperation continues to grow, it is important to take a critical look at the performance of such governance to understand how and why particular cooperative arrangements produce differential effects.

### **1.3 Research Gaps, Approach, and Contributions**

So far, this introductory chapter has shown that the world is facing significant water management challenges that threaten human well-being and economic and social development in Africa and other less-developed regions of the world. Where rivers and groundwater cross international boundaries and are shared by two or more states, the development and support of international cooperation for transboundary water management has emerged as a critical response to water scarcity and water conflicts and as an important strategy for the sustainable development of shared resources.

The expectation is that by working together to jointly design principles, rules, norms, and decision-making procedures, riparian states will be better equipped to manage the quantity, quality, and flow of water resources in a way that is mutually beneficial to them and the aquatic ecosystems. Inspired by transboundary water cooperation's range of potential benefits, bilateral and multilateral donors are endorsing and

supporting the expansion of interstate institutions across Africa and elsewhere through capacity building and technical assistance programs (Nicol et al. 2000; Mostert 2005; SADC 2008). As this agenda rapidly expands, however, the performances, effects, and determinants of existing transboundary water governance arrangements remain poorly understood.

### ***1.3.1 Research Gaps***

There is a growing body of literature that seeks to understand different aspects of the policies, politics, and effects of transboundary water governance in the Orange-Senqu basin and the wider southern African region. These contributions have provided valuable insight into the historical and hydrological context of institutional formations (Conely and van Niekerk 2000; Heyns 2003; Turton 2003, 2005; Earle and Malzbender 2008; Jacobs 2009), the coverage and context of existing agreements (Ashton et al. 2006; Kistin et al. 2009), variable impacts of cooperative arrangements (Kranz, Interwies, and Vidaurre 2005; Kranz et al. 2005; Schuermans, Helbing, and Fedosseev 2004; Raadgever et al. 2008), and ongoing water governance challenges in the basin.

Despite these important contributions, significant gaps in the research remain. Shortcomings in the current conceptualisation and analyses of transboundary water governance in the Orange-Senqu basin stem from three trends that split the scope of research in ways that divert attention from important aspects of water governance. First, analyses of institutional formation and performance in the Orange-Senqu basin tend to focus on either the LHWP (Schuermans, Helbing, and Fedosseev 2004; Duc

and Carrasco 2007; Mirumachi 2004) or ORASECOM (Raadgever et al. 2008) but rarely consider the full suite of international water management institutions operating in the basin or the impact of institutional interplay on the effects of transboundary water governance.

The second common split is between analyses of conflict and cooperation in international basins. Influenced by the water wars debate discussed in section 1.2.2, which focuses on the potential for *either* conflict *or* cooperation to occur, water conflict and cooperation are often implicitly viewed as the absence or opposite of one another (Boge 2006; Grover 2008). Such views are partly perpetuated by the prevalence of continuum, like the Water Events Intensity Scale included in figure 1.3, that place cooperative and conflictive events on opposite ends of a linear spectrum of riparian interaction. Viewing conflict and cooperation within this either/or framework diverts attention from the dynamism of riparian states' relationships and the possibility that cooperation may generate both positive and negative effects (Kistin 2006; Mirumachi 2007; Zeitoun and Mirumachi 2008).

The third common split contributing to shortcomings in the analyses of transboundary water governance within southern Africa and the Orange-Senqu basin occurs between the analysis of institutional formations and institutional effects. As in the wider body of transboundary water literature, significant attention regarding the Orange-Senqu basin is devoted to questions about the formation of treaties, agreements, and river basin organisations (e.g., Earle et al 2005; Kranz, Interwies, and Vidaurre, 2005). These studies often provide important insights into the causal factors enabling the

formation of international water management institutions. But they rarely consider the implementation of cooperative agreements and often rely on implicit assumptions that once formed, treaties and water governance organisations will generate positive effects. Conversely, the smaller body of literature examining regime effects (e.g., Schuermans, Helbing, and Fedosseev 2004; Duc and Carrasco 2007) often fails to consider the historical and political context shaping the content of agreements, the process through which goals are negotiated and problems framed, or the causal factors contributing to observed outcomes.

Together these trends contribute to misleading assumptions, also reflected in the wider body of transboundary water literature, about the nature of riparian relationships, the significance of international treaties, and the dynamic effects of water cooperation.

### *Riparian Relationships*

Viewing conflict and cooperation as separate and distinct phenomena diverts attention from the dynamic relationships between riparian actors involved in transboundary water governance and deemphasises the potential that disputes and discontent may have within the wider context of interstate cooperation (Zeitoun and Mirumachi 2008). The history of hydropolitics within southern Africa and around the world is rich with riparian relationships characterised by combinations of conflict and cooperation that coexist and oscillate overtime (Mirumachi 2007; Kistin 2007). Throughout the 1980s, for example, water ministers from Namibia and Angola met and exchanged information about the transboundary Cunene River basin despite the

fact that their governments were disputing openly and their militaries continuously clashed (Turton 2005).<sup>1</sup> Conversely, Furlong (2006) noted that efforts to cooperate on interbasin transfers within southern Africa have generated tensions and disputes between and within cooperating states. As subsequent chapters will show, riparian relationships in the Orange-Senqu basin can be characterised by conflict and cooperation coexisting and oscillating over time.

### *International Treaties*

International water agreements are often regarded as the pinnacle of transboundary water cooperation (Kistin 2007; Zeitoun and Mirumachi 2008). As such, the mere existence of cooperative arrangements is celebrated as a sign of progress with little or no interrogation of the agreements' influences on achieving goals or solving problems (Daoudy and Kistin 2008). This tendency is linked to the common practice of using treaties as proxies for transboundary water cooperation and water cooperation as a proxy for successful management (e.g., Dinar 1998; Marty 2001; Wolf, 2003).

Recent debates have focused attention on questions about the existence and coverage of transboundary water management institutions in southern Africa (Wolf, Yoffe, and Giordano 2003; Ashton et al. 2006; Turton 2005). In the groundbreaking empirical work discussed in section 1.2.2, Wolf, Yoffe, and Giordano (2003) suggested that low levels of interstate collaboration throughout southern Africa posed a potential risk for future conflict between states. Of the seventeen transboundary basins worldwide, six of them identified as being "at risk" by the study were located in the SADC region:

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<sup>1</sup> Jägerskog (2003) noted a similar persistence of technical cooperation in the Jordan basin despite ongoing tensions between Israel and Palestine.

the Orange-Senqu, Incomati, Cunene, Limpopo, Okavango and Zambezi (29). More recent studies dispute the at-risk classification assigned to these six basins by demonstrating that the number of agreements and river basin organisations related to water management in the southern African basins was underrepresented in the databases used for analysis (Ashton et al. 2006; Turton 2005). While these debates have provided important insight into the coverage and content of formal water agreements in the region, it is important to move beyond the narrow analysis of treaty commitments and organisational structures towards a deeper understanding of the context and causes of regime formation as well the implementation process and the organisations' dynamic range of effects (Kistin et al. 2009).

International treaties dealing with transboundary water management vary significantly in the rules and regulations they embody and their influence on identified problems of transboundary water governance (Conca 2006; Kistin and Phillips 2007; Dombrowsky 2007). Furthermore, many agreements that appear strong in writing remain paper tigers that are implemented only partially or not at all (Gyawali 2002; Bernauer 2002; Zawahari 2008). Combined, the nature of the agreements and their levels of implementation may yield both positive and negative effects. Thus, while the use of treaties as proxies for cooperation may be useful and necessary in certain circumstances, assumptions that an international water treaty or river basin organisation represents the end goal in the cooperative process diverts attention from important aspects of the implementation process and its effects.

### *Dynamic Effects*

Finally, the combination of either/or conceptualisations of conflict and cooperation and the tendency for authors to focus on the formation but not the effects of transboundary water governance contribute to a paradigmatic view that all conflict is bad and all cooperation is inherently good. This view is evident in important policy documents. The *2006 Human Development Report on Water*, for example, argued that “given the strategic, political and economic contexts in international basins it makes sense to promote and support cooperation of any sort, no matter how slight” (UNDP 2006, 28). This echoed previous endorsements by Green Cross International that “even where basin schemes remain fragmented, whether because not all basin states and stakeholders are actively involved or because not all issues are considered, all movement towards collaboration must be taken as a step in the right direction” (2000, 11).

These validations of transboundary water cooperation, while well intentioned, neglect the possibility that a push for cooperation of “any sort” may yield ineffective results and detrimental consequences (Hope et al. 2007). Yet analysts examining different cases of transboundary water governance worldwide have shown that international cooperation over water resources can contribute to inflexible, inequitable, and unsustainable arrangements (e.g., Selby 2003; Sneddon and Fox 2006; Phillips et al. 2006; Zeitoun 2006; Kistin 2006; Cascao 2009).

Within the Orange-Senqu basin, there is a strong tendency to view the process and outcomes of transboundary water cooperation as a win-win scenario that provides mutual benefits for all riparians (Conely and van Niekerk 2000; Lindemann 2008;

Turton and Funke 2008). In addition to generating positive and mutually beneficial effects, Turton and Funke suggested, transboundary water governance in the basin is characterised by “shared control” in the decision-making process and perceived as positive by all riparian states (2008, 64). This study argues, however, that the processes, effects, and perceptions characterising the Orange-Senqu water regime are more complex. It draws attention to the asymmetric control of the decision-making process, the enduring disputes, and the range of positive and negative effects generated by the water regime.

### ***1.3.2 Analytical Approach***

This study aims to enrich the existing body of literature pertaining to the Orange-Senqu basin by deploying an innovative analytical approach to examine how and why different transboundary water governance arrangements emerge and produce differential effects. A brief overview of the key features of the analytical approach, discussed in more detail in chapter 2, is provided here.

#### *Theoretical Framework*

The study draws on a structure–agent approach to regime analysis that modifies the analytical insights provided by mainstream regime theory with a more sociological understanding of the relationship between social structures and human agency. Defined as the principles, norms, rules, and decision-making procedures that regulate specific issue areas, international regimes establish rule-based cooperation that prescribes and proscribes the behaviour of states (Krasner 1983). Regime theory helps us explain the way in which actors create and then adhere to forms of water regulation

in the international arena (Keohane 1984). Yet, mainstream approaches to regime analysis cannot fully explain certain key aspects of transboundary water governance. Drawing on Giddens (1984), a structure–agent approach to regime analysis was developed to better account for power asymmetries, nonstate actors, discursive structures, and the ongoing, nonlinear process of water governance.

The structure–agent approach to regime analysis embodies the view that human agency and social structure are intertwined in a pattern of continuous and mutual constitution. The approach views the international system as a social system in which transboundary water governance regimes establish a set of rules, norms, and principles that govern the behaviour of actors. Within this international system, the distribution of material and immaterial resources contributes to power asymmetries that enable some actors and constrain others from controlling water resources and the decision-making process. Both the regimes and the resources that characterise the international system are created through human actions. Once established, transboundary water governance regimes shape the conduct of actors. Ensuring the stability of a water regime, however, requires continuous reproduction by these actors. Actors within the water regime are capable of recognising changing circumstances and influencing alterations in the structure of the regime by rejecting, adapting, or replacing old governance structures.

### *Evaluating Effects*

Recognizing that transboundary water governance regimes have the potential to produce numerous intended and unintended consequences, this study focuses on the

influence of the Orange-Senqu transboundary water governance regime on adaptive capacity and the allocation of water and related benefits. The selection of these two focal areas allows the study to test common assumptions that international water cooperation enables states to recognise and respond to changing circumstances through joint planning and facilitates the equitable distribution of water resources and related benefits. By tracing changes in the components of adaptive capacity and the patterns of resource use and allocation over the regime's life and determining the extent to which observed changes are caused by regime performance or other factors, this study provides fresh insights into the dynamic effects of transboundary water governance in the Orange-Senqu basin.

The concept of adaptive capacity, as section 1.2.2 described, reflects the ability of state and nonstate actors to mobilise a range of technical, institutional, and financial endowments to avoid the debilitating effects, both ecological and human, of changing circumstances in shared basins and to alter the patterns of resource management to an outcome of long-term sustainability. Drawing on a growing body of literature analysing adaptive capacity at the national and basin level (e.g., Yohe and Tol 2002; Smit and Wandel 2006; Raadgever et al. 2008; Goulden, Conway, and Persechino 2008), this study focuses on four core components of adaptive capacity in transboundary basins: institutional flexibility, information management, actor networks, and financial resources. In doing so, it demonstrates ways in which the regime both enables and constrains key components of adaptive capacity.

Analysis of the distributional effects of the Orange-Senqu water regime focuses on water use and water allocation patterns in the basin and the distribution of costs and benefits from the LHWP. The in-depth analysis challenges popular perceptions of the regime as a win-win scenario by exposing the negative impacts of the LHWP at the subnational scale and highlighting the persistent uncertainty of water allocation at the bilateral and basin-wide levels.

### *Assessing Determinants*

In addition to identifying the dynamic effects of transboundary water governance in the Orange-Senqu basin, this study seeks to develop a deeper understanding of causal factors influencing the formation, implementation, and effects of international water cooperation. The structure–agent approach to regime analysis and the wider bodies of literature regarding transboundary water governance and environmental regime effectiveness draw attention to four key categories of determinants—power asymmetry, problem structure, expert networks, and political contexts—used to guide this analysis of the Orange-Senqu water regime. A brief overview of each category, described in more detail in chapter 2, is provided here. The research questions and corresponding hypotheses derived from these descriptions are articulated in section 1.4.

### *Power Asymmetry*

Attention to power asymmetry as a key determinant in the formation and implementation of cooperative arrangements stems from both realist and strong cognitivist approaches to regime analysis. The hegemonic stability theorem (HST) put

forward by realists suggests that the leadership required to initiate and maintain an international regime depends on one state being powerful enough to be able and willing to maintain the rules and enforcements governing the issue (Keohane and Nye 1989; Snidal 1985). Applying a realist approach to the study of transboundary waters, Lowi (1993, 47) argued that cooperation is most likely if a basin hegemon (i.e., the state with the most relative power in a shared basin) is located downstream and the water is of critical need. Lowi used this variation on the HST to explain the presence of international water agreements in the Jordan and Nile basins (where the basin hegemons, Israel and Egypt, are located downstream), and the absence of agreements for the Tigris and Euphrates basins (where the upstream hegemon, Turkey, can capture and control water resources without the assistance of international agreements).

More recently, scholars affiliated with the London Water Research Group have drawn on strong cognitivist, international political-economy approaches to regime analysis to develop frameworks of hydrohegemony (Zeitoun 2006; Zeitoun and Warner 2006; Warner 2005; Warner and Zeitoun 2008) and counter-hydrohegemony (Cascao 2008, 2009) to explain the influence of power asymmetry within transboundary basins. This study draws on both frameworks to guide the empirical analysis of power asymmetries in the Orange-Senqu basin. Like the structure–agent approach to regime analysis, the hydrohegemony and counter-hydrohegemony frameworks highlight states' use of hard and soft power to influence the control of water resources and

decision-making processes in shared basins.<sup>2</sup> Most significantly, the frameworks draw attention to specific strategies and tactics employed by basin hegemony to gain control of water resources (Zeitoun 2006; Zeitoun and Warner 2006) and those available to nonhegemonic states that wish to challenge governance structures and alter patterns of resource use (Cascao 2009).

The general expectation emerging from these frameworks is that the formation and implementation of transboundary water regimes is most likely when it serves the interests of the basin hegemon. However, nonhegemonic riparians can also influence the emergence and effects of transboundary water governance arrangements by leveraging their own power endowments through strategies and tactics for resistance and change.

### *Problem Structure*

The concept of problem structure as a key determinant of regime formation, implementation, and effect stems from liberal institutional, interest-based, approaches to regime analysis. The basic rationale is that some problems or problem attributes make it more difficult for parties to reach and implement collaborative agreements (Miles et al. 2002). Though the concept of problem structure is defined differently by different scholars (Weiss and Jacobson 1998; Young 1999; Miles et al. 2002; Mitchell 2006), key attributes contributing to the difficulty of regime formation and

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<sup>2</sup> As chapter 2 will discuss in more detail, the hydrohegemony framework refers to four types of power influencing interstate interaction and transboundary water governance in shared basins: geographical power derived from riparian position); material power derived from access to military, economic, and technology assets; bargaining power derived from alliances, intellectual engagement, and the manipulation of space and time; and ideational power derived from the ability to construct facts, frame issues, and delineate what can and cannot be debated.

implementation include interest asymmetry, uncertainty, and commitment requirements. Several authors studying transboundary water governance have acknowledged these attributes as barriers to the formation and implementation of transboundary agreements (Le Marquand 1977; Marty 2001; Dombrowsky 2007, 2010; Zeitoun and Mirumachi 2008; Daoudy 2009).

Yet, while asymmetric interests, uncertainty, and high commitment requirements can diminish the likelihood of water regime formation and implementation, they do not pose absolute barriers to riparian states' cooperation (Underdal and Young 2004; Miles et al. 2002). Faced with difficult problems, parties can mobilise financial, technical, and political resources to balance incentives and address informational and normative uncertainty. Establishing strong incentives for transboundary water cooperation may require strengthening communication and trust and linking issues or providing side payments to secure mutual benefits for participating parties (Haftendorn 2000; Marty 2001; Fischhendler and Feitelson 2003; Zeitoun and Mirumachi 2008; Lindemann 2008; Daoudy 2009; Dombrowsky 2010).

### *Expert Networks*

Knowledge-based approaches to regime analysis, promoted by cognitive theorists, emphasise the role epistemic communities (i.e., a network of experts sharing a belief in a common set of cause-and-effect relationships) play in shaping the incentives, beliefs, and preferences of state actors (Haas 1992; O'Neill, Balsiger, and VanDeveer 2004). In the literature on transboundary water governance regimes, expert networks are recognized for influencing water regime formation and implementation by

framing problems, reducing uncertainty, conceptualising alternative strategies, and monitoring effects (Nishat and Faisal 2000; Meissner 2005; Kibaroglu 2008).

An important subset of this wider category is the network of bilateral and multilateral donor organisations influencing transboundary water governance initiatives through the provision of financial and technical resources and mediation and facilitation support (Le Marquand 1977; Browder and Ortolano 2000; Dinar 2000; Marty 2001; Mirumachi and Allan 2007). The general expectation is that involvement by expert networks and donor agencies will increase the likelihood of regime formation and implementation.

### *Political Context*

This final category of key determinants does not emerge from a singular approach to regime analysis but rather reflects empirical observations that wider regional or bilateral conflicts can strain the relationship between states and limit interaction over shared waters (Lowi 1993; Dinar 2000; Turton 2003; Dombrowsky 2008). In contrast, high levels of social, economic, and political integration between riparian states can enable communication and information sharing between riparian parties and increase confidence in the credibility of commitments (Durth 1996). Broad ties between countries may also provide a wider array of options for balancing incentives through compensation and linkages (Durth 1996).

### ***1.3.3 Research Contributions***

This study makes a valuable contribution to existing literature regarding the Orange-Senqu basin by providing a critical analysis of the emergence and performance of all four international water management institutions comprising the basin water regime. The extensive and systematic analysis of the influence of power asymmetry, problem structure, expert networks, and regional context provides fresh insights into the current state of water cooperation. Although each of these determinants has been addressed to some extent within the transboundary water literature, these categories of determinants are rarely systematically analysed together and with respect to both the formation and implementation of cooperative arrangements as this work does. By exposing the links between core factors underpinning the patterns of decision making and water use, the research illuminates opportunities for envisioning alternatives and enacting change. The critical analysis of donor engagement in the basin also provides important insight into the disjuncture between technocratic donor initiatives and the power and politics driving the performance of the water regime.

#### **1.4 Research Questions and Hypotheses**

The primary goal of this thesis is to develop a deeper understanding of the formation and performance of the international water management institutions comprising the Orange-Senqu water regime. The overarching research question explored in this study is *how and why do different transboundary water governance arrangements emerge and produce differential effects?* Seven subsidiary research questions and corresponding hypotheses were developed to help guide the work. Both the questions and hypotheses, presented here in summary form, are explained in greater detail in chapter 2.

**Sub-question 1 (SQ1):** How has the transboundary water governance regime in the Orange-Senqu basin influenced the adaptive capacity of riparian states and international water management institutions?

**Hypothesis 1 (H1):** Ongoing hydropolitical cooperation enhances adaptive capacity by enabling the exchange and utilisation of information and facilitating joint planning.

**Sub-question 2 (SQ2):** How has the transboundary water governance regime in the Orange-Senqu basin influenced the allocation of water and related benefits?

**Hypothesis 2 (H2):** Ongoing hydropolitical cooperation stabilises expectations by clarifying water allocation and enables riparian states to determine and implement the equitable distribution of water resources and related benefits.

**Sub-question 3 (SQ3):** How do power asymmetries influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?

**Hypothesis 3 (H3):** The formation and implementation of international water management institutions are most likely when they serve the interests of the basin hegemon; however, nonhegemonic riparians can influence the process and outcomes of transboundary water governance through resistance and counterhegemonic tactics.

**Sub-question 4 (SQ4):** How does problem structure influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?

**Hypothesis 4 (H4):** The higher the levels of interest asymmetry, uncertainty, and commitment requirements, the less likely it is that parties will establish or implement water governance regimes. Difficult problem structures can be overcome by balancing incentives and reducing transaction costs.

**Sub-question 5 (SQ5):** How do expert networks influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?

**Hypothesis 5 (H5):** Involvement by expert networks and donor agencies increases the likelihood of regime formation and implementation.

**Sub-question 6 (SQ6):** How does political context influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?

**Hypothesis 6 (H6):** The higher the levels of integration between states and stability within states, the more likely it is that parties will form and implement water regimes.

**Sub-question 7 (SQ7):** Which determinants are most significant for explaining the formation, implementation, and effects of the Orange-Senqu transboundary water governance regime?

**Hypothesis 7 (H7):** Each of the selected determinants plays an important and related role in shaping the emergence and outcomes of water governance. Power asymmetries and problem structure, however, are essential for understanding the formation, implementation, and effects of the water regime.

## **1.5 Structure of the Study**

The study is divided into three sections and nine chapters. The scope of each of the remaining chapters is summarised in the following sections.

### **Section 1: Research frameworks**

Chapter 2 presents the conceptual and analytical framework used to guide the empirical analysis presented in subsequent chapters. Drawing on contributions from the fields of international relations, public policy, and anthropology, the chapter develops a structure–agent approach to regime analysis as a framework for evaluating the formation, implementation, and effects of transboundary water governance. It also draws attention to four key factors—power asymmetry, problem structure, expert networks, and political context—influencing the emergence and performance of international water management institutions. Additionally, the chapter presents the research objectives, questions, and hypotheses pursued throughout this work.

Chapter 3 explains the methodological framework utilised to investigate and explain the processes, effects, and determinants of transboundary water governance in the Orange-Senqu basin. The chapter makes transparent the circumstances of fieldwork, data collection, and analysis that shaped the thoughts, ideas, and conclusions presented in this thesis.

### **Section 2: Background**

Chapter 4 provides an overview of the physical and institutional landscape of the Orange-Senqu basin. It describes patterns of early basin development and discusses the major issues and changing circumstances confronting basin managers and water users today. The chapter also analyses the national water policy frameworks in each riparian country and the content of formal treaties establishing the four core, international water management institutions comprising the Orange-Senqu water regime.

### **Section 3: Analytical chapters**

Chapter 5 analyses the formation of international water management institutions pertaining to the Orange-Senqu basin. The chapter provides an extensive review of the influence of power asymmetry, problem structure, expert networks, and political contexts on the emergence and dimensions of existing institutions and discusses the interaction between causal factors.

Chapter 6 examines the effects of the Orange-Senqu transboundary water governance regime on adaptive capacity by scrutinizing the influence of international water management institutions and interstate interactions on treaty flexibility, information management, actor networks, and financial resources. It discusses the factors enabling and constraining reflexivity and joint planning in the basin and considers the key determinants contributing to observed outcomes.

Chapter 7 analyses the distributional effects of the Orange-Senqu water regime. It discusses institutional performance in terms of water allocation and delivery and the

distribution of related benefits. The chapter examines the causal factors underpinning the national and subnational benefits and costs of the LHWP, the contested water allocation terms between South Africa and Namibia and the lack of discussion regarding water allocation at the basin scale.

Chapter 8 examines the role of international donor organisations seeking to improve the operation and outcomes of transboundary water cooperation in the Orange-Senqu basin. It discusses the disconnect between donor initiatives and the power and politics influencing the water regime's performance and analyses how pressure on donor organisations to "sell" their services to riparian states perpetuates a technocratic approach for analysing and addressing water governance challenges in the basin.

Chapter 9 concludes the thesis by drawing together the key findings from the research. It revisits the overarching and subsidiary research questions and discusses the resonance of each hypothesis with the empirical findings from the Orange-Senqu basin. The chapter also discusses the practical implications of the research conclusions and considers opportunities for altering the status quo of transboundary water governance within the basin. Finally, it reflects on the overall research process and outcomes, acknowledges limitations of the work, and identifies key areas for future research.

## **CHAPTER 2: ANALYTICAL FRAMEWORK**

### **Introduction**

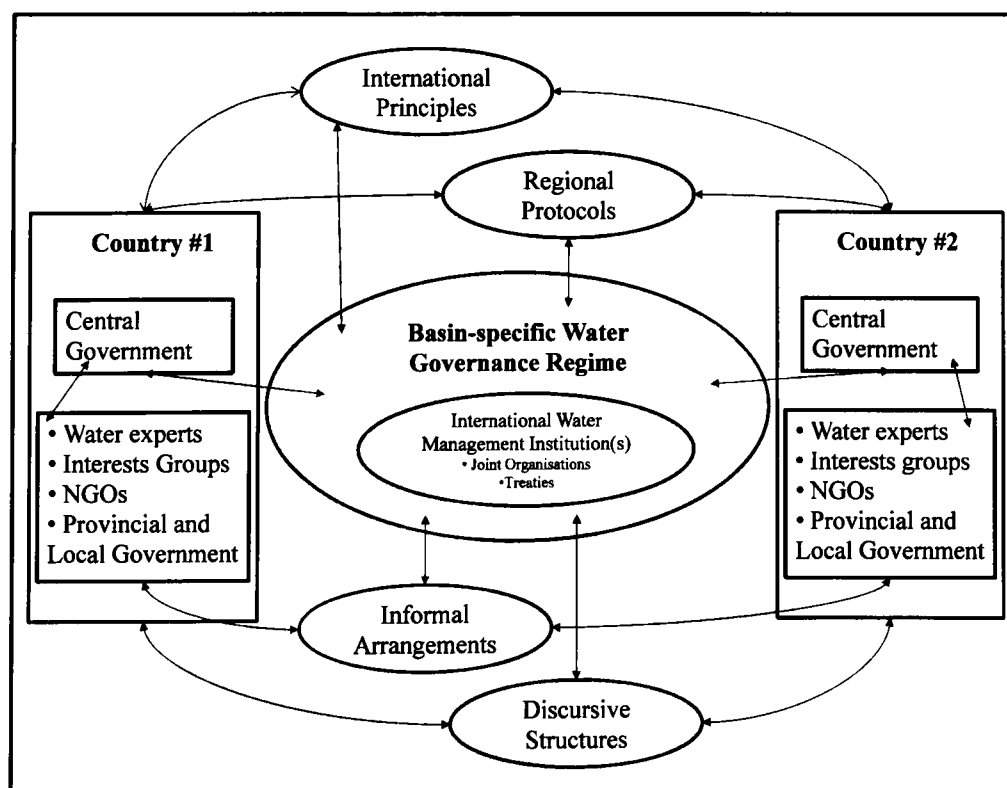
This chapter develops the analytical framework used to assess how and why different cooperative arrangements emerge and produce differential effects. As chapter 1 indicated, the purpose of this study is to develop a deeper understanding of the formation and performance of international water management institutions operating in the Orange-Senqu basin and the causal factors underpinning the dynamic effects of that water regime. The previous chapter also identified weaknesses in the existing literature that limit current understandings of transboundary water governance's processes, effects, and determinants. This chapter aims to address some of those gaps by developing an analytical framework that bridges the analysis of transboundary water governance's formations and implementations with special attention to their effects and the determinants shaping the performance and outcomes of water regimes.

Section 2.1 establishes a conceptual model of transboundary water governance that emphasises the dynamic, political processes of negotiation and implementation and the multiplicity of actors and governance structures contributing to water management in shared basins. Section 2.2 develops a structure–agent approach to water regime analysis to facilitate a critique of transboundary water cooperation. Section 2.3 supplements the structure–agent approach to analysis with contributions from the frameworks of hydrohegemony and counter-hydrohegemony that provide insight into the strategies and tactics used by powerful and less powerful states in shared basins to shape the nature of water management and allocation. Section 2.4 establishes criteria

for the evaluation of regime effects, and Section 2.5 discusses determinants of water regime formation and implementation. Section 2.6 concludes the chapter by articulating the specific research aims, objectives, and questions guiding this work.

## 2.1 Transboundary Water Governance Regimes: A Conceptual Framework

The first key step for analysing the effects of international water cooperation is defining the object to be evaluated. This section introduces transboundary water governance regimes as the key focus of the analysis. Defined as the principles, norms, rules, and decision-making procedures for the development, management, and allocation of shared water resources, transboundary water governance regimes are formed by state and nonstate actors to establish rule-based structures that prescribe and proscribe the behaviour of water users. As figure 2.1 illustrates, water regimes can be highly complex systems involving multiple actors and numerous formal and informal agreements and organisations.



**Figure 2.1** Conceptual map illustrating the multiplicity of actors and governance structures influencing basin-specific, binational, water governance regimes.

Given the complexity and multilayered nature of transboundary water governance in basins, analysts have chosen to examine water governance at different scales. Conca (2006), for example, evaluated governance arrangements at the international level (as shaped by the 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses) and at the national level (as defined by national water policies of both Brazil and South Africa). Dombrowsky (2008) focused her analysis of transboundary water governance on outcomes from one specific agreement on one specific tributary of the larger Rhine River system.

The primary focus of this thesis is on the performance of water regimes at the basin level. Basin-specific water regimes, as conceptualised here, encompass international water management institutions established between riparian states that consist of formal treaties and joint organisations. They are influenced by a range of actors and by additional governance structures in place above and below basin-level authority (figure 2.1).

### ***2.1.1 Actors***

Multiple actors within each country shape the structures of water governance. These different actors, and coalitions of actors, possess different interests in and capabilities for influencing water management rules and routines. For example, although national-level government is responsible for making official international agreements, responsibilities for monitoring, managing, and delivering water resources are delegated at various levels in different countries. Some of the most influential actor groups that contribute to shaping international water governance structures include

water experts, international donors, interest groups (e.g., agriculturalists, business coalitions, environmental NGOs) and provincial and local governments. In addition to the actors depicted in figure 2.1, international organisations, including bilateral and multilateral donors and transnational NGOs, also play an influential role in shaping and transforming transboundary water governance structures.

### ***2.1.2 Governance Structures***

At the international level, state and nonstate actors contribute to the articulation of *international principles* intended to provide guidance for the effective management of transboundary water resources. The most important articulation of current international principles includes the yet-to-be-ratified 1997 Convention on the Law of Non-Navigational Use of International Watercourses. The Convention establishes three central principles for the management of shared waters: (a) equitable and reasonable use, (b) the avoidance of significant harm, and (c) the prior notification of transboundary watercourse works that may affect co-riparian states (UN 1997). The Convention also asserts both a duty and a responsibility to engage in cooperative management. It does not, however, establish details for how cooperation between states should be realised. Riparian nations are thus left to negotiate arrangements for the allocation, monitoring, and management of shared resources as befits their specific circumstances (Wouters et al. 2005).

In some areas, states have also adopted binding and nonbinding *regional protocols* to stabilise expectations about water development and utilisation. Examples include the Revised Protocol on Shared Watercourse Systems for the SADC, the European Union

(EU) Water Framework Directive, and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes sponsored by the UN Economic Commission for Europe, the United States, and Canada.

Below the basin level of government, *informal arrangements* for international water cooperation also exist. Such arrangements may include international councils or task forces, binational provincial commissions, NGO coalitions, and research initiatives. While these informal arrangements and coalitions may lack the explicit authority to construct and codify international rules and regulations, they are often engaged in the processes of defining issues, shaping priorities, crafting policy recommendations, and implementing established agreements. Finally, though less tangible than other governance structures, *discursive structures*, or unwritten rules about the nature of the water governance challenges and the scope of acceptable responses, shape the nature of and influence transboundary water governance structures (Allan 2001; Feitelson 2001; Jägerskog 2002; Warner and Zeitoun 2008).

Where present, these four types of governance structures are implemented and enforced simultaneously. Intertwined and mutually influential, they shape the rules and routines of transboundary water governance.

### ***2.1.3 Avenues of Interaction***

Studying water governance highlights the dynamism of relationships between governance structures and human agents (Franks 2006; Conca 2006). This is reflected in figure 2.1 by the multiplicity of arrows that connect the different types of

international agreements as well as the range of actors who contribute to their formation. These bidirectional arrows represent potential avenues of interaction and influence between the structures of water governance and the range of actors contributing to and influenced by them. The dynamic process through which this happens is described in the following section.

### 2.1.4 Policy Process: The Crooked Path of Governance

In addition to being multilayered, transboundary water governance regimes can also be characterised as ongoing and nonlinear processes of negotiation and implementation (O'Neill, Balsiger, and VanDeveer 2004; Furlong 2006). As figure 2.2 illustrates, the process of developing, articulating, and enacting governance arrangements is one in which rules and norms are filtered, condensed, and refracted.

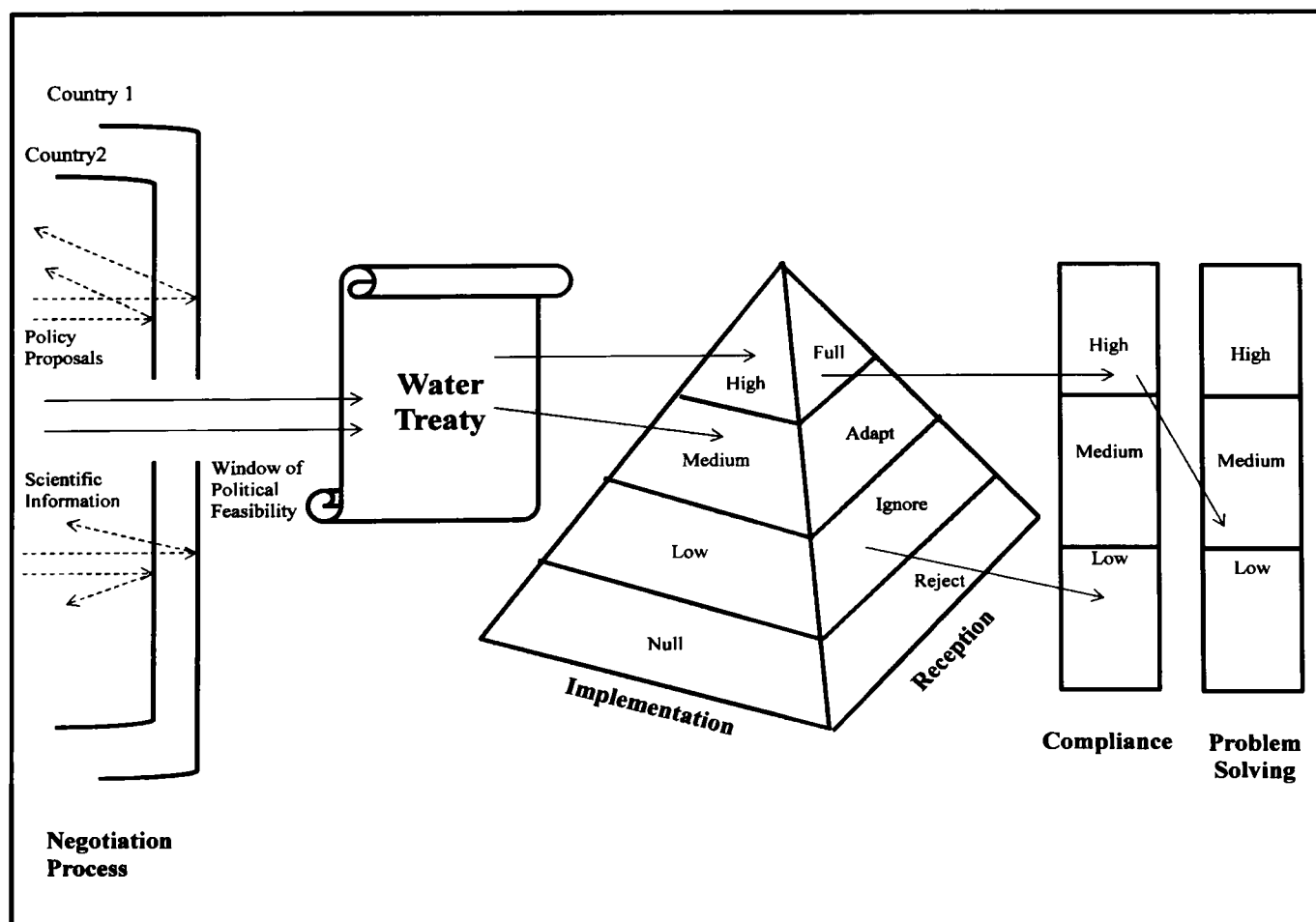


Figure 2.2 The refractive nature of transboundary water governance.

Formal agreements established between riparian nations are preceded by a complex process of negotiation throughout which policy proposals and scientific evidence are filtered through lenses shifted and shaped by various interest groups. The rules and regulations included in formal international agreements emerge when the windows of political feasibility for each country align (Nicol et al. 2000). As such, they constitute only a subset of the rules, ideas, and policies proposed.

Once articulated, the rules and regulations in international water agreements are refracted through the political prism of implementation and reception. In the context of transboundary water governance, implementation may entail a range of activities from the ratification of a treaty or protocol to the execution of joint studies to the adoption of national policies to ensure deliveries and maintain water quality. However, a strong implementation and reception of agreements is not inevitable as rules and norms may be adopted, subverted, or diverted to varying degrees after the agreement has been signed.

The crooked path of water governance emphasises that, given the complex political processes underpinning its development, there is no straightforward way to infer outcomes (e.g., changes in the behaviour of key actors in the system) or impacts (e.g., changes in the state or allocation of water resources themselves) from an analysis of the outputs (e.g., treaties, statutes, rules, regulations) comprising governance

regimes.<sup>3</sup> Instead, outcomes and impacts depend on the refraction of rules and regulations through complex political processes.

To understand how the dimensions of power, influence, and intentions can be mapped onto these avenues of interaction requires the selection of theoretical tools to analyse these dynamic relationships.

## **2.2. Analytical Framework: A Structure–Agent Approach to Regime Analysis**

This thesis draws on a structure–agent approach to regime analysis that modifies the analytical insights provided by mainstream regime theory with a more sociological understanding of the relationship between the social structures and human agency. The intent is to gain a coherent set of tools that responds to the important elements of dynamic, multitiered governance mapped out in section 2.1 and allows us to understand and critique the processes, effects, and determinants of the Orange-Senqu water regime.

### ***2.2.1 Regime Analysis: It's Relevance to Water Governance***

Regime theory emerged in international relations (IR) as one way of explaining the existence of international cooperation amidst a presumably anarchic international system (Keohane and Ostrom 1995). The regime theories that emerged in the mid-1970s recognised an increasing interdependence between nations in the international

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<sup>3</sup> Possible outcomes that illustrate nonlinearity include (a) a negotiated agreement that requires little behaviour change, doesn't meet established goals, and doesn't solve the problem; (b) a negotiated agreement that does require behaviour change but gets ignored in the implementation phase; and (c) a negotiated agreement that requires behaviour change, gets and meets its goals, but the goals are ill-suited for problem solving.

system (Jägerskog 2003). As a result of this interdependence, theorists observed that new forms of rules, procedures, and institutions were created to manage and control transnational relations (Keohane and Nye 1989). The concept of international regimes was developed to describe this phenomenon.

Defined as the principles, norms, rules, and decision-making procedures that regulate specific issue areas, international regimes establish rule-based cooperation that prescribe and proscribe the behaviour of states (Krasner 1983, 186; Keohane 1984, 59). Regime analysis has often been used to understand the ways in which nation-states create and adhere to forms of self-regulation in the international arena. Over time, however, regime analysis has grown to consider how changes in the governance of specific issues can occur gradually due to changes within the regime (Rosenau 1992). This is now applied as a means of identifying the structural conditions under which adaptation is most likely and the role that state and nonstate actors can play within regime structure to improve cooperative outcomes (Checkel 1998; Wendt 1992).

In the last decade, several authors have explicitly or implicitly drawn upon regime theory in their work on transboundary water governance (e.g., Browder and Ortolano 2000; Jägerskog 2003; Turton 2004; Kranz et al. 2005; Furlong 2006; Raadgever et al. 2008). Within the field of IR, there exists a variety of explanations for the emergence and influence of regimes. Each of these strands of regime analysis draws attention to different determinants enabling and constraining the formation and implementation of cooperative arrangements. Key focal areas of the different

approaches to regime analysis are discussed here and revisited in section 2.5 with the articulation of key determinants and their corresponding hypotheses. Mainstream regime theory is characterised by rationalist and cognitivist approaches.

### *Rationalist Approaches*

Rationalist, or economic, approaches to regime theory are grounded in two basic assumptions. The first is that the international system is characterised by anarchy, which implies that in the absence of a central global authority, states must resort to self-help. The second assumption is that states are rational, self-interested, utility-maximising, atomist actors whose preferences and behaviours are exogenously determined (Waltz 1979; Keohane 1984).

Within the rationalist perspective, there exist two main schools of thought, liberal institutionalism and realism, which maintain divergent assumptions about the implications of an international system characterised by anarchy. Liberal institutionalists view states within the international system as rational egoists, indifferent to how well others do and concerned primarily with their own absolute gains. States will thus favour cooperation when doing so avoids collectively suboptimal outcomes and is mutually beneficial. Realists, in contrast, believe the anarchy of the international system places states in a constant struggle for survival and heightens competitiveness and concerns with relative gains (i.e., whether or not other states are benefiting more from a cooperative arrangement). Thus from a realist perspective, states may sometimes abstain from cooperation even when it would be beneficial to them in absolute terms (Powell 1991).

Rationalist schools of regime theory also differ in their metatheoretical focus on conceptions about the likelihood and significance of regime formation. For realists, power relations among states constitute the key variable in regime analysis. In this view, the distribution of capabilities among actors critically affects the prospects for regime formation, the distribution of benefits and risks within the regime, and the likelihood it will be maintained over time. As such, realists tend to consider regimes epiphenomena in the international system in the sense that they are dependent on the underlying power structure of international relations (Hasenclever, Mayer, and Rittberger 1997).

For liberal institutionalists, the main focus of regime analysis is on interests. Prospects for regime formation and implementation are influenced by interest asymmetry and uncertainty. Where states have significantly divergent interests or substantial disagreement about the nature of the collective problem and/or how to address it, prospects for cooperation are lower than in situations where interests converge and uncertainty is minimised. Despite these differences, these subsets of the rational approach to regime theory have experienced increasing synthesis in recent years and a growing acknowledgement that absolute and relative gains both apply in different contexts (Grieco 1990, 47; Hasenclever, Meyer, and Rittberger 2000).

Within the rationalist approach to regime theory, theorists have identified a number of ways to entice self-interested state actors towards cooperative agreements including power asymmetries, cost and risk reduction, and issue linkages (Milner 1992). The

hegemonic stability theorem (HST) put forward by realists suggests that the leadership required to maintain a regime depends on one state being powerful enough to be able and willing to maintain the rules and enforcement governing the issue (Keohane and Nye 1989; Snidal 1985).

Hasenclever, Mayer, and Rittberger (1997, 88–90) described two models that highlight the circumstances under which a powerful state, or hegemon, will provide an international public good where there would otherwise be collective action failure. The *benevolent leadership* model suggests that if the dominant power places a higher absolute valuation on the public good than the smaller powers do, it will provide that nonexcludable good irrespective of free riding as long as it can still generate a net-relative benefit despite unilaterally bearing the full costs. The second model, *coercive leadership*, suggests that a hegemon can coerce smaller powers into providing the public good by establishing a de facto tax through mobilisation of dominance.

Applying a realist approach to the study of transboundary waters, Lowi (1993, 47) argued that cooperation is most likely if a basin hegemon is located downstream and the water is of critical need. Lowi used this variation on the HST to explain the presence of international water agreements in the Jordan and Nile basins (where the basin hegemon, Israel and Egypt, are located downstream), and the absence of agreements for the Tigris and Euphrates basins (where the upstream hegemon, Turkey, can capture and control water resources without the assistance of international agreements). In line with this assumption, this study aims to test the general hypothesis that the emergence and implementation of water management

institutions is more likely when it is in the interest of a basin hegemon (see section 2.5.1).

A second strategy for enticing self-interested actors towards cooperative agreements, put forward by liberal institutionalists, is to provide information in a way that reduces transaction and communication costs (Keohane 1984). Compliance mechanisms and the facilitation of repeated interactions between parties can also lengthen the shadow of the future and decrease each actor's suspicion of cheating or free riding by the other parties over time (Axelrod and Keohane 1986). In line with these theoretical assumptions, information exchange and institution building have long been regarded as cornerstones for cooperative governance in transboundary basins (Marty 2001).

Finally, the provision for mutual benefit through issue linkages is regarded as a key strategy for motivating cooperation. When balanced agreements are difficult to construct for narrow issues, the linkage of multiple issues can facilitate side payments that make cooperation more likely (Keohane 1984, 91). In the transboundary water literature, several authors have illustrated the use of issue linkages and side payments to overcome asymmetrical interests in water negotiations (e.g., Wolf 1997; Fischhendler and Feitelson 2003; Dinar et al. 2007; Daoudy 2009; Dombrowsky 2010). Drawing on the liberal institutional approach to regime analysis, this study explores the expectation that reducing transaction costs and balancing incentives can help parties overcome high levels of interest asymmetry in order to form and maintain cooperative institutions (see section 2.5.2).

### *Cognitivist Approaches*

Cognitive approaches to regime analysis emerged, in part, as an effort to address shortcomings in the rationalist approach. Among the primary critiques by cognitivists is that rationalist approaches treat states as unitary actors with interests and preferences exogenously given and antecedent to interaction (Haggard and Simmons 1987). Cognitive approaches view interests as mutually constituted by states' identities, which are subject to change under the influence of norms, rules, and institutions (Hall and Biersteker 2002).

Hasenclever, Mayer, and Rittberger (1997) distinguished between two strands of cognitivist thinking. *Weak cognitivists* focus on the role of causal beliefs in regime formation and change (Goldstein and Keohane 1993). Although they ascribe to the belief that states function as rational actors concerned with individual gains, weak cognitivists believe rationalist theorists underrate the amount of uncertainty confronted by state actors, the capacity for learning, and the possibility that interests and preferences will change over time. As such, weak cognitivists have focused on the role of epistemic communities in shaping the incentives, beliefs, and preferences of state actors (O'Neill, Balsiger, and VanDeveer 2004, 158; Haas 1989, 377). Meissner (2005) and Kibaroglu (2008) have both applied weak cognitivist approaches to analysing the role of nonstate actor networks in transboundary water governance in southern Africa and the Tigris-Euphrates basin. This study also seeks to explore the role of expert networks in shaping the formation, implementation, and effects of international water management institutions in the Orange-Senqu basin (see section 2.5.3).

*Strong cognitivists* place a greater emphasis on the social character of international relations and reject the conception of states as rational actors who are atomistic in the sense that their identities, powers, and fundamental interests are prioritised above international society and institutions (Hasenclever, Mayer, Rittberger 2000, 11). Rather, they believe that state identities and preferences are shaped by international society and its institutions. Thus, instead of responding to a simple utility-maximising “logic of consequentiality,” states are also guided by the “logic of appropriateness” that incorporates the consideration of norms and obligations alongside calculations of personal preferences (March and Olsen 1989, 162). *Norms* are defined by cognitive theorists as shared expectations about appropriate behaviour held by a community of actors (Finnemore 1996, 22). Norms influence behaviour by simplifying choices and modelling standards (Kratochwil 1989, 14), altering incentive structures (Cortell and Davis 2000), and clarifying expectations for what are considered appropriate actions (March and Olsen 1989; Risse 2002).

Strongly cognitivist theories also challenge the conception of the state as the central actor in regime formation and maintenance, arguing that nonstate actors may dominate politics, economics, and knowledge on specific issues. Strong cognitivist approaches to regime analysis draw attention to the multiple dimensions of power affecting interstate interactions. This reframes hegemony in terms of the ideas and governance structures that permeate the international system (Cox 1981; Arts 2000). Strong cognitivist approaches to regime analysis have contributed to the power analytical frameworks applied to the study of transboundary water management by

the London Water Research Group (Zeitoun and Warner 2006; Warner and Zeitoun 2008; Cascao 2009). This study draws on these approaches to refine the analysis of power asymmetries in the Orange-Senqu basin (see section 2.3; section 2.5.1).

### *Insights and Critiques*

As Hasenclever, Mayer, and Rittberger (1997, 212) noted, none of these schools of thought, taken alone, is capable of capturing all essential dimensions of international regimes. Yet each provides valuable insights into the influence of power, interests, and expert networks on the formation and implementation of transboundary water governance regimes. Cognitivist assumptions, which account for the evolution of interests, provide a more realistic approach for analysing the emergence and effects transboundary water governance arrangements. Interests in transboundary water governance are not fixed or exogenous as the rationalist models assume, but rather perceived, constructed, and changed over time. Yet actors' interests regarding water resources are also not infinitely malleable in the short run. As such, rationalist approaches provide important insight into potential mechanisms for enticing and maintaining transboundary cooperation in situations of interest asymmetry.

The stark differences in the epistemology and ontology underlying rationalist and strong cognitivist approaches renders a synthesis of these two schools of thought impossible (Hasenclever, Mayer, and Rittberger 1997, 211–244). Regardless, this analytical framework draws insights from both rationalist and cognitivist approaches. Because the primary concern of this thesis is deriving lessons on cooperation in the field of transboundary water governance, epistemological and ontological consistency

is viewed as less important than deriving and examining broad insights from established theory. As section 2.5 will show, this work seeks to examine the influences of power, interests, and knowledge on transboundary water governance side by side.

Despite the contributions discussed previously, mainstream approaches to regime analysis have limitations. In particular, these approaches lack the capacity to address the full role of nonstate actors, explain the dynamic relationship between actors and governing structures, or account for changes to regimes over time (Arts 2000; Gooch et al. 2000; Furlong 2006).

Mainstream approaches to regime theory tend to describe the nation-state as the primary actor in regime formation and implementation. In cognitivist strands of regime theory, nonstate actors are recognised for their contributions of leadership and knowledge to international negotiations (Haas 1993; Keohane and Nye 1989; Young 1999), but less is said about their role in the process of implementation. As the growing literature on transboundary water governance emphasises, the process of establishing and maintaining international cooperation on transboundary watercourses is, by nature, a complex enterprise involving multiple actors (Furlong 2006; Meissner 2000). Authority in transboundary politics cannot be ascribed to the state alone or to the networks of nonstate actors (Conca 2006).

Instead, Conca (2006) explained, there exists a hybridisation of authority in which central governments maintain important powers, but not the only powers, to influence

the governance of shared waters. Therefore, accounting for nonstate actors like scientific communities, NGOs, and other basin stakeholders that may have an important impact on enabling or destabilising the process of international cooperation is an important step in constructing an accurate and useful picture (Haas 1993; Levy, Young, and Zern 1995).

Mainstream approaches to regime theory rely on a mix of different ontologies to explain the nature of actors, structures, and their relationships (Wendt 1987, 337; Kratochwil 1989). Rationalist approaches tend to view agency as prior to structure. Once actors have produced rules, norms, and decision-making procedures, however, the structures rule the subjects who produced them (Wendt 1987). Little consideration is given to the way structural constraints and power relations affect the process of rule production or to the role of agents in maintaining, modifying, or rejecting established regimes (Arts 2000). This makes it difficult to account for the processes of change within international regimes.

Developing more useful tools with which to critique the Orange-Senqu water regime thus requires a modified approach to regime analysis that more adequately addresses the various types of agreements, range of actors, and avenues of interaction present in situations of transboundary water governance.

### ***2.2.2 Applying a Structure–Agent Lens***

Structure–agent approaches to regime analysis embody the view that human agency and social structure are intertwined in a pattern of continuous and mutual constitution.

Inspired by social theorists like Bhaskar (1979), Giddens (1984), and Archer (1985), structure–agent approaches to regime analysis have been applied to the study of international relations by Wendt (1987), Dessler (1989) and Carlsnaes (1992); to the study of environmental issues by Arts (2000); and to local water governance studies by Cleaver and Franks (2005). A structure–agent approach draws attention to power asymmetries between actors and the ongoing, nonlinear process of governance. It is a helpful framework for identifying the structural conditions under which changes to governance regimes are most likely and the role that state and nonstate actors can play within the regime structure to influence cooperative outcomes (Wendt 1992; Checkel 1998). Drawing on the work of Arts (2000), this section tailors regime analysis using Giddens's (1984) theory of structuration.

### *Giddens's Theory of Structuration*

Within the social sciences, it is increasingly accepted that social structures and human agency are related. However, the contentious question remains: In what manner are social structures and human agency linked? (Parker 2002, 9) In one response to that question, Giddens (1984) argued that human agency and social structures are intertwined in a pattern of continuous and mutual constitution. Social structures are made up of traditions, institutions, and moral codes. These structures, however, do not stand alone. They are continuously reproduced by the acts of individual agents and may be altered when people challenge, ignore, or replace them. As Giddens explained, “Society has form and that form only has effects on people, insofar as structure is produced and reproduced in what people do” (Giddens and Pierson 1998, 77).

For Giddens, human agents are conceptualised as social beings integrated in social practices. They are capable, knowledgeable, and have the ability to reflexively monitor the conditions and consequences of their own actions and actions of others. This reflexivity is used as the basis for “how to go on in social life” (Giddens 1984, 9). This reflexive capacity sits at the level of practical consciousness, which is characterised by habit, routine, and the right way of doing things. While Giddens’s primary emphasis is on this form of practical consciousness, he acknowledges that human agents may also be motivated by the unconscious (i.e., underlying psychological and emotional factors) and discursive consciousness (i.e., rationalized and intentional behaviour).

In the theory of structuration, human capabilities and knowledge are constrained by the rules and resources, or structures, of social systems. While such structures place considerable constraints on agents, they cannot fully determine social action. Agents, after all, are capable of reflecting on established rules, routines, and resources and can still decide to intervene to do things otherwise. Decisions to alter or reject the established set of structures and rules may be motivated by a shock event that forces actors to alter established routines or by insights gained with access to new information (Giddens 1984).

Structure, according to Giddens, consists of “rules and resources or sets of transformation relations, organized as properties of social systems” (1984, 25). Giddens distinguishes between different types of rules and resources that contribute to

three types of structures present in social systems: signification, legitimation, and domination (table 2.1).

**Table 2.1** Types of structures comprising Giddens's theory of structuration.

<b>Types of Rules/Resources</b>	<b>Types of Structure</b>	<b>Contribution</b>
Constitutive Rules	Signification	Constitute Meaning Enable Communication
Regulative Rules	Legitimation	Prescribe Standards of Behaviour Establish Norms and Sanctions
Allocative Resources	Material Domination	Exercise of Power
Authoritative Resources	Immaterial Domination	

In terms of rules, constitutive ones contribute to the structure of signification by enabling communication between humans and defining meaningful behaviour in specific contexts. Regulative rules prescribe standards of behaviour, establish societal norms, produce sanctions, and contribute to the structures of legitimation (Dessler 1989, 454–8).

Giddens also distinguished between two types of resources from which power is derived. Allocative resources include a range of material capabilities (e.g., raw materials, means of production, produced goods) and are a precondition for human domination over nature (1984, 15). In contrast, authoritative resources encompass immaterial capabilities (e.g., the organisation of time and space; relationships between people, life, and chances). Authoritative resources result from the dominion of some actors over others and generate power from the capability of harnessing other human beings' activities (373). Together, allocative and authoritative resources contribute to the structures of domination.

At the core of Giddens's theory of structuration is the assertion that human agency and social structures are intertwined in a pattern of continuous and mutual constitution. Once these structures are established, they will shape the actions of individual agents within the social system. Simultaneously, however, individual agents are capable of leveraging their knowledge, awareness, and reflexivity to alter social structures. While the structures of domination are always asymmetrical, they are never absolute (1984). No matter how great the imbalance of power, Giddens argued, there is always potential for weaker actors to mobilise at least some form of power against stronger actors. Additionally, control within the social system depends on a combination of all three types of structure and not the direct exercise of power alone. This means that actors who are able to (re)define social issues by altering the structures of signification or (de)legitimise social practices by rejecting or modifying regulative rules may also be able to alter behaviour and effects within the system (Arts 2000, 526).

### *Linking Structuration, Regime Analysis, and Transboundary Water Governance*

Having explored Giddens's interpretation of the relationship between social structures and human agents, the key question now is what does a structure-agent approach to regime analysis mean for evaluating the formation and implementation of transboundary water governance regimes?

Drawing on Arts (2000), I begin by redefining the international system as a social system in which transboundary water governance regimes establish a set of rules, norms, and principles that govern the behaviour of actors. Within this international

system, the distribution of material and immaterial resources enables some actors to and constrains others from controlling water resources and the decision-making process. Both the regimes and the resources that characterise the international system are created through human actions. Once established, transboundary water governance regimes shape the conduct of actors. Ensuring the stability of a water regime, however, requires continuous adjustment by these actors. They are capable of recognising changing circumstances and can influence alterations in the structure of the regime by rejecting, adapting, or replacing old governance structures.

Forming a transboundary water governance regime is thusly mediated by a range of existing governance structures including the suite of previously established rules and regulations, the discursive structures framing the nature of water governance challenges, and the realm of feasible solutions. The negotiations are also influenced by the range of motives, interests, and intentions driving actors as well as the distribution of resources and resulting asymmetries in power.

In this modified approach to regime analysis, both state and subnational actors play important roles in the establishment and legitimation of governance structures comprising transboundary water regimes. The power of central governments in the process of regime formation and implementation is derived from the possession of access to both rules and resources. Though less powerful in the realisation of formal agreements, subnational actors play an important role in framing problems, diminishing uncertainty, and accepting, rejecting, and adapting the rules and norms that characterise water regimes.

Giddens's distinction between allocative and authoritative resources resonates strongly with four types of power commonly discussed in the study of transboundary water governance: material power, geographically based power, bargaining power and ideational power (Turton 2003; Zeitoun 2006; Cascao 2008; Zeitoun, Mirumachi, and Warner 2009).<sup>4</sup>

*Material power* reflects the power derived from access to allocative resources or control over economic, military, and political resources as well as technology and means of production. *Geographically based power* is also related to access to allocative resources and refers to the relative position of riparian states in a transboundary basin. Parties upstream in a shared basin possess greater potential for water resources capture than the nations that are located downstream, provided they have the infrastructure and technical capacity to capture and use them (Zeitoun and Warner 2006).

The concept of *bargaining power* refers to the use of authoritative resources (e.g., the alliances, intellectual engagement, and manipulation of space and time) to establish,

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<sup>4</sup> The dimensions of power identified by members of the London Water Research Group (e.g. Zeitoun 2006; Cascao 2009) draw heavily on Lukes' (1974/2005) typology of power dimensions. While it is important to acknowledge the academic debate between Giddens and Lukes, the key features of the structure-agent approach to water regime analysis resonate strongly with the core assumptions of the hydrohegemony and counter-hydrohegemony frameworks (see section 2.3). The debate between Giddens and Lukes centred on issues of capability and reflexivity. According to Lukes (1974), the power process favours certain interests over others even though the dominated are not always aware of it. Lukes's third dimension of power, ideational power, allows issues to be framed in such a way that their portrayal is accepted without question and assumed to be the natural order of things. Giddens (1984) acknowledged that the structures of signification and legitimation exert very real constraints on actors, but rejected Lukes's typology of power for being overly deterministic and denying the dominated actors the capability of reflexivity. As section 2.3 will show, Cascao's (2009) framework of counter-hydrohegemony utilises Lukes's dimensions of power but clearly maintains the dialectic of control that enables the possibility of resistance and reform supported by Giddens and others.

modify, or reject the codification of regulative rules. It reflects the capability of actors to set agendas, define incentives, and control the rules of the game (Zeitoun 2006, 81; Cascao 2009, 76). *Ideational power* emerges from the use of authoritative resources to alter constitutive rules in a way that constructs or rejects facts, reframes the nature of water governance challenges, or delineates what can and cannot be debated (Zeitoun 2006; Cascao 2009). It is exercised through the construction of knowledge structures (Strange 1994, 176), the promotion of sanctioned discourses (Allan 2002, 182), and the imposition of certain narratives and storylines (Hajer 1997, 52). This study investigates each of these dimensions of power and their effects on actor behaviour and the governance structures comprising the Orange-Senqu water regime.

Adopting Giddens's (1984) *dialectic of control* means that although stronger actors have the upper hand in shaping the behaviour of other actors and the formation, reproduction, or alteration of governance structures, weaker actors are always able to mobilise some form of power against the stronger actor directly or through the rejection or alteration of existing signification and legitimation structures. Once established, transboundary water governance regimes shape the conduct of actors in so far as governance structures are maintained and reproduced over time. Actors are still capable, however, of leveraging awareness, reflexivity, and power endowments to redefine social issues and delegitimise social practices to alter the governance of water resources and control of the decision-making process.

### **2.3 Hydrohegemony and Counter-Hydrohegemony Frameworks**

The structure–agent approach to transboundary water regime analysis established in section 2.2 identifies power asymmetry and the multiple dimensions of power as key factors influencing the formation, implementation, and effects of transboundary water governance arrangements. The structure–agent approach also emphasises that the structures of domination, while always asymmetrical, are never absolute. Stronger parties may exert significant control over water resources and the governance process, but weaker parties are also able to influence the patterns of water governance by leveraging their own resources and power endowments to alter structures of domination, legitimation, and signification.

These key features of the structure–agent approach to regime analysis resonate strongly with the hydrohegemony and counter-hydrohegemony frameworks developed to explain the influence of power asymmetries in transboundary basins (Zeitoun 2006; Zeitoun and Warner 2006; Warner 2005; Cascao 2009). Most significantly, the frameworks extend beyond the structure–agent approach by identifying specific strategies and tactics used by powerful and less powerful states in shared basins to shape the nature of water management and allocation.

Early iterations of the frameworks were rightly criticized for their state centrality (Furlong 2006; Selby 2007; Davidsen-Harden et al. 2007). Recent contributions by Warner (2005, forthcoming) on the Tigris-Euphrates and by Suhardiman and Giordano (2009) on the Mekong, however, have illustrated that the core concepts are relevant for understanding the behaviour of actors at sub- and supra-national levels. As Warner (forthcoming) explains, hydrohegemony is a layered, multilevel

phenomenon, the layers of which impinge upon one another. The frameworks of hydrohegemony and counter-hydrohegemony provide important guidance for the analysis of how power asymmetry in the Orange-Senqu basin has affected the formation, implementation, and effects of international water management institutions comprising the water regime.

### ***2.3.1 Hydrohegemony***

The concept of hydrohegemony is described as “hegemony at the river basin level, achieved through water resource control strategies such as resource capture, integration and containment . . . that are enabled by the exploitation of existing power asymmetries” (Zeitoun and Warner 2006, 435). This section describes the water control strategies and water control tactics identified in the hydrohegemony framework and used to guide the analysis of power asymmetries in the Orange-Senqu basin.

#### *Water control strategies*

The framework of hydrohegemony (FHH) identifies three core strategies that enable riparians of a transboundary river basin to attain and maintain control over shared water resources: resource capture, containment, and integration (Zeitoun and Warner 2006, 444–6; table 2.2).

**Table 2.2** Water control strategies identified in the framework of hydrohegemony.

Strategy	Definition	Examples
Resource Capture	Technical control of water resources	Construction and expansion of dams, transfers, and irrigation schemes
Containment	Engagement with neighbouring riparians	Use of military force or covert action to prevent infrastructure development elsewhere in the basin Establishment of agreements to legitimise and formalise water use
Integration	Provision of incentives and benefits to other riparians	Grant water allocation to fellow riparians Compensate neighbours for the storage or transfer of water

*Source:* Table derived from classifications presented in Zeitoun 2006 and Zeitoun and Warner 2006.

Strategies for resource capture are achieved through the construction and expansion of hydraulic infrastructure and allow riparians to secure access to and control over water resources in the basin (Reisner 1986). Resource capture strategies allow riparian states to physically shift the distribution of water in their favour and exert acquired rights to its use (Homer-Dixon 1994). As chapter 4 will illustrate, resource capture by South Africa in the form of dams, transfers, and irrigation schemes played a significant role in shaping the current allocation of water resources in the Orange-Senqu basin. In the early phase of resource development this strategy was pursued unilaterally. By the mid-1960s, however, the hegemon's control of water resources in the basin relied on the complimentary strategies of containment and integration (see chapter 5).

Strategies for containment reflect engagement with neighbouring riparians (Zeitoun and Warner 2006, 445). As table 2.2 indicates, containment strategies may be deployed through the use of military force or covert action designed to deter water abstractions elsewhere in the basin. Containment strategies may also take the form of formal agreements established to formalise and legitimise resource use. This study demonstrates how coercive, normative, and ideational approaches to containment

have been used to shape the structures of water governance in the Orange-Senqu basin.

Integration strategies reflect the provision of incentives and benefits to other basin riparians as a mechanism for attaining and maintaining water resources (Turton 2005; Zeitoun 2006, 245). This may take the form of water allocations or water use allowances granted to neighbouring riparians or the monetary compensation for the storage and/or transfer of water resources. Integration strategies have played an important role in the formation and operation of the Orange-Senqu water regime (Turton and Funke 2008). Chapters 5 and 7 take an in-depth look at the range of incentives and benefits offered and exchanged between riparian states in the context of water governance.

#### *Water control tactics*

Drawing on Lustick's (2002) categorisation of compliance-producing mechanisms, the FHH identifies four core tactics used by riparians in deploying the aforementioned strategies to attain and maintain control of water resources in shared basins. The tactics include coercive, utilitarian, normative and hegemonic mechanisms (Zeitoun 2006; Zeitoun and Warner 2006; table 2.3).

**Table 2.3** Water control tactics identified in the framework of hydrohegemony.

Category	Tactic	Definition	Examples
Coercive	Military force	Use of force to access water or limit the access or others	Invasion; Attack of Infrastructure
	Coercion-pressure	Use of political, military, or economic threats	Sanctions; Border closures
	Covert actions	Interference in internal affairs	Assistance to opposition groups
Utilitarian	Allocation of water/benefits	Provision of water resources or related benefits	Abstraction permits; Hydropower
	Monetary compensation	Payment for water deliveries or related services	Royalties for water storage and delivery
Normative	Agreements	Use of laws and joint arrangements to secure access to resources	Water treaties; Memorandum of Understanding
	Sanctioned discourse	Promotion of ideas and narratives	Emphasis on acquired rights; Assertions of nonnegotiability
Hegemonic	Securitisation	Definition of water as a matter of national security	Military deployment; Fast-track approval
	Knowledge construction	Capacity to control and sanction data and information	Determining the scope of shared data and the process for exchange
	Silentisation	Removing items from the dominant agenda	Downplaying information or events
	Playing with time	Efforts to delay or rush decisions	Active stalling to maintain the status quo

*Source:* Table derived from classifications presented in Zeitoun 2006; Zeitoun and Warner 2006.

Coercive tactics to secure access to water resources and thwart abstraction attempts elsewhere in the basin include the use of military force, coercive threats, and covert actions (Zeitoun and Warner 2006). The subsequent analysis of the Orange-Senqu basin shows that while coercive tactics have been relatively rare, they did play an important role in establishing and maintaining early water agreements (see chapter 5).

Utilitarian tactics correspond with strategies for integration (table 2.3) and reflect the provision of incentives and benefits to other riparians. Incentives may take the form of water allocation, monetary compensation, hydropower resources, trade concessions, or political support (Yoffe and Larson 2001, 26–27; Cascao 2009, 82). This analysis of the Orange-Senqu water regime provides interesting insights into the use of utilitarian tactics for water control.

Normative tactics include the establishment of formal rules and agreements to stabilise expectations about water deliveries and abstractions and govern water use in shared basins. Treaties may be used by powerful riparians to formalise and legitimise their water uses while containing the water abstractions and future allocation expectations of neighbouring riparians. As section 1.3.1 noted, not all treaties specify water allocations and few formalise what could be considered equitable water distribution. The in-depth examination of the Orange-Senqu water regime demonstrates the range of different allocation approaches embodied in each of the four basin treaties (see section 4.3.2) and discusses the origin of these arrangements (see chapter 5) and the effects they have had on the allocation of water and related benefits within the basin (see chapter 7).

The final category, hegemonic mechanisms, includes tactics exercised through ideas, discourses, and institutions rather than through material capabilities. Hegemonic mechanisms include the tactics of sanctioned discourse, securitisation, knowledge construction, silentisation, and playing with time. They reflect what Zeitoun and Warner (2006, 438) described as the most efficient water control tactics in transboundary basins.

The concept of sanctioned discourse is the promotion and legitimisation of certain ideas and narratives (Hajer 1997; Allan 2002). In transboundary basins, riparian actors may actively emphasise certain perspectives on water management while de-emphasizing others (Jägerskog 2002; Zeitoun 2006; Warner 2008; Cascao 2009). In

the Rio Grande-Rio Bravo basin, for example, the United States government promotes a discourse of treaty nonnegotiability to solidify the water allocation status quo (Kistin 2006). Elsewhere, in the Jordan and Nile basins, sanctioned discourse is used by Israel and Egypt, respectively, to emphasise the legitimacy of their prior use and acquired rights to water resources (Phillips et al. 2006; Cascao 2009). As subsequent chapters will demonstrate, sanctioned discourses promoted in the Orange-Senqu basin play a fundamental role in shaping the performance of international water management institutions and the allocation of water and related benefits.

The tactic of *securitisation* refers to the definition of water resources as a national security issue (Turton 2003, 93–95; Warner 2004, 8–10). By defining water as a matter of national security, states are able to legitimise the use of extraordinary measures (e.g., military deployment, fast-track approval for infrastructure) to protect or develop water resources within the basin. *Knowledge construction* describes the control of data and information and the ability to emphasise certain facts and interpretations and influence the terms of data collection and exchange (Allan 2002, 2004). *Silentisation* is a tactic used to remove items from the agenda and downplay particular events or information (Greco 2005; Allan 2005). Riparians may also *play with time* by stalling or rushing decisions in the basin to gain favourable treaty terms or maintain the status quo (Daoudy 2005; Zeitoun 2006). This study provides evidence of each of these hegemonic tactics in the Orange-Senqu basin and discusses the extent to which they have shaped governance structures, planning procedures, and resource use.

In sum, the FHH provides important supplementary insights into the structure–agent approach to regime analysis developed in section 2.2 by identifying specific strategies and tactics used by powerful actors in transboundary basins to attain and maintain control of water resources. However, the FHH focuses primarily on actions taken by the basin hegemon and fails to discuss in the same detail the roles and capabilities of nonhegemonic states and other basin actors, or the possibilities for resistance, alternatives, and change. For greater insight into these factors, we turn to the framework of counter-hydrohegemony (FCHH) developed by Cascao (2008, 2009).

### **2.3.2 Counter-Hydrohegemony**

The FCHH builds on contributions made by Zeitoun (2006) and Zeitoun and Warner (2006) that illuminate the dynamic nature of power asymmetry in transboundary basins and draw attention to the capabilities of weaker parties and opportunities for generating resistance, envisioning alternatives, and enacting change (Cascao 2008, 2009). Like Giddens’s theory of structuration, the FCHH is based on the assumptions that power and hegemonic relations are not static and that weaker riparian actors are capable of leveraging their own power resources to relinquish consent to establish relationships or governance structures and propose alternatives (Cascao 2009, 88–90). Similar to the FHH, Cascao’s (2009) framework identifies a range of strategies and tactics utilised by weaker riparians to contest existing water governance arrangements and alter the status quo.<sup>5</sup> These strategies and tactics for resistance are outlined briefly

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<sup>5</sup> Cascao (2009, 90–91) distinguished between *resistance* as reactive in motivation and refractory in consequence and *counter-hydrohegemony* as “pro-active, organized and fully-articulated actions that have transformative potential and promote viable alternatives to particular hydropolitical regimes.” Cascao described the formation of a modified, basin-wide regime supporting the equitable utilisation of shared water resources as one potential example of counter-hydrohegemony.

here and used throughout the study to understand how and why different transboundary water governance arrangements emerged in the Orange-Senqu basin and continue to produce differential effects.

### *Strategies for Countering*

When riparian relationships and transboundary water governance structures generate inflexible, inequitable, or unsustainable outcomes, riparian states and other actors are capable of resisting this potentially damaging status quo. According to the FCHH, agendas for generating resistance and enacting change may include three broad strategies: contesting legitimacy, envisioning alternatives, and challenging the status quo (Cascao 2009, 90–97).

Contesting the legitimacy of governance arrangements imposed by the basin hegemon requires an understanding of what needs to be resisted. This could entail, for example, the recognition that the nonnegotiability of water treaties in the Rio Grande-Rio Bravo basin represents constructed knowledge and not absolute fact (Kistin 2006). The potential of this resistance can be grasped by understanding the contradictions and sources of existing structures and past transformations (Cox 1985). Contesting the legitimacy of water regime components requires a strong understanding of the strategies, tactics, and power relations that have shaped the formal and discursive governance structures. In many cases, it may require the identification and deconstruction of sanctioned discourses that limit basin managers in considering policies and water governance strategies that extend beyond the status quo. Worth and

Kuhling (2004, 35) described this as a process of “manoeuvring against” and destabilising the common sense in order to transform it.

Beyond contesting the legitimacy of existing governance structures, developing an agenda for positive change in water governance requires envisioning alternatives to the present configuration of power relations and governance structures. As Foucault (1980) reminded us, emancipation starts with the creation of the possibility of alternatives. Enacting change in transboundary water governance requires not only a deconstruction of the domination structures but the generation of alternative mechanisms with which to reconstruct the regime. The third broad strategy for enacting change in transboundary water governance is using these envisioned alternatives to enact change. This requires actors within the water regime to leverage their power endowments to alter the principles, rules, and norms that shape its structures.

#### *Tactics for Countering Hydrohegemony*

The FCHH identifies three categories of tactics used by weaker actors in transboundary basins for resistance and counterhegemony: coercive, leverage, and liberating mechanisms (Cascao 2009, 92–97; table 2.4).

**Table 2.4** Tactics used by nonhegemonic riparians for resistance and counter-hydrohegemony.

Mechanism	Description	Tactics
Coercive	Efforts to resist existing governance structures through violence, pressure, intimidation, and obstruction	Threat or use of military force
		Support for opposition groups
		Destruction of hydraulic infrastructure
Leverage	Efforts to increase political leverage and bargaining power in their relationships with other actors	Diplomacy
		Water law
		Unilateral construction
		Alternative funding
Liberating	Efforts to challenge legitimacy through the advancement of alternatives	Cooperation
		Alternative knowledge Discourse alternatives

*Source:* Table derived from information presented in Cascao 2009.

As table 2.4 indicates, coercive mechanisms for resistance and counter-hydrohegemony include the threat or use of military forces, support for opposition groups, and the destruction of hydraulic infrastructure. According to Cascao (2009, 93), coercive mechanisms are often used as a reactive resistance strategy. Leverage and liberating mechanisms, in contrast, often reflect more deliberate and strategic actions.

Leverage mechanisms are deployed by riparians to “increase their room for manoeuvre within the regional hydropolitical context” (Cascao 2009, 94). The use of diplomacy (e.g., letters of protest, political declarations, coalitions with other nonhegemonic riparian states), international water law (e.g., reference to legal principles), and cooperation (e.g., formation of and participation in joint institutions) are all evident as counterhegemonic strategies in the Orange-Senqu basin (chapters 5, 6, and 7). Cascao (2009) also identified the complementary leverage tactics of the unilateral construction of infrastructure (e.g., technological mechanisms to capture resources and establish acquired rights) and the mobilisation of alternative funding

(e.g., circumnavigating traditional financing mechanisms to obtain resources for infrastructure projects). While neither of these tactics is present in the Orange-Senqu basin, Cascao (2009) provided compelling insights into how the mobilisation of financial support from China and the unilateral construction of infrastructure in the Nile basin have shifted power dynamics in those areas.

Mechanisms for resistance and counterhegemony serve as the counterpart to the hegemonic tactics (e.g., sanctioned discourse, knowledge construction, silencing) deployed by powerful riparians (Cascao 2009, 96). Those include tactics for mobilising alternative knowledge and discourse alternatives that challenge the sanctioned discourses underpinning the status quo and proposing alternative scenarios for water governance and water allocation in the basin. This study takes a close look at the alternative discourses that have emerged over the life of the Orange-Senqu water regime.

By identifying a range of specific strategies and tactics used by powerful and weaker riparians in transboundary basins to influence water governance and allocation, the FHH and FCHH provide important supplementary insight into the structure–agent approach to regime analysis established in section 2.2. Both frameworks are used throughout this study to inform the analysis of how power asymmetries in the Orange-Senqu basin have influenced the formation, implementation, and effects of the water regime.

### **2.3.3 Application to the Orange-Senqu Basin**

Thus far, there has been very little work on power and interest asymmetries and their outcomes in the Orange-Senqu basin. Turton and Funke (2008) provided one notable exception. Like much of Turton's groundbreaking work, the 2008 article gave a detailed historical analysis of resources capture and regime formation as well as important commentary on riparians' use of both hard and soft power to achieve their aims. There are pieces of Turton and Funke's article that resonate strongly with the analysis presented in subsequent chapters of this work. Turton and Funke noted, for example, that "the hydrohegemon [South Africa] is likely to opt for a maintenance of the status quo and the retention of the existing bilateral arrangements as the dominant instruments of cooperation" (2008, 62), a trend this work addresses in chapters 6, 7, and 8.

However, there are many ways in which the conclusions drawn from this work call into question the assumptions and assertions made by Turton and Funke (2008). In particular, the examination of effects and determinants presented in this thesis challenges Turton and Funke's characterisation of the Orange-Senqu water regime as one of shared interests, shared control, and mutual benefits perceived as positive by all parties. Their analysis suggested that South Africa is motivated by a desire to "create benefits for itself as well as all of the non-hegemon" (65). That implies that the interests of all riparian states are aligned. This work argues, however, that competing interests have characterised not only the formation of transboundary water governance arrangements in the Orange-Senqu basin but the continued implementation of agreements as well (chapter 6 and 7). Turton and Funke further characterised interstate interaction in the basin as one of "shared control" (64). This

work, in contrast, will draw attention to the ways in which power asymmetries contribute to imbalances in the decision-making process affecting the basin.

Finally, Turton and Funke (2008) described the Orange-Senqu water governance regime as one that produces “mutual benefit for all riparian states” (60) and through which “all key strategic interests have been met” (64). Among these benefits, they suggested, is Namibia’s secure entitlement to sufficient water resources for current and future needs (63–5). Yet this thesis illustrates the persistent uncertainty about and contested nature of Namibia’s water allocation in the lower basin. Turton and Funke’s related claim (64) that all parties perceive the current water governance arrangements as positive thus masks a significant level of discontent among certain nonhegemonic states and subnational groups exposed in this work.

The assumptions and assertions put forward by Turton and Funke (2008) are linked to recent efforts to label powerful riparian parties as either basin bullies or basin leaders based on a combination of interests, process, and outcomes (Zeitoun and Jägerskog 2009). The subsequent analysis cautions against this trend. By evaluating both the effects and determinants of transboundary water governance in the Orange-Senqu basin, this thesis illustrates why the simplistic characterisation of leaders and bullies diverts attention away from the dynamism and nuances of power and interest asymmetries and riparian actions.

## **2.4 Evaluating Effects**

Section 1.3.1 identified the lack of attention to water regime effects as a significant gap in the research regarding transboundary water governance. The conceptual and analytical frameworks developed in Sections 2.1 and 2.2 draw attention to the crooked path of governance and the possibility that international cooperation over transboundary water resources may lead to both positive and negative effects. Neither, however, provides strong guidance for the evaluation of water regime effects. This section outlines the study's general approach to evaluating the effects of the Orange-Senqu water governance regime. It also explains the focus on adaptive capacity and the allocation of water and related benefits and presents the first two subsidiary research questions and their corresponding hypotheses.

The concept of evaluation is not new. Concerns with effects and effectiveness have long characterised the analysis of public policy, and more recently, the assessment of international environmental regimes (Underdal 1992; Sprinz and Helm 1999; Miles et al. 2002). In general terms, the evaluation of regime effects requires documentation of key changes postregime formation and throughout the life of the regime. The determination of the extent to which observed changes are attributable to the water regime or other, external factors is also necessary. The methods used to track such changes and establish causal linkages are discussed in more detail in chapter 3.

In evaluating the performance of international environmental regimes, analysts use multiple definitions of the elusive concept of *effectiveness* (Haas 1993; Bernauer 1995; Victor, Raustiala, and Skolnikoff 1998; Young 2001; Miles et al. 2002). For the most part, scholars tend to reject limited definitions that rely on party commitments or

procedural compliance and opt instead for evaluations that focus on issues related to problem solving and goal achievement. These questions get beyond intent and into more critical thinking about what outcomes and impacts are produced and the extent to which they are attributable to a given governance regime (Young and Levy 1999; Conely and Moote 2003).

The motivations underpinning the formation of transboundary water governance regimes reflect a number of identified problems and related goals. Commonly articulated problems include data and information gaps, tension and mistrust between riparian parties, lack of control over or a reliable supply of water resources and related benefits and deteriorating ecosystems (Kistin 2007). Similarly, a review of the preambles to formal water treaties in the Orange-Senqu basin reveals broad goals and expectations ranging from equitable and reasonable utilisation to sustainable socioeconomic development, to peace and good neighbourly relations (table 2.5).

**Table 2.5** Goals of cooperation in the preambles of agreements pertaining to the Orange-Senqu Basin.

<b>Agreement</b>	<b>Preamble Clauses</b>	<b>Goals</b>
Revised SADC Protocol (2000)	“Desirous of developing close cooperation for judicious and coordinated utilization of the resources of the shared watercourse systems in the SADC region”	Judicious and coordinated utilisation
	“Convinced of the need for coordinated and environmentally sound development of the resources of shared watercourse systems in the SADC region in order to support sustainable socio-economic development”	Sustainable socioeconomic development
ORASECOM (2000)	“Considering the relative paucity of water resources in the southern African region and the need to provide people in the Region with access to sufficient water supplies”	Access to sufficient water supplies
	“Conscious that collaboration between the parties with regard to the development of the river system as a water source of common interest could significantly contribute towards the mutual benefit, peace, security, welfare and prosperity of their people.”	Mutual benefit, peace, security, welfare, and prosperity
	“Committed towards the realization of the principle of equitable	Equitable and reasonable utilisation;

	and reasonable utilization, as well as the principle of sustainable development with regard to the river system”	sustainable development
PWC (1992)	“Conscious that cooperation between the Parties with regard to the development of mutual projects in respect of water resources of common interest will contribute towards the prosperity and welfare of their peoples” (Preamble)	Prosperity and welfare Development of mutual projects of common interest
LHWP (1986)	<p>“Recognizing the advantage of regional development and that cooperation between the parties with regard to the development towards the peace and prosperity of the southern African region and the welfare of its peoples”</p> <p>“Desiring to enhance the conditions of life of the people of the Kingdom of Lesotho and the Republic of South Africa by raising the level of development of those resources”</p> <p>“Considering the mutual benefits for the Kingdom of Lesotho and the Republic of South Africa to be derived from the enhancement, conservation and equitable sharing of the water resources of the Senqu/Orange River and its effluents, and taking account of their particular natural advantages”</p> <p>“Wishing to promote the traditions of good neighbourly relations and peaceful cooperation between the parties”</p>	<p>Peace, prosperity, and welfare</p> <p>Resource development</p> <p>Improved living conditions</p> <p>Enhancement, conservation, and equitable sharing of water resources</p> <p>Good neighbourly relations</p>

*Note:* ORASECOM = Orange-Senqu River Commission, SADC = Southern African Development Community, PWC = Permanent Water Commission, LHWP = Lesotho Highlands Water Project

Of course, there are critiques of problem-solving and goal-achievement evaluation approaches as well. In particular, critics caution that narrow assessments of goal achievement and problem solving tend to overlook wider distributional, relational, and unintended consequences generated by regimes and often ignore the political processes that influence goal setting and problem framing (Young and Levy 1999; Young 2002; Conely and Moote 2003; Daoudy and Kistin 2008). In light of these critiques, this study endeavours to analyse the effects of the Orange-Senqu transboundary water governance regime on adaptive capacity and the allocation of water and related benefits in a way that accounts for the notion of goal achievement

but also takes distributional and relational issues into consideration and recognises goal setting as part of a political process.

#### ***2.4.1 Adaptive Capacity***

Riparians in the Orange-Senqu basin face complex water governance challenges characterised by uncertainty and change. The analysis of adaptive capacity is used here as a proxy measurement for understanding the impact of joint governance efforts on sustainable development. The concept of adaptive capacity, as section 1.2.2 described, reflects the ability of state and nonstate actors to mobilise a range of technical, institutional, and financial endowments to avoid the debilitating effects, both ecological and human, of changing circumstances in shared basins and to alter the patterns of resources management towards outcomes of long-term sustainability.

This is the first subsidiary research question posed in this study: How has the transboundary water governance regime in the Orange-Senqu basin influenced the adaptive capacity of riparian states and international water management institutions? The general expectation is that cooperation between riparian states will bolster adaptive capacity by allowing riparian states to recognise (through data collection, exchange, and utilisation) and respond (through joint planning and policy implementation) to changing circumstances in the basin (Turton and Ohlsson 2000; Yohe and Tol 2002; Raadgever et al. 2008). Based on these expectations, this study examines the hypothesis that ongoing hydropolitical cooperation in the Orange-Senqu basin enhances adaptive capacity by enabling the exchange and utilisation of information and by facilitating joint planning.

Drawing on a growing body of literature analysing adaptive capacity at the national and basin levels (e.g., Yohe and Tol 2002; Smit and Wandel 2006; Raadgever et al. 2008; Goulden, Conway, and Persechino 2008), this study focuses on four core components of adaptive capacity in transboundary basins: institutional flexibility, information management, actor networks, and financial resources (table 2.6).

**Table 2.6** Framework for analysing the effects of the Orange-Senqu water regime on adaptive capacity.

<b>Component</b>	<b>Subcomponents</b>
Institutional Flexibility	Allocation strategies' drought provisions, amendment and review processes, revoking clauses, managing organisations, and willingness to alter strategies
Information Management	Collection, exchange, credibility, and compatibility
Actor Networks	Activity between basin managers, technical and political representatives, government sectors, basin organisations and stakeholders, basin organisations and universities
Financial Resources	Wealth creation, access to financing

By tracing changes in these four components over the life of the Orange-Senqu water regime and determining the extent to which the observed changes were caused by regime performance or other factors, chapter 6 illuminates the regime's effects on adaptive capacity and the underlying determinants affecting the regime's performance.

The analysis presented in chapter 6 differs from other known analyses of the same subject (i.e., Kranz and Vidaurre 2008; Raadgever et al. 2008) in two important ways. It extends the analysis beyond the performance of ORASECOM to consider contributions from all four international water management institutions comprising

the regime and assesses not just the regime's effects but also the causal factors contributing to the regime's influence on adaptive capacity. The analysis of regime effects on adaptive capacity illuminates the operational realities of the international water management institutions in the basin and challenges common assumptions that ORASECOM serves as the overarching planning organisation. Chapter 6 also illustrates South Africa's complex role as a pusher and a laggard with respect to different aspects of transboundary water governance.

#### ***2.4.2 Allocation of Water and Related Benefits***

Consideration of the distributional effects of transboundary water governance, or who wins and who loses at different scales and over time, illuminates the positive and negative impacts of interstate interaction. As table 2.5 illustrated, the goals of judicious and equitable resource utilisation are enshrined in formal water agreements pertaining to water management at the bilateral, basin, and regional scales.

Chapter 7 seeks to answer the second subsidiary research question of this study: How has the transboundary water governance regime in the Orange-Senqu basin influenced the allocation of water and related benefits? The corresponding hypothesis is derived from expectations that interstate cooperation in shared basins stabilises expectations about water abstraction and deliveries (Dinar 2000) and enables riparian states to determine and implement the equitable allocation of water and related benefits (Wouters et al. 2005).

The study measures the allocation of water and related benefits by examining the patterns of water utilisation within the basin and formal agreements specifying the terms of water allocation. In the case of the LHWP, special attention is paid to water allocation, royalties, and hydropower at the national level and the disbursement of compensation payments and related services at the subnational scale. The analysis presented in chapter 7 draws attention to the asymmetry in water use between countries, the lack of clarity regarding water allocation beyond project-level agreements, and continued contestation between riparians about the terms of water allocation and the principles underpinning cost-sharing mechanisms for joint infrastructure. In doing so, it challenges the common notion of transboundary water governance as a win-win scenario in the Orange-Senqu basin.

## **2.5 Assessing Determinants**

For improving the state of transboundary water governance regimes, an analysis of their positive and negative effects (described in section 2.4) is insufficient unless coupled with an investigation into the determinants driving their formations and performances. The structure–agent approach to regime analysis described in section 2.2, the FHH and FCHH described in section 2.3, and the wider body of literature regarding transboundary water governance and international environmental regimes draw attention to four core categories of determinants influencing the formation, implementation, and effects of transboundary water governance regimes: power asymmetries, problem structures, expert networks, and political contexts. Subsidiary research questions 4–6 posed in this study seek to understand how each of these

categories of determinants influenced the formation, implementation, and effects of the Orange-Senqu water regime.

Drawing on contributions from Marty (2001), Bernauer (2002), and Lindemann (2008), this section outlines and explains four corresponding hypotheses to help guide the subsequent analysis of determinants underpinning the Orange-Senqu water regime's formation and performance (table 2.7). Although each of these determinants has been addressed to some extent within the wider literature pertaining to transboundary water governance, these categories of determinants are rarely analysed together systematically and with respect to both the formation and implementation of cooperative arrangements as this work endeavours to do.

**Table 2.7** Categories of determinants and their corresponding hypotheses.

<b>Determinant</b>	<b>Hypothesis</b>
Power Asymmetry	H3: The formation and implementation of international water management institutions are most likely when they serve the interests of the basin hegemon; however, nonhegemonic riparians can influence the process and outcomes of transboundary water governance through resistance and counterhegemonic tactics
Problem Structure	H4: The higher the levels of interest asymmetry, uncertainty, and commitment requirements, the less likely it is that parties will establish or implement governance regimes.; Difficult problems structures can be overcome by balancing incentives and reducing transaction costs
Expert Networks	H5: Involvement by expert networks and donor agencies increases the likelihood of regime formation and implementation.
Political Context	H6: The higher the levels of integration between states and stability within states, the more likely it is that parties will form and implement water regimes.

*Note:* H = Hypothesis.

### **2.5.1 Power Asymmetry**

*H3: The formation and implementation of international water management institutions are most likely when they serve the interests of the basin hegemon;*

*however, nonhegemonic riparians can influence the process and outcomes of transboundary water governance through resistance and counterhegemonic tactics.*

Attention to power asymmetry as a key determinant in the formation and implementation of cooperative arrangements stems from both realist and strong cognitive approaches to regime analysis (section 2.2.1). The HST put forward by realists suggests that the leadership required to initiate and maintain an international regime depends on one state being powerful enough to be able and willing to maintain the rules and enforcement governing the issue (Keohane and Nye 1989; Snidal 1985). Applying a realist approach to the study of transboundary waters, Lowi (1993, 47) contended that water regime formation is most likely in the presence of a powerful downstream state, a basin hegemon, with an interest in securing its water supply. This is why. Lowi argued, agreements exist in the Jordan and Nile basins but not on the Tigris and Euphrates (section 2.2.1). Turton (2003, 302) described a similar pattern in southern Africa wherein South Africa's relative dominance in the region and need for augmented water supplies motivated the formation of numerous transboundary agreements.

Applying a strong cognitivist approach to the study of transboundary waters, scholars developing the FHH and FCHH argued that asymmetries in the combination of multiple dimensions of power give hydrohegemons the upper hand in capturing water resources and related benefits and controlling the decision-making process (Zeitoun and Warner 2006; Cascao 2009). The structures of domination, however, are never absolute. Less powerful parties can also leverage power endowments to influence the

formation, implementation, and effects of transboundary water governance arrangements.

The general expectation emerging from these power-based approaches to the study of transboundary water regimes, and articulated in H3, is that the formation and implementation of transboundary water regimes is most likely when it serves the interests of the basin hegemon. Yet relatively weaker, nonhegemonic riparians can also influence them by leveraging their own power endowments through strategies and tactics for resistance and change.

This study focuses on four dimensions of power affecting transboundary water governance: geographically based power, material power, bargaining power, and ideational power (section 2.2.2). Chapters 5, 6, and 7 provide a comparative analysis of the dynamic power endowments characterising each riparian state and trace the strategies and tactics used by riparian states and subnational actors to influence the formation, implementation, and effects of the Orange-Senqu transboundary water governance regime.

### **2.5.2 Problem Structure**

*H4: The higher the levels of interest asymmetry, uncertainty, and commitment requirements, the less likely it is that parties will establish or implement water governance regimes. Difficult problem structures can be overcome by balancing incentives and reducing transaction costs.*

The concept of problem structure as a key determinant of regime formation, implementation, and effects stems from liberal, institutional, interest-based approaches to regime analysis. The basic rationale is that some problems or problem attributes make it difficult for parties to reach and implement collaborative agreements (Miles et al. 2002). Though the concept of problem structure is defined differently by different scholars (Weiss and Jacobson 1998; Young 1999; Miles et al. 2002; Mitchell 2006), key attributes contributing to the difficulty of problem structures in transboundary basins include interest asymmetry, uncertainty, and commitment requirements.

In the context of transboundary waters, several authors have argued that when states have similar interests in a joint solution (e.g., preventing flooding along a common border), they are more likely to reach a cooperative agreement and follow through on established obligations (LeMarquand 1977; Durth 1966; Marty 2001; Dombrowsky 2007). However, when parties have asymmetrical, or competing interests (e.g., increasing water allocation to a riparian state downstream), convergence around a common agreement will be more difficult and the level of implementation may suffer (Le Marquand 1977; Durth 1996; Marty 2001; Dombrowsky 2007). Marty (2001) noted that *double asymmetry* problems, characterised by asymmetrical interests between riparian countries, local players, and their respective national governments, are among the hardest transboundary water problems to solve.

High levels of normative and informational uncertainty also diminish the likelihood that states will form and implement cooperative agreements (Elhance 2000; Kibaroglu

and Unver 2000; Miles et al. 2002; Mirumachi 2007). In situations of normative uncertainty, parties hold a plurality of views regarding the nature of a transboundary water problem and its solution, making it difficult to get consensus on a joint agreement (Newig, Pahl-Wostl, and Sigel 2005). As Waterbury noted when reflecting on the experience of forming a transboundary water government in the Nile basin, “It is no easy task to arrive at compensatory schemes when the beneficiaries of cooperation are not sure of what they will gain or the losers of the extent of their potential losses. The indifferent may prefer the familiarity of the status quo to the uncertainties of binding cooperation” (1997, 280). High levels of normative uncertainty can be compounded by informational uncertainty or a general lack of knowledge about the dimensions of the particular problem (Elhance 2000; Kibaroglu and Unver 2000; Brugnach et al. 2008).

Finally, the commitment requirement refers to the natural, political, and financial resources required from riparian states to address a given problem. When the level of commitment required of riparian states is low (e.g., the exchange of data and information), regime formation and implementation are expected to be easier than in situations when it is high (e.g., constructing infrastructure for the transfer of water resources; Marty 2001). Dombrowsky (2007, 2010) argued that regimes requiring riparians to resolve disputed property rights are more difficult to form than those where no property rights are involved.

While asymmetric interests, uncertainty, and high commitment requirements can diminish the likelihood of water regime formation and implementation, they do not

pose absolute barriers to riparian states' cooperation (Underdal 1992; Miles et al. 2002). Parties can mobilise financial, technical, intellectual, and political resources to reach, maintain, and implement cooperative water agreements (Turton 2003). A core component of problem-solving capacity is the ability to institute mechanisms to balance incentives and address informational and normative uncertainty. When difficult problem structures prevail, establishing strong incentives for transboundary water cooperation may require linking issues or providing side payments to secure mutual benefits for participating parties (Le Marquand 1977; Marty 2001; Dombrowsky 2007; Zeitoun and Mirumachi 2008, 311; Daoudy 2009). Fischhendler and Feitelson (2003) and Dombrowsky (2010) showed how the United States and Mexico expanded the geographic scope of negotiations in 1944 to achieve a set of politically feasible mutual benefits by including three basins as opposed to just one.

When material benefits fail and countries remain reluctant to cooperation, Durth (1996) noted that illustrating the costs of maintaining the status quo and the reputational or political prestige benefits derived from collaboration can also reduce high levels of interest asymmetry. Strategies to reduce transaction costs and address information and normative uncertainties include the execution of joint studies, the formalisation of data exchanges, and joint institutions' development and strengthening (Le Marquand 1977; Marty 2001).

### ***2.5.3 Expert Networks***

*H5: Involvement by expert networks and donor agencies increases the likelihood of regime formation and implementation.*

Knowledge-based approaches to regime analysis, promoted by cognitive theorists, emphasise the role epistemic communities play in shaping the incentives, beliefs, and preferences of state actors (Haas 1989; O'Neill, Balsiger, and VanDeveer 2004). Within the literature on transboundary water governance regimes, expert networks are recognised for influencing water regime formation and implementation by framing problems, reducing uncertainty, conceptualising alternative strategies, and monitoring effects (Nishat and Faisal 2000; Meissner 2005; Kibaroglu 2008). Nishat and Faisal (2000) argued that cooperation between nonstate experts in India and Bangladesh reduced both informational and normative uncertainty. Similar cooperation on the Tigris-Euphrates' agreements, Kibaroglu (2008) suggested, helped develop a common understanding of the water governance challenges facing riparian states and potential cross-national solutions. Expert networks also encouraged decision makers to think outside the box and consider issues often excluded from official agendas for those water resources (Kibaroglu 2008, 194).

In addition to expert networks' involvement, bilateral and multilateral donor organisations are expected to play an influential role in the formation and implementation of transboundary water governance regimes (Le Marquand 1977; Marty 2001; Mirumachi and Allan 2007). Commonly cited interventions include the involvement of the UNDP in water negotiations in the Mekong River basin (Browder 2000; Dinar et al. 2007) and the financial and facilitation support provided by the World Bank for brokering agreement between India and Pakistan on the management of the Indus (Dinar 2000). In addition to financial resources, donor organisations often

provide technical expertise and may contribute to problem framing and strategy development (World Water Assessment Programme 2009).

#### ***2.5.4 Political Context***

*H6: The higher the levels of integration between states and stability within states, the more likely it is that parties will form and implement water regimes.*

This final category of key determinants does not emerge from a singular approach to regime analysis but rather reflects empirical observations that wider regional or bilateral conflicts can strain the relationship between states and limit interaction over shared waters (Lowi 1993; Dinar 2000; Turton 2003; Lindemann 2008; Dombrowsky 2008). In contrast, high levels of economic and political integration in the region can contribute to increased confidence and communication between parties. Durth (1996) argued that high levels of regional integration correlate with high levels of information shared and confidence in credible commitments. Broad ties between countries, he contended, may also provide a wider array of options for balancing incentives through compensation and linkages.

#### **2.6 Research Goals, Objectives, and Questions**

The overarching goal of this study is to develop a deeper understanding of the key determinants of the Orange-Senqu water regime's formation, performance, and effects. The goal of this research is not to develop a theory of effective transboundary water governance. Taken alone, these cases are inadequate to test hypotheses derived from established theory (King, Keohane, and Verba1994). Rather, the primary aim of

this work is to serve as a building-block study through which the understanding of causal mechanisms in the case of the Orange-Senqu water regime will have implications for understanding causal mechanisms in other cases (McKeown 2004). To achieve these overarching goals, three core objectives must be met and their corresponding research questions answered (table 2.8).

**Table 2.8** Research objectives, sub-questions, and hypotheses.

<b>Objective 1: To characterise the structure, operation, and outcomes of water regime components in terms of adaptive capacity and the allocation of water and related benefits.</b>	
SQ1: How has the transboundary water governance regime in the Orange-Senqu basin influenced the adaptive capacity of riparian states and international water management institutions?	H1: Ongoing hydropolitical cooperation enhances adaptive capacity by enabling the exchange and utilisation of information and facilitating joint planning
SQ2: How has the transboundary water governance regime in the Orange-Senqu basin influenced the allocation of water and related benefits?	H2: Ongoing hydropolitical cooperation stabilises expectations by clarifying water allocation and enables riparian states to determine and implement the equitable distribution of water and related benefits.
<b>Objective 2: To identify and characterise the determinants affecting the formation, performance, and outcomes of the international water management institutions comprising the Orange-Senqu water regime.</b>	
SQ3: How do power asymmetries influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?	H3: The formation and implementation of international water management institutions are most likely when they serve the interests of the basin hegemon; however, nonhegemonic riparians can also influence the process and outcomes of transboundary water governance through resistance and counterhegemonic tactics
SQ4: How does problem structure influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?	H4: The higher the levels of interest asymmetry, uncertainty and commitment requirements, the less likely it is that parties will establish or implement water governance regimes. Difficult problem structures can be overcome by balancing incentives and reducing transaction costs
SQ5: How do expert networks influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?	H5: Involvement by expert networks and donor agencies increases the likelihood of regime formation and implementation
SQ6: How does political context influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?	H6: The higher the levels of integration between states and stability within states, the more likely it is that parties will form and implement water regimes
<b>Objective 3: To explore theoretical and practical insights based on case study findings.</b>	
SQ7: Which determinants are most significant for explaining the formation, implementation, and effects of the Orange-Senqu transboundary water governance regime?	H7: Each of the selected determinants plays an important and related role in shaping the emergence and outcomes of water governance; Power asymmetries and problem structures, however, are essential for understanding the formation, implementation, and effects of the water regime

*Note:* SQ = Sub-question, H = Hypothesis.

By providing a deeper empirical understanding of the key determinants of water regime formation, performance, and outcomes, this work will illuminate opportunities for enhancing internal and external strategies for improving the process and effects of transboundary water cooperation.

## **CHAPTER 3: RESEARCH METHODS**

### **Introduction**

The purpose of this chapter is to justify and describe the research methods utilised to investigate and explain the formation, implementation, and effects of international water governance regimes in the Orange-Senqu basin. The aim is to make transparent the circumstances of fieldwork, data collection, and analysis that shaped the thoughts, ideas, and conclusions presented in this study.

The chapter is divided into four main parts. Section 3.1 establishes the overarching research approaches used to translate the conceptual and analytical frameworks established in chapter 2 into strategies for collecting and analysing information on the ground. Section 3.2 describes the research methods and techniques utilised to collect data, and section 3.3 discusses the analysis, verification, and validity of information. Section 3.4 comments on the ethical considerations.

### **3.1 Research Approaches**

The overarching goal of this study is to develop a deeper understanding of the emergence, effects, and determinants of international water management institutions comprising the Orange-Senqu water regime. Chapter 2 outlined the conceptual and analytical frameworks guiding the investigation of how and why different arrangements form and produce differential effects. Applying a structure–agent approach to regime analysis requires two broad tasks: the identification of formal and discursive governance structures that define the water regime and the analysis of the

formation, reproduction, and transformation of these structures as well as the identification of actors that influence and are influenced by the regime and the assessment of their routines, intentions, and capabilities (Arts 2000; Gooch et al. 2000). This section describes the overarching research approaches selected to guide such analyses.

### *Interpretive and Liberatory Inquiry*

This study relies on a combination of complementary approaches to investigative inquiry drawn from Pimbert (2004).<sup>6</sup> The first approach, interpretive inquiry, reflects a general social science approach to research that sees knowledge as a subjective, social construction (Pimbert 2004, 16; Smith, Willems, and Johnson 1997). Interpretive inquiry resonates strongly with the structure-agent approach to regime analysis and enables investigation into the process through which actors influence and are influenced by formal and discursive water governance structures.

The second approach, liberatory inquiry, reflects a participatory action approach that views reality as being socially constructed and transformable through knowledge and understanding (Pimbert 2004; Smith, Willems, and Johnson 1997). The liberatory approach draws attention to the analysis of counterhegemonic efforts to generate resistance, envision alternatives, and enact change (Cascao 2009, 111). It encourages investigation into the material and immaterial factors reinforcing the status quo and possibilities for the transformations of relationships and governance structures.

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<sup>6</sup> Zeitoun (2006) and Cascao (2009) both drew on Pimbert (2004) in their research. Conversations with both authors in 2006 inspired the adoption of similar research approaches for this work.

### *Multiple Case Study Approach*

This work adopted a multiple case study approach for the investigation of the formation, implementation, and effects of the four international water management institutions comprising the Orange-Senqu water regimes (table 3.1). The comparative approach provided important insight into the range of effects and determinants influencing transboundary water governance. It also helped to identify and illuminate the issues of institutional interplay often overlooked in studies focusing on a singular agreement or treaty in the basin.

**Table 3.1** International water management institutions comprising the Orange-Senqu water regime.

<b>Parties</b>	<b>Year</b>	<b>Treaty</b>	<b>Joint Organisation(s)</b>
Lesotho South Africa	1986	Treaty on the Lesotho Highlands Water Project Between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho	Lesotho Highlands Water Commission
Namibia South Africa	1992	Agreement Between the Government of the Republic of South Africa and the Government of the Republic of Namibia on the Establishment of a Permanent Water Commission	Permanent Water Commission
Namibia South Africa	1992	Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Scheme Between the Government of the Republic of Namibia and the Government of the Republic of South Africa	Joint Irrigation Authority
Lesotho South Africa Botswana Namibia	2000	Agreement Between the Government of the Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa on the Establishment of the Orange-Senqu River Commission	Orange-Senqu River Commission

Many scholars of transboundary water governance have used in-depth case studies to examine particular regions and basins and enhance our understanding of the emergence and effects of water governance regimes (see Lowi 1993; Weinthal 2002; Zeitoun 2006; Cascao 2008). Though the case study approach is occasionally criticised for insufficient precision and rigor, the methodology is well suited for the

objectives of this study as it allows the investigator to retain holistic and meaningful characteristics of real-life effects that alternative strategies don't permit (Hepworth 2009). The remaining sections of this chapter illustrate the steps taken to ensure rigor in the research and analysis that drive this work.

### *Field Research*

Extensive fieldwork, conducted in the Orange-Senqu riparian countries from January to May 2007 and September 2007 to April 2008, facilitated the collection of primary and secondary data that inform the four in-depth case studies of international water management institutions comprising the basin water regime. Fieldwork activities in Lesotho, South Africa, Botswana, and Namibia included document collection, interactive participation, and most importantly, interviews with key informants involved in various ways with water governance in the basin. Over the course of fieldwork, I was based as a visiting researcher at the Council for Scientific and Industrial Research (CSIR) in Pretoria, South Africa, and spent extended periods of time in each riparian country.

### **3.2 Methods and Techniques**

Chapter 2 articulated the main research questions and hypotheses driving this study. This section identifies the multiple methods and techniques used throughout the research process to respond to the overarching questions about how and why different transboundary water governance arrangements emerge and produce differential effects. The following discussion is on the role of the researcher as interpreter and the strategies used for document analysis and participatory observation. Particular

attention is given to the interview methods that shaped the central strategy for data collection and verification within the study.

### ***3.2.1 Researcher as Interpreter***

Before discussing the range of strategies used to collect data and information, it is essential to acknowledge my role as an interpreter in the research process. As Stanley and Wise (1993, 157) explained, “There is no method or technique of doing research other than through the medium of the researcher.” Reflecting on the role of the researcher as interpreter is necessary for situating the information presented in this thesis with my role in seeking, collecting, and compiling data. As Geertz (1973, 9) put it, “What we call our data are really our own constructions of other people’s constructions of what they and their compatriots are up to.”

As a young, white, American woman raised on the banks of the Rio Grande and affiliated with the CSIR in Pretoria, I was both an outsider and an insider in regards to the research location. As Mullings (1999) noted, the cultural identity, race, class, and gender of interviewer and interviewee will affect the outcome of the interviews. Perceptions about my identity affected what kinds of information people shared with me and on what level people were willing to open up to me.

Throughout the interview process, I found myself manipulating my positionality by emphasising certain aspects of my identity to gain access to interviews or to build rapport with respondents (Laws, Harper, and Marcus 2003). In certain circumstances, it was beneficial for me to emphasise my identity as a New Mexican raised in an

agricultural community fed by the Rio Grande. In others, my affiliation with the CSIR helped facilitate conversations with respondents, and scheduling interviews with high-level government officials was occasionally aided by describing myself as a Rhodes Scholar studying at the University of Oxford. These aspects of my identity and the ways in which they were perceived by interviewees and community members heavily shaped all three methods of data collection used to gather information for my thesis: document analysis, interviews, and participant observation.

### ***3.2.2 Document Analysis***

This study draws on a wide range of documents and secondary sources to illuminate the historical and contemporary circumstances of transboundary water governance in the Orange-Senqu basin. The analysis of government, NGO, and donor documents helped me gain a deeper understanding of the interaction between states, the activities of international water management institutions, and the condition of the basin and its water resources. These documents provided important insights into key officials' preferences and positions as they contributed to deliberations and decision making. They also illuminated interstate communication, policy justifications, and resource management trends and contained the work and recommendations of private consultants and correspondence and contracts with international donor agencies.

During my fieldwork, I obtained documents from a range of key repositories. Within southern Africa, I relied on a several document centres in each country. In South Africa, I obtained documents from the Water Research Commission, the CSIR library, and the files at the Department of Water Affairs and Forestry (DWAF). In Lesotho, I

utilised the libraries run by the Lesotho Highlands Development Authority (LHDA), the Transformation Resources Centre (TRC), and the office of Sechaba Consultants. In both Botswana and Namibia, I obtained documents through the departments of water affairs. Back in England, I relied heavily on resources from both the Bodleian and British libraries. In each country, I benefited from contacts and interviewees who provided historical and contemporary documentation from their personal files.

By reading and analysing these documents from a critical perspective (see Schaffer 1984; Apthorpe 1996), I identified the sources and scope of information that feed into deliberations and decision-making processes and the assumptions that shape different types of water governance analysis and planning. Document analysis also enabled me to trace how private consultants and international donors engaged in the policy-making process by providing information, facilitating communication, and drafting recommendations. Examining the fine details of the policy-making process thus provided important evidence for understanding the behaviour of different actors in the management of the basin and the causal factors underpinning the emergence and effects of joint institutions.

### ***3.2.3 Participatory Observation***

Participant observation in interstate, water-related meetings and regional and international conferences provided important insights into the intentions and capabilities of different actors operating within the region and the discursive structures shaping agendas and discussions (table 3.2). Attending meetings between riparian governments and international donors illuminated linkages between different

actors and provided context for both the interviews and documents previously reviewed. The opportunity to attend public and private meetings allowed me to integrate into the area as a quasi-insider and enhanced subsequent interviews by increasing the pool of contacts with whom I was acquainted as well as the openness of interviewees with whom I had interacted previously.

**Table 3.2** Basin meetings and regional and international conferences attended.

<b>Meeting/Conference</b>	<b>Location</b>	<b>Dates</b>
Exploring the next frontier in transboundary water research in Africa	Stockholm, Sweden	August 2009
World Water Week	Stockholm, Sweden	August 2009
Universities' Council on Water Resources Annual Conference	North Carolina, USA	July 2008
International Studies Association Annual Convention	California, USA	March 2008
WaterNet/WARFSA/GWP-SA Symposium	Lusaka, Zambia	November 2007
ORASECOM Workshop	Johannesburg, South Africa	October 2007
International Workshop on Hydrohegemony	London, UK	May 2007
Lesotho Water Partnership Meeting	Maseru, Lesotho	April 2007
Governance as Trialogue Book Launch	Midrand, South Africa	March 2007
General Assembly of the African Network of Basin Organisations and the Network of Transboundary Basin Organisations	Johannesburg, South Africa	March 2007
Young Professionals Transboundary Water Training Program	Johannesburg, South Africa	February 2007
Water Governance for Africa	Bradford, UK	December 2006
World Water Week	Stockholm, Sweden	August 2006
International Workshop on Hydrohegemony	London, UK	May 2006

*Note:* GWP-SA = Global Water Partnership, South Africa; ORASECOM = Orange-Senqu River Commission; WARFSA = Water Research Fund for Southern Africa.

Participation in regional and international conferences allowed more interaction with a range of actors involved in different aspects of water governance in the Orange-Senqu basin. These conferences provided important opportunities for scheduling interviews and conducting follow-up conversations with key informants. They also allowed me to present preliminary findings from the ongoing research through papers, presentations, and panel discussions (see Appendix 2) and to receive constructive

feedback about my analysis and interpretation of the effects and determinants of transboundary water governance in the basin.

### **3.2.4 Interviews**

Given the desire to reconstruct the routines, intentions, and capabilities of actors within the Orange-Senqu water regime, the interviewing process was based on qualitative, semistructured methods (Rubin and Rubin 1995).

#### *Sampling*

The sampling technique used for these interviews was a combination of nonrandom, stratified sampling (Bryman 2001) and snowballing. I employed this technique to meet my overall aim of interviewing a wide variety of relevant actors while ensuring a balanced representation of respondents from all four riparian states and a variety of sectors. During the course of the fieldwork, I targeted five basic groups of actors for interviews (table 3.3). Interviewees were selected on the basis that they had a significant role or interest in issues of regional and binational water management.

**Table 3.3** Target groups for data collection interviews.

<b>Target Group</b>	<b>Examples</b>
Government	Technical and political representatives to the joint commissions Representatives from the Ministries of Water Resources, Agriculture, Environment, Mining, and Foreign Affairs
International and Financial Organisations	Representatives from bilateral and multilateral donor organisations, the World Bank and Regional Development Banks
Regional Organisations	Representatives from the SADC water sector and NEPAD water team
Academics	Representatives from regional and international universities and independent research centres
Nongovernmental Organizations	Representatives from water- and environment-focused organisations
Private Sector	Representatives from consulting and construction firms Industry representatives and commercial water users

*Note:* SADC = Southern African Development Community; NEPAD = New Partnership for African Development

The majority of the interviews took place in the capital cities of each riparian state (Maseru, Pretoria, Gaborone, and Windhoek). In addition to time spent in the capitals, I also visited cities, towns, and infrastructure sites throughout the basin including dams and surrounding communities in the Lesotho Highlands and the Joint Irrigation Scheme straddling the common border between Namibia and South Africa. Interviews and follow-up conversations were also conducted at regional and international conferences held in Lusaka, London, San Francisco, and Stockholm.

The vast area of the Orange-Senqu Basin and the distance between these research locations meant I often had to make difficult decisions about research planning, forgoing a public meeting in one locale to obtain an interview in another. I attempted to design a research schedule that allowed me to concentrate for a few weeks at a time in each locale, but complications inevitably arose and trade-offs had to be made. For example, with relevant meetings being held simultaneously in Johannesburg (for ORASECOM) and Noordower (for the Joint Irrigation Authority [JIA]), I ultimately had to make decisions about which event to attend.

Despite my initial desire to speak to as many people as possible, I learned while conducting interviews in the first phase of fieldwork that overscheduling appointments may ruin opportunities to access more in-depth information from interviewees who are willing to extend the conversation or to assist with introductions to their colleagues. While individual interviews tended to vary in length (from 35 minutes to 3½ hours), there were a few occasions when interviewees offered to have

me speak with other members of their organisation or institution who may have had slightly different insights or opinions on some of the questions that were raised. As my field work progressed, more flexible scheduling allowed me to take advantage of opportunities to spend virtually the whole day interviewing different members of a single organisation.

Overall, it proved imperative to use previous interviewees' recommendations to make contact with additional respondents in the region. As Cornelius (1982) argued, where there are gatekeepers or other obstacles to access, an insider's introduction can prove extremely useful in gaining access to additional contacts. Frequently, this was facilitated by a recommendation of names that was occasionally accompanied by additional contact information. In some cases, I received direct assistance in soliciting a subsequent interview: Towards the end of our conversation, one respondent suggested I get in contact with a particular leader in the region. When I mentioned that I had attempted to both call and e-mail this individual but had received no response, the interviewee immediately grabbed the phone, called the leader on his mobile, and arranged for us to meet that afternoon at a local café.

Of course, the difficulty with this method of sampling is that interviewees are often more inclined to recommend respondents whose views correspond with their own. This, in turn, can bias the cross section of data that is obtained (Berg 2004). I did, however, encounter a few interviewees who were quite candid in recommending other actors in the region to talk to for opposite views about the process of institutional formation and implementation.

There were individuals and institutions that I would have liked to have interviewed and approached to ask for one, but they were not able to comply for logistical or other reasons. As King, Keohane, and Verba (1994) suggested, it is important to assess whether restricted access is linked to the topic being investigated and how that affects the overall selection bias. Two of the key individuals whom I solicited for interviews but was never able to connect with were Kader Asmal, a member of the South African parliament and the former minister of Water Affairs and Forestry for South Africa, and Maliso Phakoe, the chief executive officer of the LHDA. Whereas scheduling difficulties prevented a meeting with Mr Asmal, I believe the lack of conversation with Mr Phakoe stemmed from a wider institutional strategy to deflect research inquiries to other members of the LHDA staff.

### *Process*

As Mason (2002) argued, qualitative interviewing requires the ability to think on one's feet and respond quickly and coherently to the dynamics of an interview. The ability to do both requires both substantive and interactive preparation. With respect to substance, Arskey and Knight (1999) argued that the most important aspect of interview preparation is to understand the topic. The intensely interdisciplinary nature of transboundary water governance in a water-scarce environment made building the foundations of understanding a difficult task.

My substantive preparation focused on a review of documents published by the institutions and organisations I solicited for interviews and a significant, cross-

disciplinary, literature review focused on the pertinent disciplines wherein my knowledge was the weakest.<sup>7</sup> In addition to this background reading, I scheduled interviews in the early stages of the fieldwork process to help strengthen my knowledge of national and regional water policy complexities. Frequent conversations with colleagues at the CSIR and collaboration on related interdisciplinary projects also strengthened my understanding of the technical and local context of policy reform and implementation.

Of course, there is always more to learn. As Jennifer Montoya of the World Wildlife Fund told me when I was conducting field research for my master of philosophy dissertation, “Water is the sort of issue for which you could study forever. No matter how many degrees you have in however many subjects, there will always be another aspect you don’t quite understand” (pers. comm., 2005).

Interactive preparation is less tangible than substantive preparation. Two tactics I found useful for interactive preparation were (a) the development and sequencing of core interview questions and (b) periodic self-critiques of my interview style. First, in preparation for each interview I drew on a core list of questions that I maintained and updated throughout the research process. When preparing for specific interviews, questions were drawn from this core list and adapted based on my knowledge of the experience and expertise of the interviewee. To balance the flexibility of an open-ended interview style with sufficient thematic focus, I often divided my interview

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<sup>7</sup> With an educational background in political science, economics, and anthropology, substantial preparation was required to familiarise myself with topics like groundwater hydrology and systems dynamics modelling.

plans into a few central thematic areas. I attempted to order my questions so that sensitive issues would be dealt with towards the middle of the interview to build up the level of trust established through the course of conversation (Mason 2002, 73).

My second tactic for interactive preparation consisted of reviewing early interviews shortly after they had been conducted. Before worrying about transcribing them—a process focused almost exclusively on what the interviewee is saying—I reviewed them to listen and analyse my own contributions to the conversation. Despite the painful process of listening to my voice on a recording, this self-critique proved a valuable opportunity for evaluating my performance as an interviewer and seeking strategies to improve it. For example, I realised I failed to adequately use opportunities to follow up on responses or more deeply probe explanations. This limited the depth of information I gained from the initial interviews. According to Berg (2004), an irresponsive interviewer may unintentionally communicate a disinterest in the interviewee's responses and limit the content of subsequent responses. Reflection on my tendency to speed from one question to the next allowed me to slow down in subsequent interviews and focus on creating a more conversational and interactive climate for discussion.

During the first phase of fieldwork, I endeavoured to use a standardised questionnaire that asked respondents to provide numerical rankings of the level of overall goal achievement obtained by international water management institutions in the basin and of achievement in different areas of activity. I also asked them to explain how the institution contributed to those objectives. Overall, I found that the request for

numerical rankings distracted respondents from reflecting on the role of the water management institution or considering external causal factors. Additionally, discussion and clarification of the ranking process took up a significant amount of time. When meeting with busy, high-ranking officials, it drastically cut into the limited amount of time available for exploring causal factors and asking follow-up questions regarding the interpretation of key events and outcomes. Thus, after a significant trial period and reflection on the information obtained through the structured questionnaire and the overall objectives of the research, I chose to abandon the formal questionnaire and pursue semistructured interviews focused on the effects and determinants of institutional participation.

### *Language and Recording*

Interviews for this dissertation were conducted entirely in English. In my initial correspondence, I asked some interviewees, when relevant, to specify their preferred language for the meeting and noted that I would be happy to arrange for a translator due to my poor abilities in Sotho, Swana, and Afrikaans. Over the course of the field research, I worked to develop basic vocabulary in a variety of the regional languages so I could, at the very least, greet and thank interviewees in their first languages. Though extremely limited, this gesture was an important way to build rapport with respondents (Bernard 1995, 146). Becoming conversant in the “language” of soccer, cricket, and rugby also helped me build a level of comfort and familiarity with interviewees.

The majority of the interviews were taped and later transcribed. This allowed me to use direct citations to support the presentation of research. I could also concentrate on engaging with the interviewee over the course of our conversation rather than on taking notes. I continued to take notes during the tape-recorded interviews, partially motivated by my persistently poor luck with electronics and the need for back-up records, but mostly to aid in formulating subsequent questions from the content of interviewees' responses.

Interviewees were all asked for permission before recording interviews, which is discussed in more detail in the ethics section of this chapter. In most cases, the presence of the tape recorder presented no problem at all. There were, however, a few respondents who preferred not to be taped. While each individual's reaction to the interview process and tape recorder varied, I found that high-level, government officials tended to be more relaxed—and occasionally provided more in-depth information—without the recorder. During the second phase of fieldwork, I used the tape recorder less and less for follow-up interviews. Interviewees were still asked for prior consent to record and use their thoughts, but I found that certain interviewees provided more thorough analysis and opinions without the tape recorder present.

### **3.3 Analysis, Verification, and Validity**

Taken together, the data obtained through document analysis, interviews, and participant observation provided rich information about the formation, implementation, and effects of the Orange-Senqu water regime. Using the process of triangulation (Berg 2008), I was able to extract information from documents and

compare it with information supplied in interviews, observed meetings, and secondary literature to develop a more complete understanding of the multifaceted policy process. The analysis and interpretation of outcomes and causal factors involved piecing together a complex policy process from directly and indirectly documented events.

The quality of case study research is often judged in terms of construct, internal, and external validity (Yin 2003). *Construct validity* is derived from the selection of appropriate operational measures for the concepts being analysed and the assurance that both the concepts and measurements are relevant to the aims of the study (Hepworth 2009). Chapter 2 demonstrated the relevance of the concepts at the core of this study, that is, the effects and determinants of international water management institutions. Additionally, and as the previous sections have shown, this study draws on multiple sources of evidence to develop a deeper understanding of the outcomes and determinants of transboundary water cooperation. I also sought to achieve construct validity through the solicitation of feedback and verification in public forums and from individual informants about my definition of the concepts and my selection of measurement strategies.

The *internal validity* of case study research refers to the strength of causal inferences and interpretations drawn from case study data. In any research endeavour concerned with causal factors, there is the risk of drawing spurious conclusions (e.g., that outcome  $x$  has been caused by factor  $y$  when some unknown factor  $z$  is actually the cause of  $x$ ). Internal validity is thus threatened when inferences are drawn without

having considered and rejected all rival explanations (Yin 2003). Attention to internal validity was particularly important for this study as it strives to focus on the explanatory power of four categories of causal factors while not ignoring the possibility that other causal factors may have influenced the emergence and effects of the international water management institutions under examination. It is, however, difficult, if not impossible, to ensure that all alternative explanations have been considered. To bolster the internal validity of the research, I've drawn on the use of triangulation and the consideration of multiple perspectives to decrease the chances of severe oversight. I have also relied on feedback from colleagues, conference participants, and key informants to test the strengths of my causal explanations and interpretations (see Appendix 2).

Finally, the concept of *external validity* raises questions about whether the insights gained from one case study are generalisable across other cases outside of the study (Hepworth 2009). Indeed, there are limitations to the generalisability of empirically grounded and qualitative case studies (Levy, Young, and Zern 1995). Taken alone, the cases examined in this study are inadequate to formally test hypotheses derived from regime theory (King, Keohane, and Verba 1994). Nevertheless, the understanding of causal mechanisms underlying the emergence and performance of the international water management institutions within the Orange-Senqu water regime may provide important insights into the causal mechanisms in other cases (McKeown 2004). Recognising these limitations, the goal of this research was *not* to develop a theory of effective governance. Rather, the aim of this work was to serve as a building block study, through which the understanding generated in the case of the Orange-Senqu

water regime will have implications for understanding causal mechanisms in other cases.

### **3.4 Ethics**

Two central ethical concerns arose with respect to this research: informed consent and dissemination of research. Within the process of researching, any researcher will have multiple and simultaneous responsibilities to a number of groups: society, funders, employers, colleagues, and subjects (Laws, Harper, and Marcus 2003). A researcher's objective—to cause minimum harm while maximising the beneficial outcomes of research—requires that these multiple obligations be balanced and trade-offs carefully acknowledged. Although the individuals interviewed for this research did not constitute vulnerable groups, there were, nevertheless, important ethical considerations that had to be kept in mind.

The first ethical concern, prior and informed consent, reflects the knowing consent of individuals to participate in an exercise of their choice (Berg 2004). This extends to the right of the individual to consent to how the material they provide is used and grants participants the right to both confidentiality and anonymity in their responses. While most interviewees granted permission for their names to be used in this dissertation, there were several instances when participants shared information that was off the record. At this point in an interview, I would turn off the tape recorder and put down my pen. Often, I was able to follow up on off-the-record comments with further probes. Knowing this portion of the interview was not going to be repeated or published allowed interviewees to be more candid and reflective.

Confidentiality about off-the-record information was crucial for many respondents who felt that their employment could be threatened if their sentiments were directly attributed and publicly disseminated. For others, requests for off-the-record commentary seemed less tied to self-protection and more closely linked with diplomacy-related fears: upsetting regional partners or close colleagues. The ethical dilemma a researcher faces in these situations is how to honour the commitment of the individuals that have participated in the research while also weighing the potential benefits of making this information public knowledge. One of the mechanisms for reconciling this dilemma is to search for alternative sources such as written texts or other interviews to which off-the-record information may be attributed.

The second ethical concern confronted in this research was related to its dissemination and communication. In taking a critical approach to the topic of transboundary water cooperation, it was essential to reflect on how the ideas communicated in this research may be utilised when the information and ideas are publicly shared. At this point, many of the ideas embodied in this thesis have been published in academic journals, presented at conferences, and posted on the Internet (see Appendix 2). In addition to the private feedback I've sought from interviewees and colleagues, I have received comments from the wider public. The hope is that this research will contribute to a nascent movement to critique the current power relations and water allocation arrangements that characterise the state of international cooperation over transboundary water resources. In many ways, this is a role for which academics are well positioned: using analytical tools to expose the current nature of cooperation and

envision more equitable alternatives. Yet as these ideas are made public, it is imperative to recognise that this type of academic analysis will be deemed and used as political tools by actors who are both in favour of and against maintaining the status quo of water management.

### **3.5 Conclusion**

This chapter makes transparent the methodologies selected and employed throughout this multistage research process. The description of the circumstances of fieldwork, data collection, analysis, and dissemination is essential for situating the thoughts, ideas, and conclusions presented in this thesis.

## **CHAPTER 4: PHYSICAL AND INSTITUTIONAL LANDSCAPE OF THE BASIN**

### **Introduction**

This chapter provides key background information regarding the Orange-Senqu water regime. The chapter is divided into three main parts. The first section provides a brief overview of the historical and ecological factors contributing to the development, utilisation, and management of water resources prior to the establishment of the international water management institutions comprising the Orange-Senqu water regime. The second section discusses the major issues and changing circumstances confronting basin managers today. The third section illustrates the institutional landscape of the Orange-Senqu basin and the multiplicity of agreements and policies in place at the regional, basin, and bilateral levels influencing water governance. The evaluation of treaty content provides important insight into the rules, regulations, and institutional landscape that guide current patterns of water utilisation and decision making in the Orange-Senqu basin.

### **4.1 Early Basin Development**

This section presents a brief overview of the historical and ecological factors contributing to the development, utilisation, and management of water resources prior to the establishment of the Orange-Senqu water regime. It provides important background information for the analysis of regime formation presented in chapter 5 and illustrates how the combination of migration, colonisation, population growth, economic development, and political agendas shaped the physical and institutional landscape of the Orange-Senqu basin.

#### ***4.1.1 Pre-colonial Period***

The indigenous San people, who lived along the banks of the Orange-Senqu River and subsisted by hunting, gathering, and fishing, were some of the earliest inhabitants of the area (Funke et al. 2007). Other early inhabitants in the region included the Khoi-Khoi, a seminomadic population of hunters and pastoralists that migrated south from the north of present-day Botswana with herds of sheep and cattle. Bantu-speaking populations also moved into the basin following the Khoi-Khoi and practiced agropastoralism along the banks of the river (Ross 1999).

The climatic template of the basin (see section 4.3.1) affected the distribution of pre-Colonial populations throughout it. The Khoi-Khoi concentrated in the well-watered southern plains while the Bantu-speaking populations stayed in the eastern part of the basin to avoid the erratic rainfall patterns that characterised the west. The San dispersed throughout the region, inhabiting portions of the Drakensberg Mountains, the Western Cape, and the Karoo and Kalahari deserts where they could access natural resources and avoid persecution from neighbouring groups (Turton et al. 2004).

Each of these groups depended heavily on the natural resources of the basin for subsistence, production, and survival. Yet despite a few accounts of competition over resources, very little conflict over natural resources has been recorded or speculated on from this era (Turton et al. 2004). This is likely due, in part, to the abundance of natural resources relative to the sparse population and low levels of water demand

they had. Additionally, as natural resources came under greater demand, the seminomadic populations often migrated to new, sparsely inhabited and resource-rich areas (Murombedzi 2003). As settlements expanded and the prospects for migration as a solution to resource stress declined, pre-Colonial populations developed a variety of political, religious, and technological innovations—from water harvesting to resource use regulations—to address ecological concerns (Funke et al. 2007).

#### ***4.1.2 Colonisation***

In 1652, the Dutch East India Company established a fortified refreshment station along the Cape of Good Hope for traders travelling between Europe and the colonies in the east. Their focus at the outset was not to establish an extensive colony but rather to fortify the station and facilitate intercontinental trade. Nevertheless, the settlers quickly established strict control of water and land along the Cape, harnessing natural resources for agricultural production and the distillation of brandy for trade (Turton et al. 2004). Nearly two decades of poor economic production within the Cape colony, coupled with desires to discover precious metals and a wider market for cattle and sheep, spurred expeditions from the southern coast into the interior of southern Africa (Wilcox 1986).

Throughout the later part of the eighteenth and the early nineteenth centuries, explorers continued to venture to the river in search of good soil, precious minerals, trade routes, transportation, and adventure (Turton et al. 2004). As Dutch settlers moved north from the Cape, they appropriated large amounts of land and livestock held by the Khoi-Khoi and San. They settled large tracts of land north of the Orange

River and the Vaal tributary and established two sovereign states: the Zuid-Afrikaansche Republiek in 1852 and the Orange Free State in 1854. As the population increased in those Boer republics, the practice of commercial agriculture and irrigation increased in the basin. European migration into the Orange-Senqu basin continued to rise throughout the early nineteenth century following the British takeover of the Cape colony (Turton et al. 2004).

Beyond the territory of present-day South Africa, Basutoland (present-day Lesotho) was declared a British protectorate in 1868.<sup>8</sup> Nearly two decades later, in 1885, Bechuanaland (present-day Botswana) was also named a British protectorate.<sup>9</sup> Downstream, South West Africa (present-day Namibia) was declared a German protectorate in 1884 and remained under German control until the invasion by South Africa in 1915.<sup>10</sup> Unlike the Boer republics, these territories did not engage in the same level of irrigation or commercial agriculture with water from the Orange-Senqu basin (Turton et al. 2004).

#### ***4.1.3 Mineral Discovery***

The discovery of precious minerals within the basin (diamonds in 1867 followed by gold in 1886) also marked a significant turning point in the development trajectory of the Orange-Senqu River. The rush to access the mineral wealth discovered in the

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<sup>8</sup> The territory remained a protectorate until gaining independence as the Kingdom of Lesotho in 1966.

<sup>9</sup> Like Lesotho, Botswana gained independence from the British crown in 1966.

<sup>10</sup> The territory of South West Africa remained under German control until 1915 when Britain mobilised the Union of South Africa to invade the German colony. The territory remained under South African military rule until the signing of the Treaty of Versailles in 1919 when the League of Nations ordered South Africa to administer the treaty on behalf of Britain. Thus, until Namibia gained full independence in 1990, South Africa controlled much of the political agenda in the downstream territory, including foreign policy and natural resources management (see section 5.1.1).

Witwatersrand ridge of the Zuid-Afrikaansche Republiek (present-day Gauteng province) contributed to substantial population growth and “the infusion of European technology, capital and railroad systems deep into the interior of southern Africa” (Thompson and Lamar 1981, 23). Mining towns sprung up where springs and streams were available to sustain settlements and process ore (Applegryn 1984, 14), transforming the previously rural setting into a rapidly expanding urban centre. By 1896, the population in the area reached 100,000 and grew to 150,000 by 1901 (Turton et al. 2006).

As the city grew, the landscape transformed. Settlers planted vast quantities of fast-growing eucalyptus trees (imported from Australia) to settle dust in the cities and harvest for mining timbers. The area rich with gold, however, was poor in water. Heavy use and severe droughts in the early 1890s left streams and springs along the mining ridge running dry. The widespread adoption of the McArthur Forester process of gold extraction, which used cyanide to coalesce fine gold particles and increase milling yields, further diminished water availability through significant contamination (Turton et al. 2004). Faced with the growing challenge of maintaining sufficient water quantity and quality for production and settlements, the government of the Zuid-Afrikaansche Republiek created the Witwatersrand Water Supply Commission to oversee water management in the region (Turton et al. 2004).

#### ***4.1.4 Union, Urbanisation, and Basin Development***

The discovery of gold in the Zuid-Afrikaansche Republiek sparked a series of political and military skirmishes between British forces and the Boer Republic that

eventually gave rise to the Anglo-Boer War in 1899. The brutal battle between white authorities vying for political, economic, and military power in the region ended in 1910 with the British forces consolidating the Boer republics of the Orange Free State and the Zuid-Afrikaansche Republiek and the two former British colonies of the Cape and Natal into the Union of South Africa, an enlarged, self-governing, British colony (Geldenhuis 1984).

The conflict spurred additional migration into urban centres throughout the basin, and by war's end, the population of Johannesburg tripled to more than 420,700 inhabitants (Turton et al. 2004). Within the Union, Britain's Royal Engineers and the former Witwatersrand Water Supply Commission established the Rand Water Board to develop and manage a secure water supply for production and consumption. The Board quickly determined that the supply from local springs, streams, and aquifers would be inadequate for meeting projected water demands. They planned to divert water from the Vaal River basin located 60 km away. The diversion of water and the promotion of large-scale irrigation throughout this era were guided by assumptions that arable land and perennial water resources would be abundant indefinitely and that their exploitation was the key to progress and economic development. Managed correctly, the mantra went, not a single drop of water needed be lost to the ocean (Turton et al. 2004).

Throughout the early twentieth century, political concerns about white poverty contributed to the fervour for the expansion of dams, diversions, and irrigation districts throughout the basin. In 1930, the Union government ordered the rapid

construction of numerous irrigation works to “provide employment for white people suffering from the effects of drought” (Turton et al. 2004, 170). The irrigation director objected to the haste and cautioned against proceeding without studied blueprints and plans. But significant public works projects moved forward regardless of his concerns.<sup>11</sup>

In 1948, the racial segregation prevalent in the region throughout colonial times became formalised when the National Party came to power and introduced apartheid on a grand scale. The National Party pursued grandiose water resources development projects aimed at bolstering economic development, providing employment for white citizens, and establishing ideological symbols of strength and control. According to Dr Hendrick Verwoerd, the Orange River Development Scheme announced in parliament in 1962 stood as “a symbol of the determination of white civilisation in southern Africa to stay as such in the African context” (Verwoerd 1965 in Turton et al. 2004, 57).

Throughout the first half of the twentieth century, significant water resources development in the basin remained concentrated within South Africa and the territory of South West Africa. Due to a combination of geographical and political constraints, neither Lesotho nor Botswana had developed significant agriculture, mining, or industry within in the basin by the time the two countries obtained independence in 1966. As South Africa’s demand for water resources continued to grow, however, the government looked beyond its own borders for means to secure an expanding water

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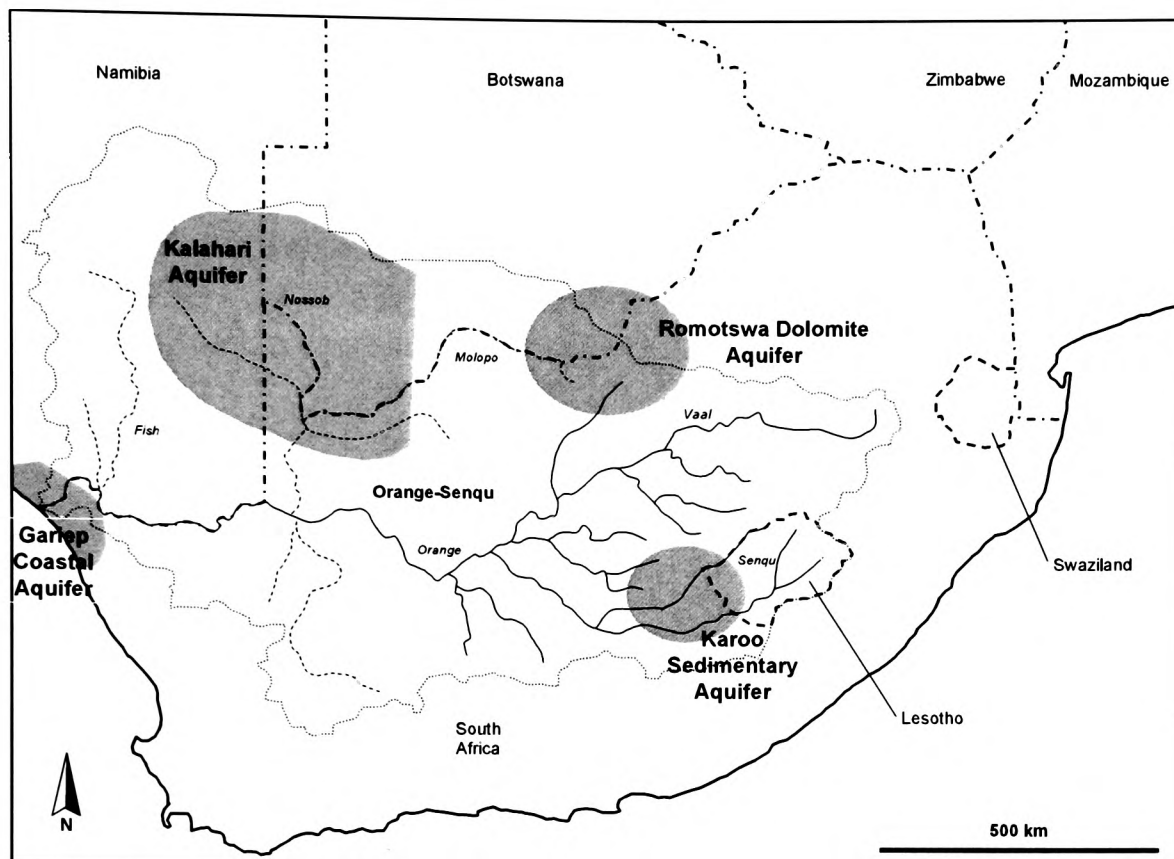
<sup>11</sup> For a detailed account of public works projects affecting the Orange-Senqu basin during this period, see Turton et al. 2004.

supply. The process through which South Africa continued to attain and maintain water resources in the basin to support the development of mining, agriculture and population growth is examined in detail in chapter 5.

In sum, this section illustrated the effects of colonisation, expansion, and mineral discovery on the patterns of water flow and utilisation in the Orange-Senqu basin. The location of diamond and gold deposits far from substantial water resources sparked plans for the diversion of the river and its tributaries to meet rapidly growing demand. Efforts to provide employment opportunities for poor whites further motivated the rapid development of irrigation and infrastructure throughout the early twentieth century. The patterns of resources discoveries and colonisation contributed to a significant imbalance in the development of water resources between present riparian states. Chapter 5 continues the historical analysis of basin development with an in-depth examination of the factors underpinning regime formation.

#### **4.2 Physical Characteristics and Changing Circumstances**

The Orange-Senqu River is shared between four countries: Botswana, Lesotho, Namibia, and South Africa. Rising in the Maluti Mountains of Lesotho, the river flows through central and western South Africa receiving inflows from several important tributaries before flowing along the border between Namibia and South Africa and entering the Atlantic Ocean (see figure 4.1). The basin covers roughly 896,000 km<sup>2</sup> and carries an estimated natural runoff of 11,300 km<sup>3</sup> with varying contributions from riparian states (Mare 2007; table 4.1). The basin also encompasses four major, transboundary aquifers (figure 4.1).



**Figure 4.1** Map showing the location and extent of major tributaries and aquifers in the Orange-Senqu River basin and the major tributaries in the basin. *Source:* Derived from United Nations Educational, Scientific, and Cultural Organisation’s Internationally Shared Aquifer Resources Management 2004; Struckmeier et al. 2006.

**Table 4.1** Contributions to mean annual runoff of the Orange-Senqu basin.

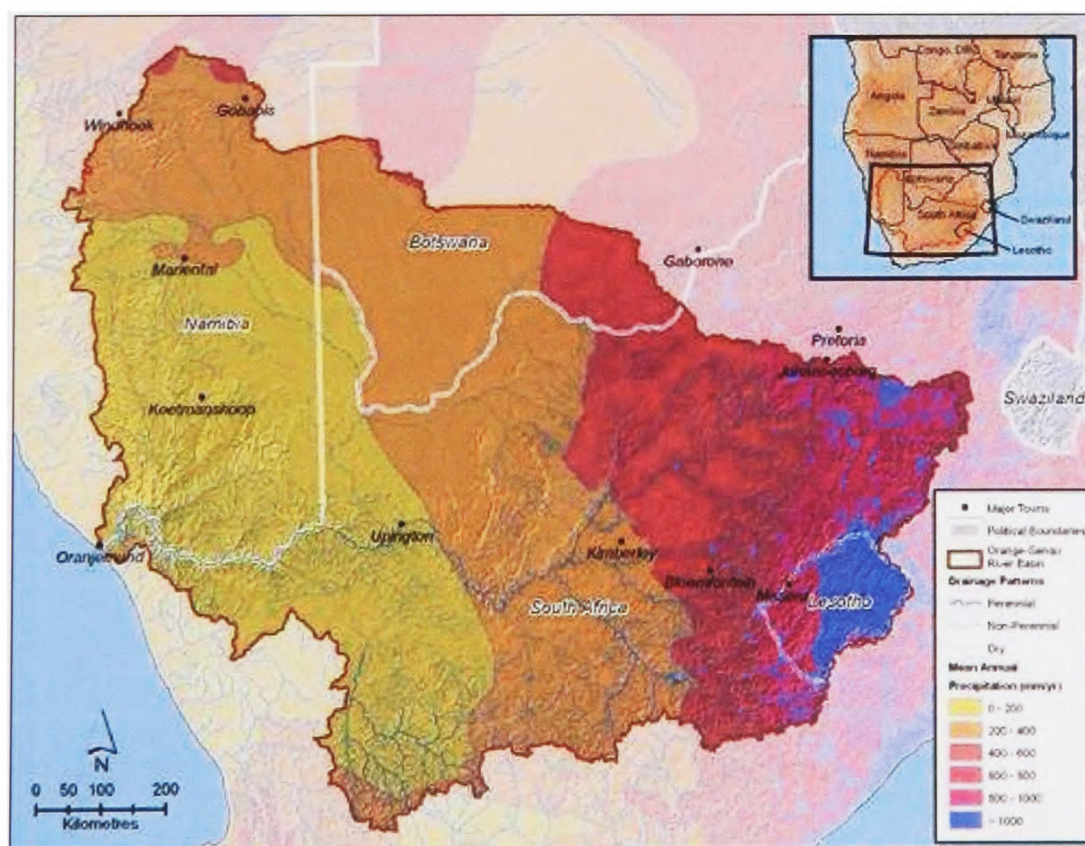
	Lesotho	South Africa	Botswana	Namibia
% of basin within territory	5	60	12	25
Mean annual runoff (%)	41	55	0	4

*Source:* Data from Kranz, Interwies, and Vidaurre. 2005.

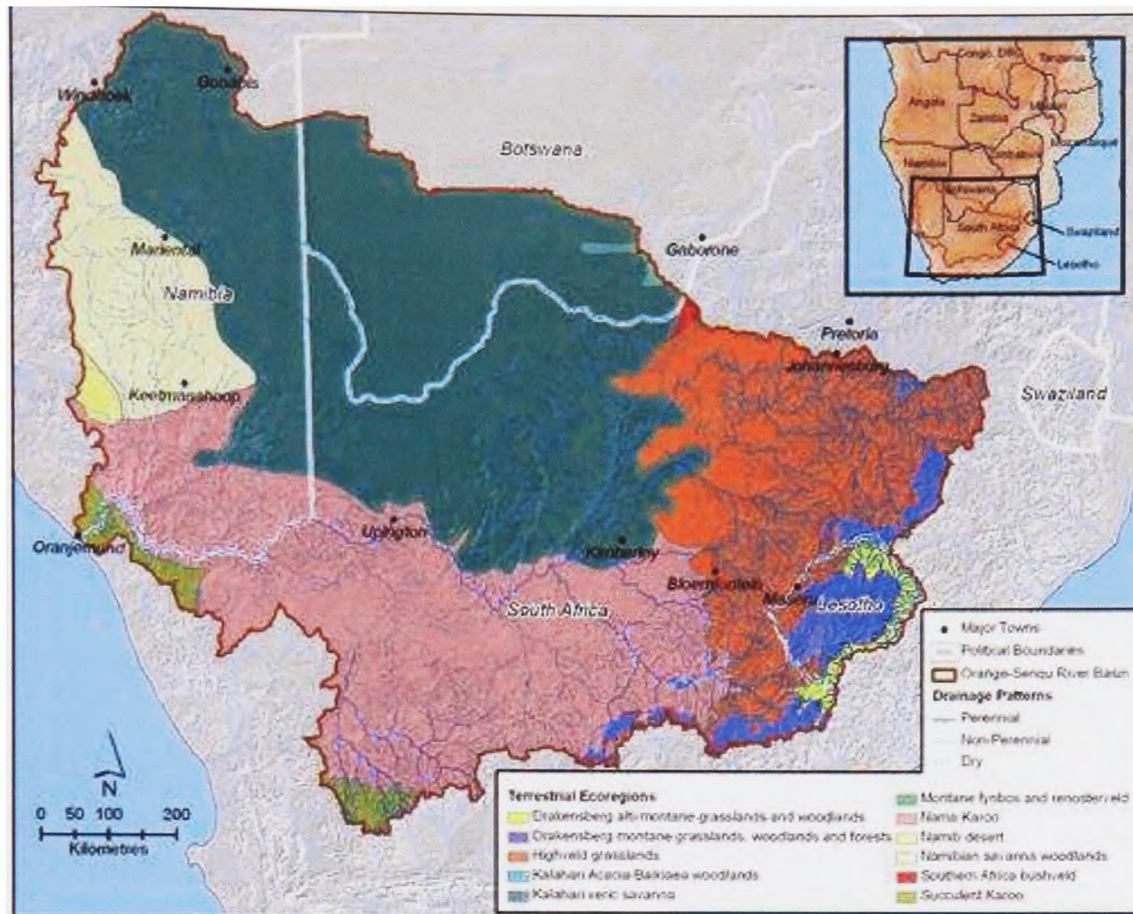
Patterns of water flow, recharge, and utilisation in the basin are driven by climatic characteristics, population growth, economic development, and changing resources management practices. The combination of physical characteristics and changing circumstances in the basin has generated a situation in which water demand is outpacing water supply. Addressing issues of water scarcity in the context of changing circumstances is thus one of the core challenges facing riparian states.

### 4.2.1 Climatic Template

The Orange-Senqu basin experiences substantial seasonal and spatial variation in precipitation and has a low conversion of rainfall to runoff (Conley and van Niekerk 2000). The basin experiences two main seasons: a wet season that runs from November to April and a dry season extending from May to October (Jeleni and Mare 2007). While the basin-wide average is 400 mm, levels of mean annual precipitation vary drastically. Parts of Lesotho, where the river originates, receive an average of 1600 mm to 1800 mm of rainfall per year while the river mouth receives just 45 mm over the same time period (DWAF 2008; figure 4.2). The uneven spatial distribution of rainfall coupled with erratic summer precipitation patterns throughout the region render the runoff from the Orange-Senqu seasonal in nature and highly variable from year to year (Heyns 2004). The precipitation patterns also contribute to the wide range of terrestrial ecoregions found throughout the basin (figure 4.3).

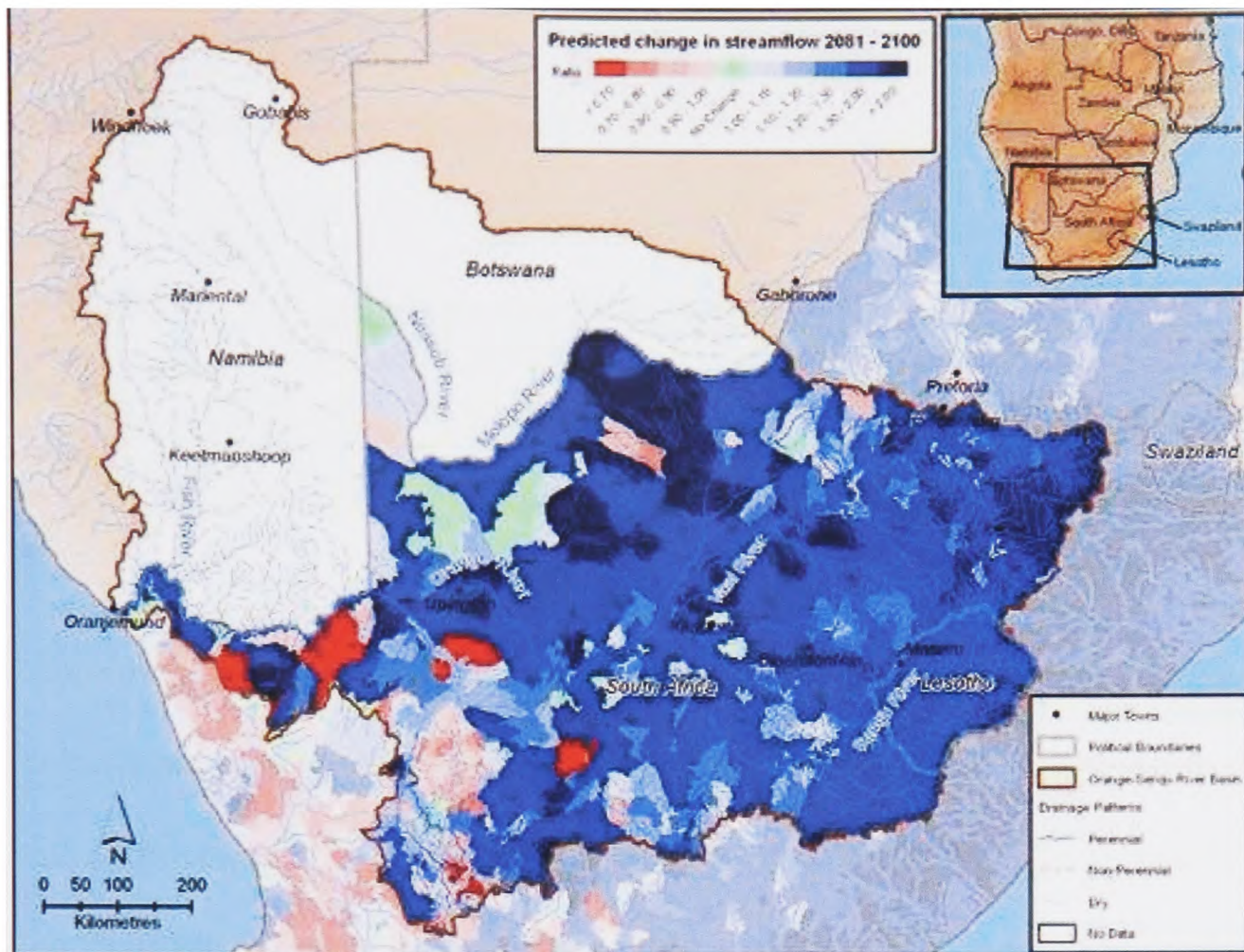


**Figure 4.2** Variation in mean annual precipitation across the Orange-Senqu basin. *Source:* Reproduced with permission from Hatfield 2009.



**Figure 4.3** Terrestrial ecoregions of the Orange-Senqu basin. *Source:* Reproduced with permission from Hatfield 2009.

Forecasts suggest that the existing variability will likely be compounded by the effects of climate change in the region, as precipitation is likely to decline in the western portion of the basin while increasing towards the river's source (de Wit and Stankiewicz 2006). The higher rainfall levels expected in the eastern portion of the basin are likely to increase streamflow and in some cases, flooding (Knoesen et al. 2009; figure 4.4).



**Figure 4.4** Predicted changes in streamflow 2081–2100. *Source:* Reproduced with permission from Hatfield 2009.

#### ***4.2.2 Changing Circumstances and Water Demand***

The patterns of water utilisation and demand in the Orange-Senqu basin are highly asymmetrical and driven by a combination of demographics, socioeconomics, and management practices.

##### ***Demographic Changes***

The four riparian states occupying the Orange-Senqu basin have very different national and within-basin populations (table 4.2). South Africa’s population was 44.8 million in 2001 (Statistics South Africa 2007), and current estimates suggest that it had grown to 49 million in 2009 (Central Intelligence Agency [CIA] 2009), making it

approximately eight times larger than the combined populations of Botswana, Lesotho, and Namibia.

**Table 4.2** National and within basin population and growth rates of riparian states.

	<b>Lesotho</b>	<b>South Africa</b>	<b>Botswana</b>	<b>Namibia</b>
Population (million)	2.1	49	2	2.1
% of population residing in-basin	100	29.8	2.8	8.9
Population growth rate (%)	0.12	0.28	1.9	0.95

*Source:* Data obtained from Central Intelligence Agency 2009 and Hall and Jennings 2007.

The proportion of each country's national population located within the Orange-Senqu basin and relying on its water supplies varies greatly among the states. In 2001, the size of the combined population living within the basin was approximately 15.7 million (Hall and Jennings 2007, 4). The entire population of Lesotho lives within the basin and relies on the river for all water supplies. In contrast, only a small portion of Botswana's population lives within the basin. With no direct territorial access to perennial surface flows in the Orange River, basin inhabitants in Botswana meet their water requirements through groundwater pumping and the occasional extraction of surface runoff from the ephemeral Molopo-Nossob system (Heyns 2003). In Namibia, the small within-basin population is expected to decline gradually over the next twenty-five years due to urbanisation (Lange, Mungatana, and Hassan 2007).

The annual population growth rate in the four riparian states varies widely, with some sources anticipating negative population growth rates as a result of the high HIV/AIDS prevalence (CIA 2007, 2009). This devastating pandemic has already reduced population growth rates and will continue to influence water use patterns throughout the region (Ashton and Ramasar 2002). Despite these estimates of small

population growth rates, the South African DWAF anticipates that the South African population will grow at an annual rate of 1.1 to 2.2% through 2025 and expects water use will continue to rise three times faster than the rate of population increase (DWAF 2004b). The gradual population increase throughout the basin, coupled with industrialisation and increasing migration to urban centres in the Gauteng Province, will contribute to increasing water demands over time (DWAF 2004a).

### *Socioeconomic Changes*

In addition to the demographic changes in the basin, the economic growth and development aspirations in riparian states contribute to current patterns of water use. According to 2006 estimates, annual gross domestic product growth rates for the riparian states were 6.2% in Lesotho, 5.4% in Botswana, 5% in South Africa and 2.9% in Namibia (CIA 2007; table 4.3). As these countries continue to grow, their demands for water from the Orange-Senqu and other international and national water sources is increasing (table 4.4).

**Table 4.3** Gross domestic product (GDP) and annual GDP growth rates by country for the four countries sharing the Orange-Senqu basin.

Country	Real GDP growth rate (%)	GDP per capita (PPP \$)	GDP Composition by sector (%)		
			Agriculture	Industry	Services
Lesotho	6.2	2,700	16.1	43.0	40.9
South Africa	5.0	13,300	2.6	30.3	67.1
Botswana	5.4	10,900	2.4	46.9	50.7
Namibia	2.9	7,500	11.8	30.2	58

*Source:* Data taken from Central Intelligence Agency 2007. *Note:* PPP = purchasing power parity.

### *Water Demand*

Currently, South Africa dominates water use patterns in the Orange-Senqu basin to sustain its larger population and key mining, industrial, and agricultural activities. As chapter 5 will describe in more detail, the midstream hegemon has captured and controlled access to these resources through a combination of engineered water storage and transfers as well as formal agreements with neighbouring states. Between 2005 and 2025, South African water use within the basin is expected to increase only marginally, with the principal increase allocated for irrigation on the 12,000 hectares that have been allotted for resource-poor farmers (table 4.4).

**Table 4.4** Current (2005) and projected (2025) surface water demand by sector for all riparian states in the Orange-Senqu basin.

Riparian State	Sectoral Water Demand (Mm <sup>3</sup> / year)		
	Urban, Industrial, Mining	Irrigation	Total
<b>2005</b>			
Lesotho	11	9	20
South Africa	2115	3273	5388
Botswana	0	0	0
Namibia	16	60	76
<b>Total:</b>	2142	3342	5484
<b>2025</b>			
Lesotho	17	9	26
South Africa	2487	3381	5868
Botswana	0	0	0
Namibia	48	227	275
<b>Total:</b>	2552	3617	6169

*Source:* Data taken from Permanent Water Commission 2005.

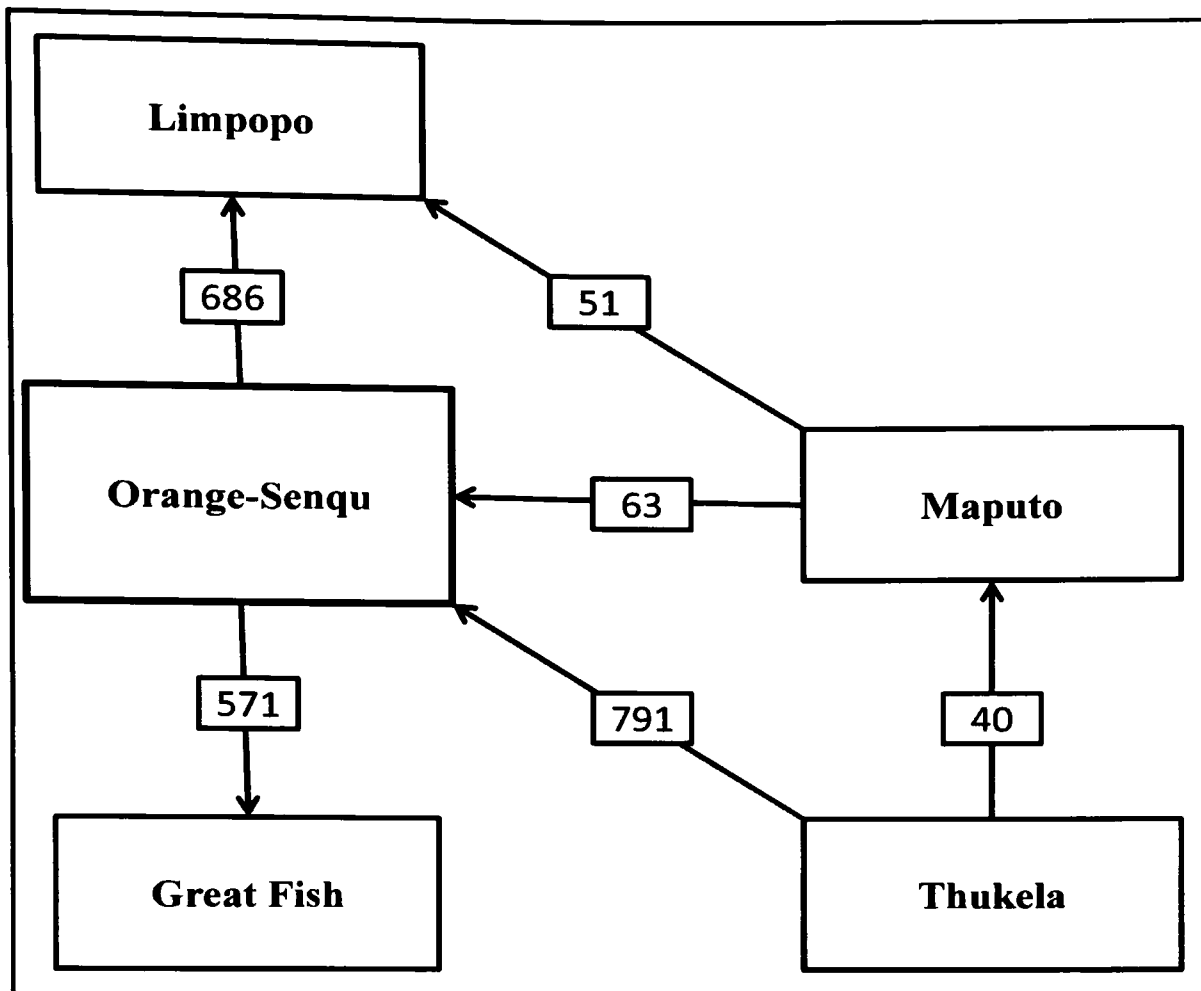
Elsewhere in the basin, urban and industrial development in the rapidly growing lowlands of Lesotho is expected to contribute to marginal increases in water demand (Mare 2007; table 4.4). New developments in southern Namibia that will require water from the Orange-Senqu include the Haib copper mine and the Skorpion lead and zinc mine (Heyns 2003). Proposals for new communal and commercial irrigation projects along the common border area between South Africa and Namibia are also

under consideration and are linked to proposals for the construction of a new dam on the lower reaches of the Orange-Senqu River (Kistin and Ashton 2008).

The fourth riparian state, Botswana, uses periodic surface runoff from the ephemeral Molopo-Nossob river system but has never received water from the Orange River (Conley and van Niekerk 2000). Until recently, Botswana's use of surface water from the Orange River was expected to remain at zero through 2025 (Permanent Water Commission [PWC] 2005). In 2009, however, the Government of Botswana approached the Governments of Lesotho and South Africa to discuss the potential for obtaining water from the LHWP (Piet 2010). While the countries concluded that it will not be possible to incorporate Botswana into Phase 2 of the LHWP, South Africa and Botswana are working together to investigate the feasibility of a bilateral transfer from the Vaal tributary into southern Botswana to alleviate water shortages (Piet 2010).

#### *Management Practices and Projected Deficits*

The Orange-Senqu basin is the most intensely developed basin in southern Africa, containing over thirty dams with a storage capacity over 12 million m<sup>3</sup> (Heyns 2003). Patterns of water flow within the basin have also been modified through an intricate series of transfers: two that move water out of the basin, two that move water into it, and one that moves water from one part of the basin to another (Turton et al. 2004; figure 4.5). Water flows and utilisation in the Orange-Senqu basin are thus closely linked with evolving practices for managing them.



**Figure 4.5** Interbasin water transfers affecting the Orange-Senqu basin. *Source:* Previously published in Kistin and Ashton 2008 with data adapted from the Department of Water and Forestry 2003a–e. All water transfers rates are given in Mm<sup>3</sup>/year.

As the populations and economies of riparian states continue to grow, several riparian states are also aiming to implement water quality standards and environmental flow requirements in the Orange-Senqu basin. Implementing such in-stream flow requirements will affect the overall water balance and the quantity of water available for use by the riparian states. Recent studies show that maintaining the estuary at the mouth of the river (a designated Ramsar site) in a category C management class will require a significant increase in in-stream flows. If no other adjustments are made, this in-stream flow is expected to lead to a 500 million m<sup>3</sup> water deficit in the Orange-Senqu basin by 2025 (PWC 2005).

Riparian states are currently planning and implementing a range of adjustments designed to decrease water demand and increase water supply. Efforts are underway in each state to promote conservation, reuse, and desalination (Smakhtin et al. 2001). The lower riparian states are also considering the construction of a reregulating dam in the lower basin to augment storage and enable more precise water deliveries to the estuary (chapter 7).

Additionally, in 2008, South Africa and Lesotho agreed to move ahead with Phase 2 of the LHWP (Government of South Africa 2008). The construction of the Polihali Dam and transfer tunnels that comprise Phase 2 is expected to provide an additional 14.75 m<sup>3</sup> per second of water to South Africa for an average of an additional 465 million m<sup>3</sup> of water per year (Tanner, Tohlang, and van Niekerk 2009, 29). Additional water transfers from the Thukela River (Heyns 2003) and possibly the Mzimvubu River are also under consideration (DWAF 2004a, b). Future interbasin water transfers from the Zambezi and the Congo rivers have been tabled as additional options to relieve water stress (Smakhtin et al. 2001).

In sum, the combination of physical characteristics of and changing circumstances in the Orange-Senqu basin has generated a situation where water demand is close to exceeding water availability (ORASECOM 2007; World Water Assessment Programme 2009). Addressing issues of water scarcity and water quality in the midst of changing circumstances is among the core challenges facing riparian states.

### **4.3 Institutional Landscape**

The Orange-Senqu basin is characterised by a rich history of interstate interaction over water resources and a multiplicity of international water management institutions that have emerged and evolved over time. This section provides a brief overview of the institutional landscape at the regional, basin-wide, and bilateral levels. An in-depth analysis of international water agreements throughout the SADC region is provided in Appendix 3. For a closer look at the national water-governance structures in Orange-Senqu states, see Tompkins (2007).

#### ***4.3.1 Regional Agreements***

Shortly after the regional treaty establishing the Southern African Development Community (SADC) was signed in 1992, members of the regional body developed the SADC Protocol on Shared Watercourse Systems in 1995 (Ramoeli 2002). The 1995 SADC Water Protocol drew heavily on the international water law principles embodied in the Helsinki Rules, the Dublin Principles, and Agenda 21 (Ramoeli 2002).

In 2000, SADC members revised the original water protocol to incorporate adjustments requested by member states and to bring the protocol in line with the 1997 UN Convention (Ramoeli 2002; Malzbender and Earle 2008). The revised SADC water protocol, ratified by all riparian states in the Orange-Senqu basin and in force throughout the region today, embodies the three core principles of customary international law articulated in the 1997 UN Convention: equitable and reasonable utilisation, the obligation to prevent significant harm, and the obligation to notify of planned measures (Jacobs 2009).

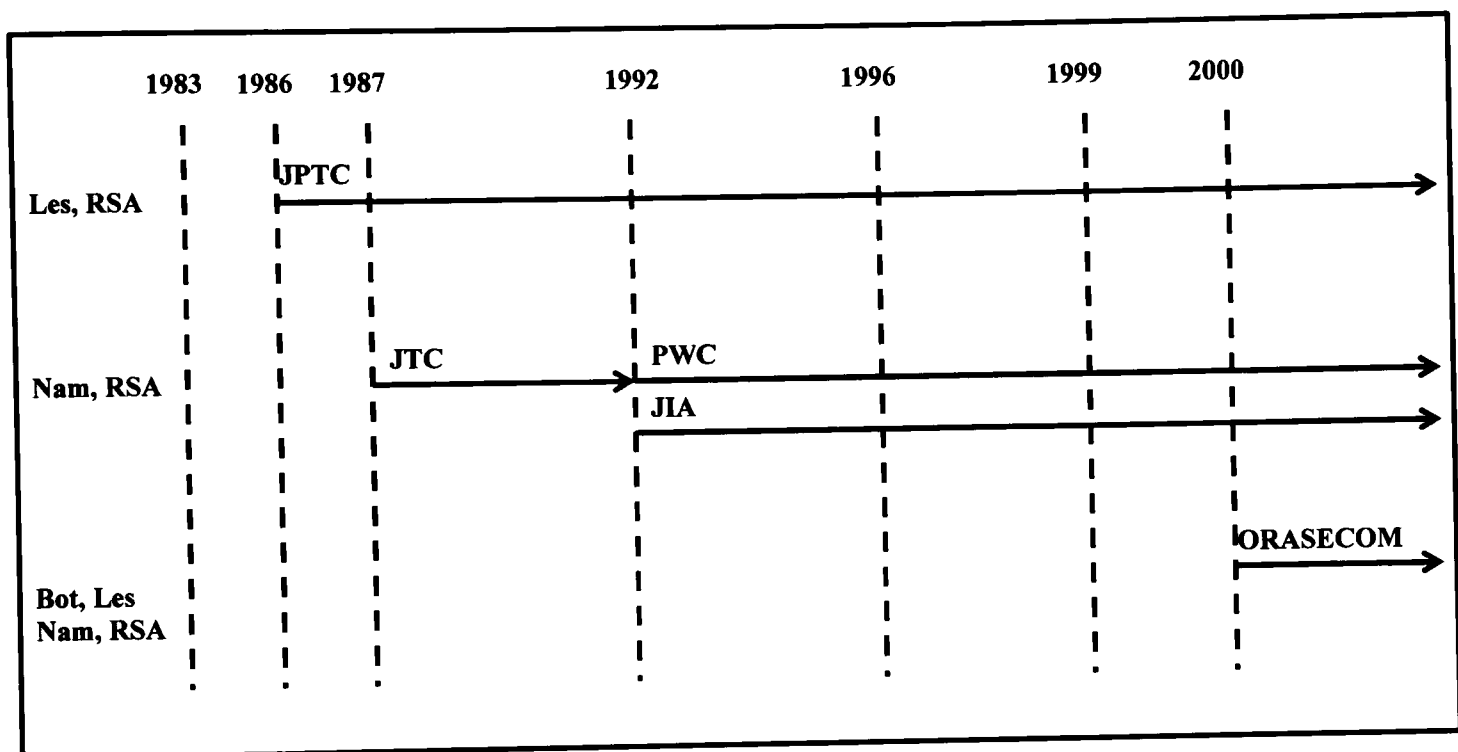
### 4.3.2 *Bilateral and Basin-wide Water Management Institutions*

In addition to the two regional SADC water protocols signed in 1995 and 2000, the four riparian states in the Orange-Senqu basin have established six bilateral agreements and one basin-wide treaty (table 4.5; figure 4.6). Four of these agreements—the 1986 treaty providing the framework for the LHWP and the establishment of the Joint Permanent Technical Committee (JPTC), the 1992 agreement establishing the Vioolsdrift and Noordoewer Joint Irrigation Scheme (VNJIS), the 1992 agreement creating the PWC, and the 2000 agreement establishing the basin-wide ORASECOM—are particularly relevant to the current management of the basin. Each treaty was developed for different purposes and varies in the regulations, decision-making procedures, and flexibility mechanisms they embody.

**Table 4.5** Agreements and institutions established between the basin states of the Orange-Senqu River.

<b>Year</b>	<b>Parties</b>	<b>Agreement</b>	<b>Organisation</b>
1983	Botswana, South Africa	Agreement between the Government of the Republic of South Africa and the Government of the Republic of Botswana establishing the Joint Permanent Technical Committee	Joint Permanent Technical Committee
1986	Lesotho, South Africa	Treaty on the Lesotho Highlands Water Project	Joint Permanent Technical Committee, replaced in 1999 by the Lesotho Highlands Water Commission  Trans-Caledon Tunnel Authority  Lesotho Highlands Development Authority
1987	South West Africa (Namibia), South Africa	Agreement between the Republic of South Africa and the Interim Government of the National Entity of South West-Africa concerning the control, development, and utilisation of the water of the Orange River	Joint Technical Commission replaced in 1992 by the Permanent Water Commission
1990	Botswana, Namibia	Agreement on the Establishment of a Joint Permanent Water	Joint Permanent Water Committee

Committee			
1992	Namibia, South Africa	Agreement on the Establishment of a Permanent Water Commission	Permanent Water Commission
1992	Namibia, South Africa	Agreement on the Vioolsdrift and Noordoewer Joint Irrigation Scheme	Joint Irrigation Authority
2000	Botswana, Lesotho, Namibia, South Africa	Agreement on the Establishment of the Orange-Senqu River Commission	Orange-Senqu River Commission



**Figure 4.6** Schematic timeline depicting the emergence of water management institutions in the Orange-Senqu basin over time. *Source:* Adapted from Turton 2003, 207, and previously published in Kistin and Ashton, 2008. *Note:* Bot = Botswana, JIA = Joint Irrigation Authority, JPTC = Joint Permanent Technical Committee, JTC = Joint Technical Commission, Les = Lesotho, LHWC = Lesotho Highlands Water Commission, Nam = Namibia, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, RSA = Republic of South Africa.

This section analyses the content of core treaties and joint organisations operating in the basin with particular focus on five key issues of institutional design: inclusivity, information sharing, water allocation, water quality, and flexibility mechanisms.<sup>12</sup>

<sup>12</sup> The categories for analysis were chosen because, based on a review of literature, they constitute some of the most common issues dealt with by states and negotiators seeking to create new agreements or modify existing arrangements.

### *Inclusivity, Organisational Mandates, and Interplay*

International principles for water management recommend that river basins be managed at the basin level by institutions that are inclusive of all riparian states (see International Law Association [ILA] 1966; UN 1997). This trend has yet to catch on globally. A review of 145 global water treaties formed since 1945 showed that 86% of water agreements are bilateral despite the fact that more than two-thirds of the basins with water treaties have three or more riparian states (Hamner and Wolf 1998; UN Environment Programme 2002, 7). Since 1994, however, riparian states in all of southern Africa's major multilateral basins—Okavango, Incomati, Maputo, Limpopo, Zambezi, and Orange-Senqu—have established basin-wide agreements and organisations (see Appendix 3).

The establishment of ORASECOM in 2000 marked the first basin-wide organisation in the Orange-Senqu basin, though bilateral institutions for international water management had been in place for nearly three decades. The result of its establishment has been that multiple international water management organisations contribute simultaneously to the governance of a single basin (figure 4.7).

The mandates and jurisdictions of these organisations vary widely. The project-related organisations, the Lesotho Highlands Water Commission (LHWC) and the JIA, are both granted substantial powers to design and implement policies and procedures. The other two commissions, the PWC and ORASECOM, serve as advisory bodies designed to counsel parties on issues related to the development and utilisation of shared waters (table 4.6). The advisory body mandates are broad; both agreements

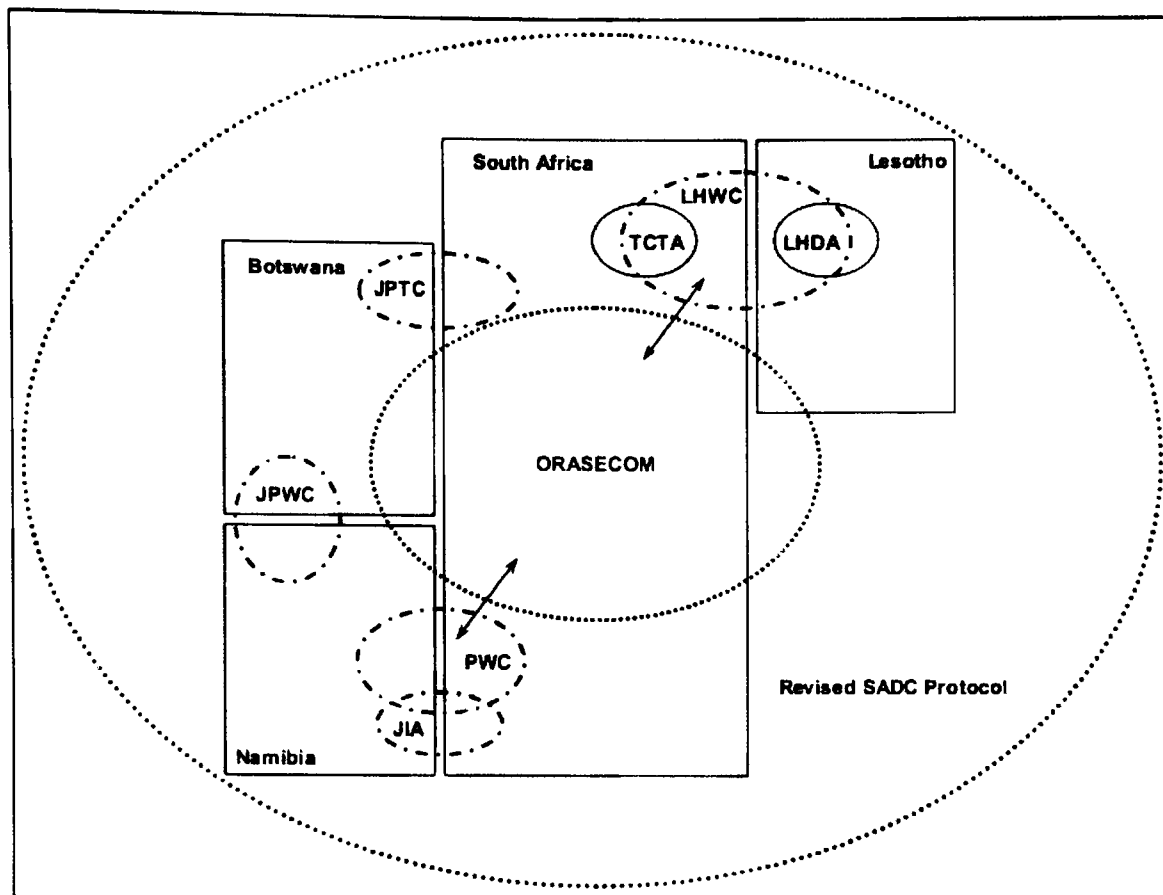
include clauses allowing the joint organisations to advise on any other matters deemed important by the riparian parties (84, 1992; 3, 2000).<sup>13</sup> These flexible mandates allow the existing institutions considerable scope to recognise the need for management changes and advise the parties accordingly (Kistin and Ashton 2008). The operational realities of these mandates are discussed in more detail in chapter 6.

**Table 4.6** Composition and mandate of joint institutions for water management in the Orange-Senqu basin.

<b>Institution</b>	<b>Composition</b>	<b>Mandate</b>
ORASECOM	The council consists of 3 delegates from each of the riparian states and is supported by a Technical Task Team comprised of specialists from each country. A permanent secretariat for the commission was established in October 2007	To serve as a technical advisor to the parties on matters relating to the development, utilisation, and conservation of water resources
PWC	3 delegates from each party	To serve as a technical advisor to parties on matters relating to the development and use of shared waters and to monitor and advise the JIA
JIA	4 delegates from each party, at least 3 of which must be landowners within the district. The fourth space on each delegation is currently filled by a representative from the respective departments of water and agriculture who also serve as liaisons to the PWC	To operate and maintain the Irrigation Scheme and control the abstraction of water from the Orange River
LHWC	3 delegates from each party	To be responsible and accountable for the project; to monitor, advise, and audit the LHDA and TCTA; to determine appropriate policies, procedures, and expenditure limits

*Note:* JIA = Joint Irrigation Authority, LHDA = Lesotho Highlands Development Authority, LHWC = Lesotho Highlands Water Commission, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, TCTA = Trans-Caledon Tunnel Authority.

<sup>13</sup> For convenience, each treaty used in this appendix is cited by its CSIR database number and year of signature (e.g., Treaty 43, 1971; Treaty 18, 1964) when it is referred to in the text. Agreements not included in the original CSIR database have been assigned database numbers A1–A15. Readers can locate the title of the relevant document from the list of treaties and agreements in table A3.1.



**Figure 4.7** Schematic diagram illustrating the landscape of international water agreements and management institutions pertaining to the Orange-Senqu basin. *Note:* JIA = Joint Irrigation Authority, JPTC = Joint Permanent Technical Committee, JPWC = Joint Permanent Water Commission, LHDA = Lesotho Highlands Development Authority, LHWC = Lesotho Highlands Water Commission, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, SADC = Southern African Development Community, TCTA = Trans-Caledon Tunnel Authority.

Operating simultaneously, the bilateral organisations are expected to liaise with the basin-wide ORASECOM, reporting on any activities that might have the potential to affect other parties (Treaty 3, 2000; figure 4.7). On a less formal level, communication between the various commissions is facilitated by the fact that the same few individuals represent their country in both the bilateral and basin-wide organisations. According to the 2000 treaty, however, ORASECOM has no formal oversight, advisory, or coordinating powers with respect to the preexisting bilateral commissions (Treaty 3, 2000, art. 1, sec. 3). While the agreement states that basin commissions that come into existence after 2000 will be subordinate to ORASECOM (art. 1, sec. 4), previously established institutions (i.e., the LHWC, PWC, and JIA)

continue to operate as separate entities. The origins and implications of this distinction are analysed in detail in chapters 5, 6, and 7.

### *Information Sharing*

Data and information regarding shared waters provide the foundation on which to base subsequent management decisions of those waters at national and basin-wide levels (Kistin and Phillips 2007). Because water resource data are often collected at national and subnational levels, the exchange, measurement, and management of data are important elements of transboundary water management (Dombrowsky 2007).

All of the agreements that comprise the Orange-Senqu regime require parties to exchange data and information (table 4.7). The same is true for the vast majority of freshwater agreements between SADC states (see Appendix 3). When an exchange of information about the development and use of a water resource is required, parties are obligated to notify any potentially affected states before proceeding with development plans. Additional information (e.g., the hydrological characteristics of the basin) is to be made available upon request from any riparian state.

**Table 4.7** Capabilities and requirements embedded in Orange-Senqu basin water treaties for the collection and exchange of information.

<b>Treaty</b>	<b>Capabilities and Requirements</b>
1986 LHWP	<ul style="list-style-type: none"> <li>• LHDA and TCTA must provide the JPTC with all information regarding the construction and operation of project components (art. 7, sec. 15; art. 8, sec. 4)</li> <li>• LHDA and TCTA must establish “effective and comprehensive information management systems” to track studies and progress indicators (art. 7, sec. 20; art. 8, sec. 8)</li> </ul>
1992 PWC	<ul style="list-style-type: none"> <li>• Each party is required “to the extent permitted by its own laws and procedures to provide such information and authorisations as the Commission may require for the performance of its functions” (art. 1, sec. 3)</li> <li>• The joint commission has the power to appoint consultants to assist in gathering and processing information (art. 3, sec. 2)</li> </ul>
1992 JIA	<ul style="list-style-type: none"> <li>• Parties are required to share data regarding in-scheme allocation with the joint authority (art. 4)</li> <li>• The joint authority has the power to appoint consultants for information collection and processing (art. 7, sec. 1)</li> </ul>
2000 ORASECOM	<ul style="list-style-type: none"> <li>• “The parties shall exchange available information and data regarding the hydrological, hydrogeological, water quality, meteorological and environmental condition of the river system” (art. 7, sec. 4)</li> <li>• “A party planning any project programme or activity with regard to the river system that may have a significant adverse effect upon any one or more of the other parties, or which may adversely affect the river system shall forthwith notify the council and provide all available data and information” (art. 7, sec. 5). Notified parties get 6 months to reply (art. 7, sec. 6)</li> <li>• “The Parties shall employ their best efforts to collect and, where appropriate, to process data and information with regard to the River System, in a manner which facilitates its utilisation by the other Parties, technical experts or consultants who may be appointed by the Council. The Parties shall make every effort to employ the standardised form for collecting, processing and disseminating data and information, where appropriate” (art. 7, sec. 11)</li> </ul>

*Note:* JIA = Joint Irrigation Authority, JPTC = Joint Permanent Technical Committee, LHDA = Lesotho Highlands Development Authority, LHWP = Lesotho Highlands Water Project, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, TCTA = Trans-Caledon Tunnel Authority.

The importance of comparable and compatible data is also acknowledged in the ORASECOM agreement. Data incompatibility renders shared data unusable for developing a comprehensive understanding of the basin and stems from a lack of consensus regarding the preferred approach to investigations. Disagreements may arise about data collection protocols, variability in laboratory analytical methodologies, poor database management and reporting systems, or interpretation methods (Kistin and Phillips 2007). While the development of a formal data protocol

is not explicitly mentioned in the ORASECOM agreement as it is in the 2004 Zambezi treaty, efforts are underway to develop basin-wide standards for data collection and analysis in the Orange-Senqu basin (Ramoeli, pers. comm. 2008).

### *Allocation*

Several scholars of transboundary water governance identify the central goals for avoiding water-related conflicts and promoting sustainable development to be achieving agreement on equitable shares of transboundary water resources and/or agreement on appropriate criteria for determining such allocations (Wolf 1999; Vaz 1999; Van der Zaag, Seyam, and Savenije 2000; Van der Zaag and Vaz 2003; Lautze and Giordano 2007). Yet only a fraction of international water agreements worldwide specify water allocation criteria. In their study of 506 freshwater treaties, Wolf, Yoffe, and Giordano, (2003) noted that only 27 included water quantity as a principle issue. Similarly, only a small portion of southern Africa's freshwater agreements specify water allocations. Of the 37 freshwater agreements reviewed in Appendix 3, only 11 specify any type of water allocation.

Within the Orange-Senqu basin, only two of the four core agreements specify water allocations. The 1986 treaty establishing the LHWP specifies the amount of water to be delivered annually from Lesotho to South Africa (see Treaty 1986, Annex 2). In the lower basin, the treaty establishing the VNJIS allocates 20 million m<sup>3</sup> per year to the overall scheme with 11 million m<sup>3</sup> designated for farmers on the South African side and 9 million m<sup>3</sup> for those in Namibia.

Outside of those two project-oriented agreements, water allocations and flow regimes have not yet been determined for the basin as a whole. This contributes to persistent uncertainty regarding Namibia's entitlement to water abstractions (PWC 2005). As South Africa strains to meet its growing water needs and Namibia strives to expand economic activity in the basin, the clarification of flexible allocation entitlements is needed to enable national planning and project development to take place. The parties granted both the PWC and ORASECOM the power to advise them on the equitable allocation and utilisation of common water resources. They continue to undertake studies and exchange information to determine the long-term, safe yield and projected levels of demand, but no action has been taken to specify basin-wide allocations (Kistin and Ashton 2008). The implications of this lack of specification are discussed in more detail in chapter 7.

#### *Water Quality and Environmental Protection*

Though often given less attention than quantity issues, the issue of water quality has been consistently recognised in southern African water agreements dating from the early 1990s (Appendix 3). In the late 1980s, the impacts of poor water quality on allocation, economic development, and ecosystem health were acknowledged in select agreements. The project agreement for water delivery from South Africa to Gaborone, Botswana, for example, specified that the delivery of poor quality water would be treated as the delivery of no water at all (Treaty 38, 1988, art. 12.13).

To date, only one agreement in southern Africa—the Tripartite Interim Agreement signed by South Africa, Mozambique, and Swaziland—formalised environmental

water allocation at the basin level. As concerns about water quality and ecological health continue to grow, however, several states in the region have started to investigate and adopt legislation to mandate in-stream flow requirements at the national level (Tharme 2000; Mazvimavi, Madamombe, and Makurira 2007).

#### **4.4 Conclusion**

This chapter examined the regional context, early development, and physical and institutional landscapes of the Orange-Senqu water regime and compared the rules and regulations that govern the water regime with global and regional trends. The analysis showed that the combination of physical characteristics and changing circumstances in the basin has generated a situation in which water demand is on the verge of exceeding water supply. Addressing issues of scarcity amidst changing circumstances poses a central, water governance challenge to riparian states.

The question now is so what? Analysing the design of existing international water management institutions provides important insight into the rules and regulations that guide riparian behaviour. However, understanding the provisions that are in place for transboundary water management is not enough. To better understand the outcomes of transboundary water management and opportunities for enhancing its effectiveness, we must look both forwards and backwards to the processes of establishing and implementing these transboundary water agreements. Chapters 5, 6, and 7 use the case of the Orange-Senqu basin to evaluate the processes that precede and follow the articulation of transboundary water agreements.

Chapter 5 looks back at the formation of six agreements that define the Orange-Senqu water regime. It analyses the drivers that shaped the current governance arrangements and provides insight into strategies and challenges for creating new agreements or amending existing ones. Chapter 6 and 7 look forwards from the text of the international agreements to the implementation of the six water regime components and analyse the extent to which interstate cooperation has contributed to joint planning and water allocation. Taken together, the analyses of the formation, articulation, and implementation of transboundary water governance arrangements provide important insights into some of the facilitators of effective cooperation.

## **CHAPTER 5: FORMATION OF THE ORANGE-SENQU WATER REGIME**

### **Introduction**

This chapter analyses the driving forces behind the formation of the Orange-Senqu water regime. It interrogates the conceptualisation and negotiation of the international water management institutions comprising the regime with a focus on the four key categories of determinants—political context, power asymmetry, problem structure, and networks—identified in chapter 2.

The analysis of water regime components is divided into two main parts. The first section covers the early stage of water regime formation beginning in 1966, when South Africa first formally approached Lesotho with the proposal for the joint Lesotho Highlands Water Project (LHWP), and ending in 1989. The second section evaluates the later stage of water regime formation beginning in 1990 and ending in 2000, when riparian parties established the Orange-Senqu River Commission (ORASECOM), the newest international water institution in the basin.

The primary distinctions between the early and late stages of regime formation are political. Between 1966 and 1989, Lesotho and South Africa were the only two independent states in the Orange-Senqu basin as South West Africa (present-day Namibia) remained under South African control at that time. Significant transitions after 1990 including Namibia's independence, the end of apartheid, and the decision to include Botswana as a basin state altered the regional makeup of water regime components. Section 5.3 concludes the chapter with a discussion of the explanatory

power of the key determinants and their resonance with expectations for water regime formation.

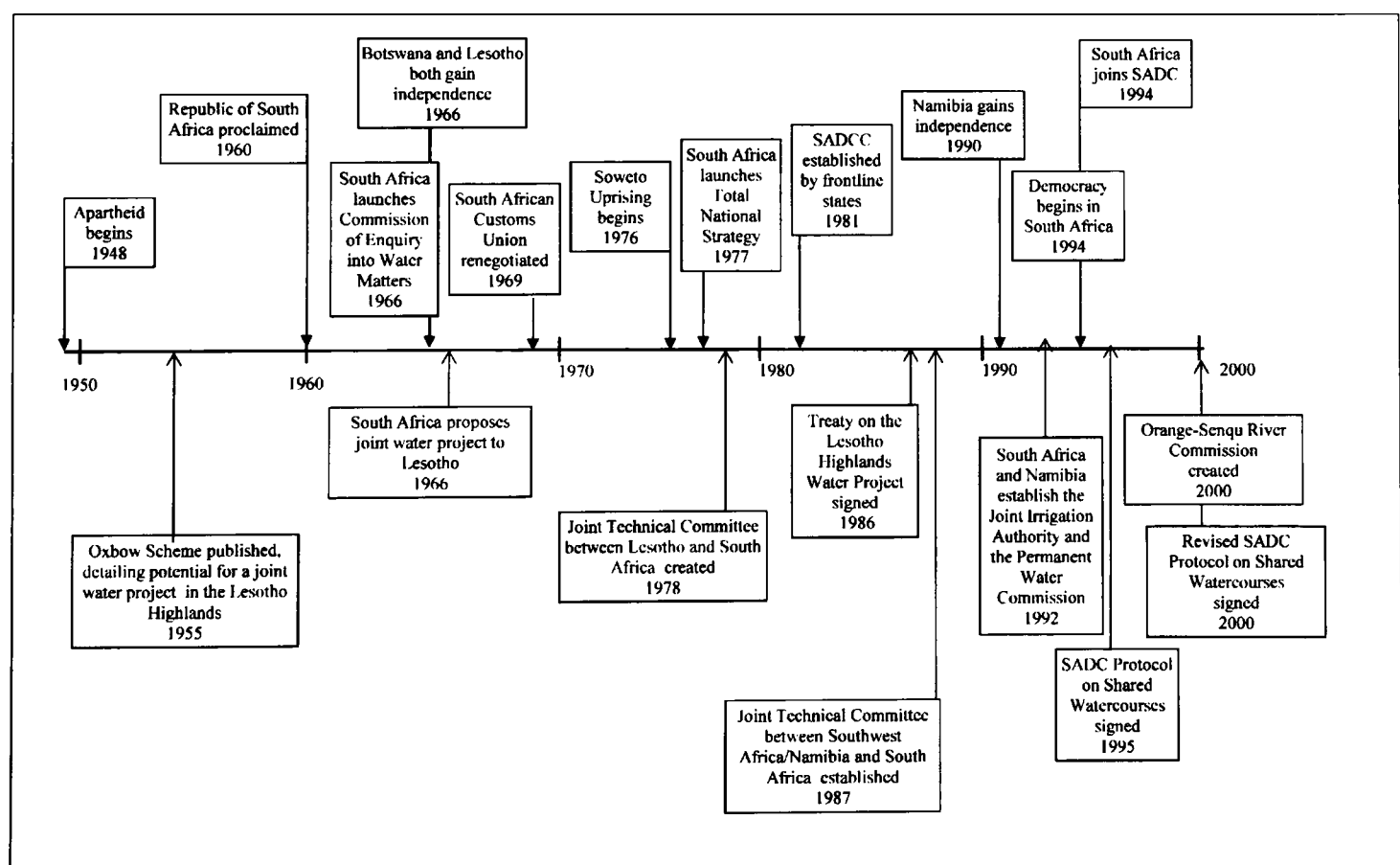
### **5.1 Early Stage of Water Regime Formation (1966–1989)**

This section evaluates the driving forces behind the formation of the first three international water management institutions created in the Orange-Senqu: (1) the first Joint Technical Commission (JTC), established in 1978 between Lesotho and South Africa to advise parties on the feasibility and design of the LHWP; (2) the Joint Permanent Technical Committee (JPTC), established in 1986 between Lesotho and South Africa to oversee the construction and maintenance of the LHWP; and 3) the second JTC, established in 1987 between South Africa and South West Africa to advise parties on the management of shared water resources. A strong degree of congruity between the expectations generated by the theory and the observations gleaned from the early stage of water regime formation will be shown with some important, qualifying insights.

#### ***5.1.1 Political Context***

The emergence of international agreements and water management organisations in the Orange-Senqu basin took place within the context of substantial regional transformations: from colonial rule to independence, apartheid to democracy, and regional tensions to integration (figure 5.1). The expectation is that high levels of regional integration between states should facilitate the formation of water regimes (H6). The experience of the early state of water regime formation in the Orange-Senqu basin provides mixed empirical evidence to support this claim.

Three regime components emerged against a backdrop of intensifying regional disputes and oscillating bilateral relationships. Much of the history in the basin from this time resonates strongly with the expectation that strong political and economic relationships enable the formation of water regimes while wider tensions hinder the process of water cooperation. Yet, somewhat contrary to this trend, political divisions in the region also contributed to South Africa's motivation to pursue water agreements with neighbouring states. This section provides a brief overview of the regional context of the basin before showing how different levels of regional integration influenced the formation of water regime components in its early stage.



**Figure 5.1** Schematic timeline for the period from 1950 to 2000 showing the historical context of the water management institutions comprising the Orange-Senqu water regime. *Note:* SADC = Southern African Development Community, SADCC = Southern African Development Cooperation Community.

Dynamic interstate relationships and gradually intensifying regional disputes characterised the early stage of water regime formation. As the timeline in figure 5.1 shows, South Africa proposed the first international water project in the basin in 1966, shortly after Lesotho gained independence from Great Britain. But the origins of the project date back farther, to a study conducted in the 1950s to design a series of high-altitude dams to generate power for Lesotho and augment water supplies in South Africa (LHDA 2000). The study was presented to South Africa's DWAF but shelved for the next several years during which South Africa pursued its hydraulic mission domestically, when they embarked on large scale dam projects and water transfers within South Africa to supply water to growing population centres and mining and agricultural endeavours (World Commission on Dams [WCD] 2000).

In the mid-1960s, the government of South Africa launched the Commission of Enquiry into Water Matters to address growing concerns that water demand from population and industrial growth within the country would soon outstrip water supply. The commission's report stressed the need for South Africa to engage with neighbouring states and establish cooperative agreements to secure access to water from transboundary rivers (Commission of Enquiry 1970). Thus, with a renewed interest in the LHWP, South Africa proposed the joint scheme to its newly independent, upstream neighbour. At the time, the political relationship between the two governments was strong. Lesotho's prime minister, Leabua Jonathan, and his Basotho National Party (BNP) came to power on a campaign for a stable Lesotho based on close cooperation with South Africa. The BNP received considerable

financial and organisational support from the South African government in the process (Davies and O'Meara 1985).

In addition to strong political ties, the countries were tightly integrated geographically and economically, because Lesotho, an enclave state, heavily depended on South Africa for trade and employment (Lee 2003). At the time of independence, Lesotho conducted over 90% of its trade with South Africa (Lundahl, McCarthy, and Petersson 2003). At the same time, households in Lesotho also relied heavily on income from wage labourers in South Africa. In the late 1960s, earnings from Basotho workers in South Africa contributed almost half of the total incomes of rural Lesotho households. By the 1980s, migrant earnings accounted for half of the entire country's total gross national product (Lundahl, McCarthy, and Petersson 2003, 71).

Despite the high level of economic interdependence, the strong political relationship between the two states did not remain static. As South Africa intensified its apartheid policies and development benefits failed to materialise in Lesotho, the Jonathan government became increasingly critical of its neighbour (Ferguson 1990). Following the Soweto Uprising<sup>14</sup> in South Africa in 1976, the Jonathan government publically condemned apartheid and adopted a formal policy of support for South African liberation movements, granting political asylum to South African refugees including members of the African National Congress (ANC).

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<sup>14</sup> The Soweto Uprising or Riots were a series of clashes organised by the black youth in South Africa in protest of the National Party and its apartheid policies. For more on the influence of the Soweto Uprising on South Africa's international relations, see Bonner and Segal 1998.

Downstream in the basin, South West Africa remained under South African control. This political relationship dated back to 1915 when South African troops, acting under British orders, occupied the German colony of South West Africa. The territory remained under South African military rule until the signing of the Treaty of Versailles in 1919, when the League of Nations ordered South Africa to administer the treaty on behalf of Britain. Throughout the 1970s, South Africa came under a variety of internal and external pressures to transfer power back to Namibians (O'Meara 1996). While South Africa made gestures and rhetorical concessions towards Namibian independence, they continued to construct and control governments within the territory and deflect internal and external pressure for the transition of power (Sidaway and Simon 1993; Jaster 1988). Thus, until Namibia gained full independence in 1990, South Africa controlled much of the political agenda in the downstream territory, including foreign policy and natural resources management (Dreyer 1993).

Closely intertwined with the dynamic interstate relationships, the early stage of water regime formation was marked by gradually intensifying regional tensions. By the late 1970s, the South African government perceived itself to be subject to a *total onslaught* from internal opposition forces and neighbouring states opposed to apartheid policies (Beinart 2001; Geldenhuys 1984). South Africa reacted to this perceived onslaught with a *total national strategy* designed to utilise a wide array of tactics to defend apartheid, support the interests of white minority rule, and create a buffer zone to protect South Africa from liberation movements in the region (South African Department of Defence 1977). These aims were embodied in attempts to

promote regional integration through the Constellation of Southern African States (Geldenhuys 1984).

Using a myriad of tactics, from friendly relationships to technical and economic assistance and military force, South Africa sought to instil a more favourable view of apartheid policy among its neighbouring states. Yet Lesotho, among other frontline states,<sup>15</sup> countered South Africa's attempts at regional integration with a parallel organisation, the Southern African Development Cooperation Community (SADCC), aimed at decreasing economic dependence on South Africa and creating a bulwark against apartheid in the region (Southern African Development Coordination Conference 1980). These competing efforts at regional integration were further reinforced by Cold War politics, with each side receiving financial and military support from the USA, USSR, or China (Turton 2005). It was within this context of escalating regional tensions and fluctuating bilateral relationships that the early components of the Orange-Senqu water regime emerged.

#### *Influence of Regional Context on Water Regime Formation*

Empirical evidence from the basin suggests that levels of regional integration affected the formation of water regime components in two key ways: (1) Political divisions in the region motivated South Africa to pursue water agreements with Lesotho and South West Africa, and (2) Strong political relationships facilitated the formation of

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<sup>15</sup> The term *frontline states* is used to refer to states in southern Africa that were opposed to white rule and apartheid policies. The primary frontline states included Angola, Botswana, Lesotho, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe.

water regime components while wider political tensions derailed cooperation processes.

First, the political divisions in the region contributed to the South African government's motivation to pursue water agreements with neighbouring states. Within the context of the total national strategy, foreign policy became captive to the State Security Council. Every aspect of foreign relations, including cooperation over water resources, became entangled with issues of national security (Turton 2003; Turton and Funke 2008). The South African government used water agreements as part of a carrot-and-stick strategy for enhancing state security and positioning itself as the regional hegemon (Barber and Barratt 1990).<sup>16</sup> South Africa offered the carrot of joint water resources development to neighbouring nations contingent upon their refusal to provide a safe haven for liberation fighters (Gutteridge 1983).<sup>17</sup> The second part of the strategy, the stick, came in the form of military reprisals and economic pressure whenever liberation fighters were detected in those countries (Turton and Funke 2008).

Political divisions in the region contributed to South Africa's motivation to pursue agreements with both Lesotho and South West Africa. Upstream, the LHWP became one of the tools South Africa leveraged to coerce compliance with its wider security

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<sup>16</sup> Other regional examples include the secret nonaggression pact signed between South Africa and Swaziland in 1982 that led to the establishment of the Tripartite Permanent Technical Committee for water resources development in the Incomati and Maputo river basin and the 1984 Nkomati Peace Accord between Mozambique and South Africa that paved the way for a revival of the joint Cahora Bassa dam project.

<sup>17</sup> Of the twenty-three water agreements South Africa signed in the last two and a half decades, fourteen of them were created during the apartheid era (Kistin et al. 2009).

requests. Shortly after South Africa launched the total national strategy, it initiated the formation of the first JTC to conduct a full feasibility study for the LHWP (table 5.1). As L. T. Molapo, a current commissioner to the Lesotho Highlands Water Commission (LHWC) and a principal negotiator for Lesotho throughout the 1980s, explained, “You could see a subtle transformation take place in these meetings. Officials from Foreign Affairs began to join the technical staff at these meetings . . . and at a very high level, beyond the committee, the original feasibility questions like ‘Can we build it?’ became linked with questions about signing the [security pact] or expelling [the African National Congress]” (pers. comm. 2007).

**Table 5.1** Timeline of selected events related to Lesotho-South Africa relations and the development of the Lesotho Highlands Water Project.

<b>Water-Related Events</b>	<b>Year</b>	<b>Other Events</b>
Oxbow Scheme investigated and designed	1955	
	1960	Republic of South Africa proclaimed
Severe drought hits region	1965	
South Africa launches Commission of Enquiry into Water Matters; South Africa proposes the Oxbow project as a binational venture	1966	Lesotho gains independence with Leabua Jonathan of the Basotho National Party as prime minister
Preliminary feasibility study, “The Oxbow Complex-Consolidated Proposals,” completed; Jonathan declares an agreement in principle to continue with the project	1967	
South Africa continues to investigate highlands potential using aerial photography and borehole samples	1970	State of Emergency declared in Lesotho (Jonathan nullifies elections and maintains power); his opposition party goes into exile and forms the LLA
Negotiations stall due to dispute over royalties	1972	
	1976	Soweto uprising takes place in South Africa; Lesotho becomes openly critical of South Africa, refuses to recognise the Transkei; South Africa imposes border slowdowns
	1977	South Africa issues Defence White Paper outlining the total national strategy, attempts to establish the Constellation of Southern African States (CONSAS)
Joint Technical Committee established to assess the feasibility of the Lesotho Highlands Water Project (LHWP)	1978	

	1980	Peka bridge meeting held to discuss an end to violence; Lesotho refuses to hand over ANC members
	1981	SADCC established (with Lesotho as a founding member) as a counter to CONSAS
	1982	South African Defence Forces (SADF) raid Maseru, killing 42
Joint feasibility study for the LHWP begins	1983	South Africa imposes partial blockade; Lesotho expels ANC members
South African technical team withdraws from project study and negotiations	1984	
South Africa investigates the Orange-Vaal Transfer Scheme as a domestic alternative to the LHWP	1985	SADF launches second raid on Maseru, killing 9
(Oct) Treaty for the LHWP signed, further planning begins	1986	(Jan) South Africa imposes border slowdown; (Jan) Jonathan government overthrown in a coup d'état; (Mar) Security Pact established: Lesotho deports ANC members to Mozambique

*Note:* ANC = African National Congress, LLA = Lesotho Liberation Army, SADCC = South African Development Cooperation Community.

Downstream. South Africa's effort to establish the second JTC with South West Africa was also influenced by political concerns. Unlike the situation with Lesotho, South West Africa was already subject to South African control. Thus, while South Africa sought to quell activity from liberation movements within the territory, it did not have to coerce compliance with a security pact in the way it did with Swaziland, Mozambique, and Lesotho (Hanlon 1986). But South Africa's efforts to maintain a buffer against frontline states was threatened by increasing pressure to transfer power to South West Africa (Sidaway and Simon 1993). The JTC agreement, which implicitly recognised the transitional government of South West Africa as an entity separate from South Africa, was a rhetorical concession to Namibian independence while South Africa maintained control. Additionally, towards the end of the 1980s, South African authorities recognised that Namibian independence was becoming increasingly inevitable (Sidaway and Simon 1993). With that in mind, the agreement

can be interpreted as South Africa's effort to establish a precedent for co-management in the lower basin.

The second key impact of regional integration was that strong political relationships between states facilitated the formation of water regime components while wider political tensions derailed cooperation processes. Examples from both the lower and upper basin highlight this phenomenon.

South Africa's occupation of South West Africa led to high levels of political integration that ultimately facilitated the formation of the 1987 JTC. Their indirect control over the foreign policy and natural resources agenda within South West Africa provided substantial leverage for establishing joint agreements (Dreyer 1993).

Strong political and economic ties between Lesotho and South Africa contributed to early convergence around the construction of the LHWP, while shifts in the political relationship repeatedly stalled research and negotiation processes. As table 5.1 showed, in 1967, Lesotho and South Africa reached an agreement in principle to move ahead with the investigation and development of the LHWP (Van Robbroeck 1986). From there, the parties engaged in preliminary feasibility studies throughout the early 1970s to assess the engineering challenges of constructing the joint scheme (LHDA 2000). Yet, as the political alliance weakened, the investigation and negotiation processes were adversely affected. In 1976, shortly after the Jonathan government publicly denounced South Africa's apartheid policy, the parties suspended the project due to the deteriorating political situation in the region (Van

Robbroeck 1986; Molapo, pers. comm. 2007). Two years later, amidst continued political tensions, the parties established the first JTC. The next item on the agenda was for each party to hire a consulting team to conduct their portion of the “joint” feasibility study.

Overall, conflict and cooperation between the two parties continued to fluctuate throughout the early 1980s, and the feasibility studies continued in “fits and starts depending on internal disputes and the wider events” (Hiddema, pers. comm. 2007). In December 1982, South African forces launched a raid on Maseru and utilised border slowdowns to put economic pressure on Lesotho (Sullivan 1989). Lesotho responded to the pressure by expelling a number of ANC members (Barber and Barratt 1990). The feasibility study was reinstated soon after. Yet despite Lesotho’s partial capitulation to South African demands, the Jonathan government refused to sign a security agreement (Lundahl and Petersson 1991). In 1983, Lesotho threatened to suspend cooperation on the water project warning that if South African military involvement continued, Lesotho would suspend the delivery of water downstream (Die Vaderland 1983). South Africa responded with a threat of its own. Any future stoppage of water delivery, they warned, could result in military invasion (*Daily News* 1983). This dispute temporarily stalled the underway feasibility study, but planning resumed in August 1983 and continued through 1986 (LHDA 2000).

On January 20, 1986, Major General Justin Lekhanya overthrew Leabua Jonathan in a military coup d’état (Lawrence 1998). In March, Lekhanya signed a security pact with South Africa and deported ANC members to Mozambique (Turton et al. 2004). In

October, the parties signed the treaty establishing the LHWP. The shift in political leadership within Lesotho strengthened the political relationship between the riparian states and ultimately enabled the formation of an important component of the Orange-Senqu water regime.

In sum, the consideration of the regional context provides important insight into the formation of water regime components during its early stage. Much of what occurred between riparian states at that time resonates with the hypothesis that strong political relationships between governments facilitate the formation of water regime components while political tensions disrupt the cooperative process. However, regional *divisions* also contributed to South Africa's motivation to pursue joint water agreements.

Consideration of the regional context also draws attention to the fact that water governance, per se, was not always the prime motivation for establishing water agreements. In the upper basin, South Africa sought to use the LHWP as a means for coercing Lesotho's compliance in ousting members of the ANC, while in the lower basin, the water treaty with South West Africa served as a gesture to Namibian independence in part, and as a tool to quell international pressure. Furthermore, the formation of the 1978 JTC amidst the deteriorating political relationship between Lesotho and South Africa highlights the coexistence of conflict and cooperation between riparian states.

### ***5.1.2 Power Asymmetry***

Like many transboundary basins, the Orange-Senqu is marked by significant power asymmetry between riparian states. According to power-based frameworks, the formation of an international water regime is most likely when it serves the interests of the basin hegemon (H3). Empirically, South Africa's dominance in the basin and its dual demands for water and security provide significant explanatory value regarding the formation of early water regime components. However, despite its hegemonic status, South Africa's control was not absolute with Lesotho exerting bargaining power to block proposals and shape the rules and decision-making procedures that formed regime components.

During the apartheid era, South Africa sought to establish international water agreements as a means to increase both water supplies and national security (see section 5.1.1). But how did South Africa's dominance in the basin influence the formation of water regime components? This section illustrates three important applications of power to show how South Africa leveraged its resources to influence the formation of water agreements during the apartheid era.

First, South Africa used its high level of expertise in water resources development to set the agenda for the LHWP. Acting on its hydraulic mission to develop water resources for consumption and production throughout the middle part of the twentieth century, South Africa generated high levels of technical and human expertise in civil engineering and water resources development (Turton 2003). The water sector, as a top government priority, also benefited from substantial financial support. Together, these resources allowed South Africa to conduct early investigations regarding water

resources management and set the agenda for negotiations with Lesotho, which lacked such resources (Molapo, pers. comm. 2007). Chapter 7 demonstrates that South Africa's efforts to frame the problem as a technical endeavour had substantial effects on project implementation and the allocation of resources at the subnational scale.

Second, South Africa used economic and political resources to influence the selection of political leadership in neighbouring riparian states and territories in at least three instances. In the lead up to Lesotho's first elections, the South African government supported the political campaign of Leabua Jonathan and the BNP (Davies and O'Meara 1985). Jonathan came to power in 1966 on a platform of strong cooperation with South Africa, and early in his tenure as prime minister, he articulated a strong commitment to the construction of the LHWP (Davies and O'Meara 1985). Next, as the political relationship between Lesotho and South Africa deteriorated, South Africa exerted significant pressure on Lesotho through economic blockades and military raids (see section 5.1.1). This pressure contributed to internal opposition to the Jonathan government and may have indirectly influenced the eventual coup d'état.<sup>18</sup> Regardless, when Major General Lekhanya assumed power in 1986, South Africa once again gained an ally in Lesotho. Lekhanya's commitment to cooperation with South Africa facilitated the final stages of negotiation about and the eventual establishment of the LHWP.

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<sup>18</sup> South Africa's indirect influence on the 1986 coup is commonly accepted (Turton 2004). While various accounts of the history of the LHWP credit South Africa with directly causing the coup (see Gordon 2009), little definitive evidence has been presented to support claims of direct involvement.

The last example of how South Africa used their power to influence their neighbours' governments and policies is of their occupation of South West Africa, which allowed them to exert significant control over their foreign affairs and natural resources agendas. This control made it easy for South Africa to push for a joint water agreement with the close allies in the South West African government downstream (Turton et al. 2004).

Third, South Africa leveraged its resources to influence the formation of water regime components in the basin through its financial capacity to provide incentives for cooperation. Given its high level of national income, South Africa could afford to offer to cover the majority of the project expenses for the LHWP while providing royalties to Lesotho in return for their collaboration. The details of the payment scheme for the LHWP are described in more detail in section 5.2.3.

As these three examples illustrate, South Africa used its relative power in the basin to orchestrate international water agreements. Its control of the process of water regime formation, however, was not absolute. Lesotho drew on its riparian position and the support and expertise of international organisations to exercise bargaining power in rejecting proposals and shaping the rules that govern the LHWP. In 1972, following preliminary feasibility studies, South Africa offered to pay Lesotho 1.25 cents per m<sup>3</sup> of water delivered through the scheme (Turton et al. 2004). However, acting on advice from World Bank advisers, Lesotho refused the offer and requested a higher sum (Van Robbroeck 1986). "Sitting at the head of the river, we are in a good place

for negotiating,” explained Manuel Lesoma, Lesotho’s water commissioner, “but we also used a lot of outside help along the way” (pers. comm. 2007).

In 1983, the Lesotho government used funding from the World Bank and the UNDP to hire the UK-based Lahmeyer MacDonald Consortium to conduct its portion of the feasibility study. Throughout the negotiating process, Lesotho also drew on assistance from the Tippetts-Abbett-McCarthy-Stratton consortium (TAMS). The consortium conducted an in-depth review of water resources management in Lesotho and provided government officials with information and negotiating strategies throughout the project planning process (TAMS 1996).

What happened during the early stage of water regime formation resonates strongly with the *power asymmetry* hypothesis. South Africa’s dominance in the basin and its dual needs for water and national security during the apartheid era played a significant role in the formation of early water regime components. However, Lesotho also played an important role in blocking early payment proposals and shaping the content of the treaty establishing the LHWP. Lesotho leveraged its geographical position in the basin and its access to external assistance. In addition to being the upstream riparian in the basin, Lesotho’s position as an enclave state within South Africa increased its strategic importance to the South African government. South Africa’s desire to oust ANC refugees from Lesotho during apartheid contributed to its willingness to bargain. Additionally, Lesotho utilised external financial and technical assistance to execute feasibility studies and strengthen negotiation strategies.

### ***5.1.3 Problem Structure***

According to the problem structure hypothesis, high levels of *commitment requirements*, *interest asymmetry*, and *uncertainty* are expected to increase the difficulty of a problem structure and decrease the likelihood of water regime formation. However, states facing difficult problem structures can overcome an impasse through bargaining processes and the provision of strong incentives for cooperation (H4). Indeed, varied levels of uncertainty, interest asymmetry, and commitment requirements help to explain the relative difficulty of forming water regime components in the early stage of their development.

By comparing the problem structures of each water regime component, this section shows that the lower commitment requirement and higher symmetry of interests within the JTCs contributed to an easier convergence of parties than experienced in the formation of the JPTC, wherein interest asymmetry, uncertainty, and commitment requirements were all high. It further illustrates how South Africa and Lesotho utilised creative cost incentives and mechanisms for flexibility, review, and arbitration to overcome negotiation paralysis due to the high interest asymmetry and uncertainty associated with the LHWP.

#### ***Problem Structure and Joint Technical Committees***

The problem structures underpinning the formation of both JTCs can be characterised by low commitment requirements, interest asymmetry, and normative uncertainty, or disagreement on how or what kind of information should be collected and exchanged.

Together, these problem characteristics contributed to the relatively easy convergence between riparian states.

The stated purpose of both JTCs was to collect and exchange information and advise riparian parties on water management strategies (Treaty 76, 1987, art. 3). As such, the level of commitment required from each riparian state was low. Neither party had to change existing water management practices or make large political sacrifices. It is important to note, however, that the level of financial commitment for the collection and exchange of information was felt differently by the parties. “While South Africa had easy access to both the expertise and the financing, we were lacking in both,” explained Lesoma (pers. comm. 2007). During the preliminary feasibility studies in the 1970s, it took Lesotho two years to come up with sufficient funds for its portion of the study; they were eventually provided by the World Bank and the UNDP. Nevertheless, the commitment to conduct the feasibility study had low political costs for both countries.

In both cases, the parties’ interests in gathering more information aligned with establishing the JTCs. Both of the JTCs were designed with a principle mandate to collect information. As such, the committees themselves were seen as mechanisms to overcome the acknowledged informational uncertainty in the basin. The level of normative uncertainty was small. This was due, in part, to the divided nature of the “joint” studies. “There was not a lot of ‘joint-ness’ in the actual study,” explained Molapo. Given the general tensions and hiring of different consulting teams, the parties decided to conduct the first joint study by dividing the work in half and

providing basic oversight (Molapo, pers. comm. 2007). Thus, while the countries inevitably had different opinions about how the LHWP should eventually be designed and managed, the low commitment requirement for participation in the JTC—binding parties to a joint study and not a joint project, per se—delayed the effects of wider normative uncertainty and interest asymmetry by delaying more definitive decisions.

### *Problem Structure and the Lesotho Highlands Water Project*

In contrast, the problem structure underpinning the formation of the rules and authorities to manage the LHWP and related governing authorities was marked by high commitment requirements, asymmetric interests, and normative and informational uncertainty. Together, these problem attributes help explain the difficulty the parties encountered in negotiating the project treaty and the strategies that helped them overcome various disputes.

First, unlike the formation of the Lesotho–South Africa JTC, where commitment requirements consisted only of resources to investigate the feasibility of the scheme, the establishment of the actual LHWP required parties to dedicate significant financial and natural capital to the scheme. “Once you get to the project level, commitment is no longer an intangible sort of thing,” explained Reatile Mochebelele, head of the water division at the New Partnership for African Development and one of Lesotho’s negotiators for the LHWP (pers. comm. 2007). The tangibility and permanence of the scheme further heightened the importance parties ascribed to the other attributes of the problem structure (e.g., interests and uncertainty). “If you’re asking for a big investment,” noted Molapo, “the policy makers want more assurance that the project

is going to work in general, but most importantly that it's going to work for them" (pers. comm. 2007).

Second, Lesotho and South Africa shared common, but not identical, interests in the development of the LHWP. As Ugo Hiddema, legal counsel to the South African negotiating team, described, "[South Africa's] aim was to get the maximum amount of water transferred to Vaal Dam for the cheapest cost, and Lesotho was there to get the maximum possible benefit for agreeing to the deal" (pers. comm. 2007). Reconciling these asymmetric interests proved a difficult task for the riparian parties.

Third, a high level of mistrust between the parties, linked to the wider regional tensions, heightened the level of informational and normative uncertainty about the agreement. The uncertainty contributed to two significant and prolonged disagreements occurring over the course of the negotiation process. The first dispute stemmed from informational uncertainty and a disagreement regarding the fundamental hydrology of the basin. "Both sides were producing reports, and they didn't match," explained Ronnie MacKenzie, a hydrologist and member of the consulting team hired by the South African delegation. "Lesotho was using inaccurate data, and South Africa made some mistakes . . . we were using a weir outside of Lesotho to do our monitoring, but it wasn't providing accurate results" (pers. comm. 2008). The dispute over hydrology held particular significance not only for the design of the project, but for the amount Lesotho would get paid.

The second, related dispute reflected normative uncertainty about the allocation of benefits generated by the scheme. “One of the biggest struggles we faced,” recalled Johan Claassens, a member of the South African negotiation team, “was to determine how to devise an appropriate payment structure for the services Lesotho was providing through the collaborative construction of this scheme” (pers. comm. 2007).

Thus, high levels of commitment requirements, interest asymmetry, and uncertainty all contributed to the difficulty of the problem structure underpinning the formation of rules and authorities to manage the LHWP. This complex problem structure, combined with the regional political factors detailed in section 5.1.1, complicated and prolonged the process of establishing the LHWP.

According to expectations, difficult problem structures can be overcome through bargaining and the provision of strong incentives for cooperative behaviour (H4). The experience of forming the LHWP resonates strongly with this hypothesis. Lesotho and South Africa overcame the barriers posed by high commitment requirements, interest asymmetry, and uncertainty by using a creative formula for defining the benefits of the scheme and the institutional mechanisms designed to manage both informational and normative uncertainty.

Lesotho and South Africa negotiated a mutually acceptable formula for dividing the costs and benefits of the joint project. They agreed to a straightforward division of costs based on each party’s demand for different components of the scheme. South Africa committed to covering all water delivery costs, and Lesotho agreed to pay all

hydropower expenses (LHDA 2000). But the definition and division of benefits is “where the real creativity came into play” (Molapo, pers. comm. 2007).

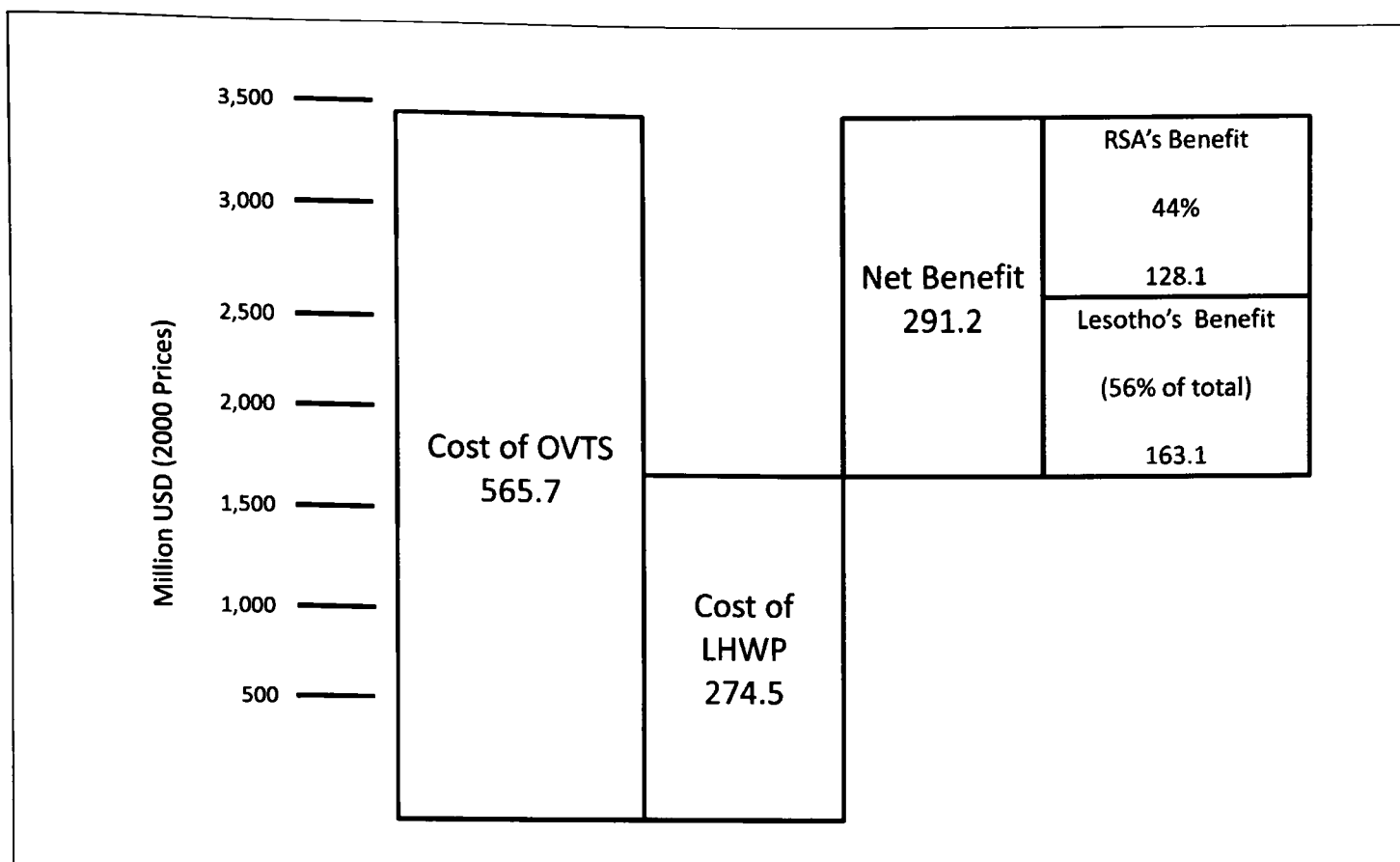
The formula, developed jointly by the consulting teams hired to carry out the feasibility study, defined the net benefit of water delivery by comparing the estimated cost of the LHWP to the estimated cost of the proposed Orange-Vaal Transfer Scheme, South Africa’s best domestic option for transferring water from the Orange River to the Vaal Dam (figure 5.2). This comparison provided the parties with a quantifiable value of cooperation by calculating the cost advantage to South Africa of collaboration with Lesotho versus trying to obtain the same objective domestically on its own (LHDA, 2008). As the leftmost column of figure 5.2 shows, the cost of the Orange-Vaal Transfer Scheme totalled 565.7 million USD.<sup>19</sup> The cost of the LHWP was 274.5 million USD.<sup>20</sup> The countries took the difference in price, 291.2 million USD, to be the net benefit of the scheme. From there, the parties divided the net benefit into two groups. Fifty-six percent, or 163.1 million USD, went to Lesotho in the form of royalty payments from South Africa.<sup>21</sup> South Africa’s 44% share of the net benefit represented the 128.1 million USD it was saving by pursuing the LHWP instead of the Orange-Vaal Transfer Scheme (LHDA 2008).

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<sup>19</sup> All currency figures in this thesis are given in terms of United States Dollars (USD) using conversion rates from the year 2000. Conversions were made based on a rate of 1 USD = 6.13 South African rand, 1 USD = 6.13 Lesotho maloti and 1 USD = .99 European Union euro.

<sup>20</sup> The cost discrepancy between the two projects was due mainly to the cost of pumping water. To get water from the Orange River to the Vaal Dam within South Africa would require significant energy to pump water through a series of delivery tunnels to its destination. In contrast, the LHWP relied on gravity to facilitate water delivery, hence eliminating the cost of pumping.

<sup>21</sup> The treaty specifies two types of royalty payments. The first, fixed royalty payments, is based on capital cost calculations. The second, variable royalties, is based on calculated operational cost savings of the LHWP against a pumped water scheme and is calculated monthly based on the actual volume of water delivered.



**Figure 5.2** Schematic diagram of the benefit-sharing formula developed for the Lesotho Highlands Water Project (LHWP). The net benefit of the project was defined as the difference between the cost of the Orange-Vaal Transfer Scheme and the LHWP. It was divided on a 56%–44% split between the parties. *Source:* Adapted from Lesotho Highlands Development Authority 2000. *Note:* RSA = Republic of South Africa.

The parties incorporated five institutional mechanisms to address the issues of uncertainty about and high commitment requirements of the LHWP: (a) extended investigation, (b) phased framework, (c) progressive allocation, (d) periodic review, and (e) amendment procedures. First, the parties agreed to sign the treaty but extend investigation of the basin hydrology. The treaty grants the parties “until the year proceeding the first year of water transfer” to reach a consensus on the hydrology (LHDA 2000).<sup>22</sup> Second, the parties structured the project using a phased framework. The treaty outlined five potential phases of the joint project but only bound the parties, under the original agreement, to the implementation of the first phase. This

<sup>22</sup> Water deliveries began in 1995 and the parties reached consensus, as mandated, one year prior (LHDA 2000).

structure allowed the parties to reassess objectives and opportunities before proceeding with subsequent phases.<sup>23</sup>

Third, the parties adopted a progressive, volumetric allocation of water resources with a clause allowing for future modifications. Annex II of the 1986 treaty specifies the amount of water to be delivered annually between 1995 and 2020 and provides for gradual increases in the quantities of water as each phase of the project is completed. The treaty also provides for the future modification of specified quantities pending changes in projected water requirements in South Africa (art. 7, sec. 2). Fourth, the treaty incorporates a requirement for parties to review it at twelve-year intervals (art. 18, sec. 1). Finally, the parties adopted a procedure for amending the original agreement through mutually agreed protocols. Together, these five flexibility mechanisms helped the parties manage interest and uncertainty concerns.

This section showed the influence of commitment requirements, asymmetrical interests, and uncertainty on the different processes of institutional formation in the early stage of the Orange-Senqu water regime. In line with the problem structure hypothesis, low levels of all three factors contributed to an easier convergence of parties when creating the JTCs than experienced with the formation of the rules and authorities for the LHWP, when all three problem factors were high. The experience of the early stage of water regime formation reinforces the notion that problem attributes are not static and can be manipulated and overcome by riparian parties. In

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<sup>23</sup> The flexibility of the phased approach is tempered by monetary penalties imposed if one or both parties withdraw before the completion of Phase 5. These penalties were included in the 1986 agreement in recognition of the financial commitments made by both parties and the anticipated need to recover the investments over the lifetime of the project.

the case of the LHWP, creative cost incentives and the incorporation of flexibility, review, and arbitration mechanisms helped parties overcome high interest asymmetry and uncertainty.

#### ***5.1.4 Expert Networks***

The early stage of water regime formation in the Orange-Senqu basin provides little evidence of an independent, epistemic community as identified in the knowledge hypothesis. However, the consultants contracted by the riparian parties to conduct feasibility studies can be viewed as a quasi-internal, expert network that, together with World Bank advisors, influenced decision makers through information collection and strategy design.

Independent scientific or academic communities did not feature prominently in the process of water regime formation during its early stage (Meissner 2005).<sup>24</sup> While occasional, independent, scientific appraisals of water development took place within South Africa, little connection was made between such studies and the policy process (WCD 2000). The political context at the time of institutional development also contributed to the extra-secretive nature of the planning process (Turton 2003). Despite the lack of input from an independent, epistemic community, the process of water regime formation was influenced by what Lindemann (2008) refers to as a

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<sup>24</sup> Despite their lack of involvement preceding treaty negotiations, networks of nonstate actors became highly involved throughout the implementation of the LHWP. The nature and impact of this involvement is addressed in more detail in chapters 6 and 7.

“quasi-internal expert network,” or technicians affiliated with riparian states whom are charged with data collection and strategy design.<sup>25</sup>

Following the formation of the first JTC, Lesotho and South Africa contracted consulting teams to perform the feasibility assessment of the LHWP. South Africa hired the locally based Olivier Shand Consortium, and Lesotho hired the Lahmeyer MacDonald Consortium (LHDA 2000). According to the study’s terms of reference, each team would assess project issues within their client’s country and submit their findings to be reviewed by the partnering team. “In many respects it wasn’t really a collaborative study,” explained Molapo, “but the key issue where the two teams actually worked together was in developing a formula for arriving at the price of water delivery for the scheme” (pers. comm. 2007).

In 1983, representatives from each consulting team collaborated to design the cost model detailed in section 5.2.3 (see figure 5.2). The model provided the parties with a solution to the contentious question about appropriate pricing strategies. “The joint development process increased the model’s credibility with both sides,” added MacKenzie (pers. comm. 2008). As previously described, this model ultimately helped parties overcome a recurring deadlock in the project negotiations and was among the factors enabling them to agree to the establishment of the LHWP.

Beyond the cost formula, the quasi-internal expert network did not reach a quick consensus about all dimensions of the project (see section 5.2.3). The quasi-internal

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<sup>25</sup> Lindeman coined the term in the context of his analysis of the links between technical staff in the riparian states comprising the Rhine River basin.

nature of the expert network and the prevailing interstate tensions exposed the network to political pressures that influenced the collection and credibility of information. As Liftin noted, the process through which expert networks influence policy makers is often far “more complicated than simply speaking truth to power” (1994). In the case of the LHWP, the client–consultant relationship contributed to a perceived dual mandate for the expert network: to collect scientific information while also protecting the interest of the country that contracted them. Disagreement about the hydrology of the basin, for example, was generated by a combination of scientific uncertainty, mistrust, and political posturing. “There was a strong sense from our end that the numbers coming from the other team were being manipulated to punish South Africa and give Lesotho an advantage,” explained McKenzie (pers. comm. 2008). Lesoma agreed, “To a certain extent the technical teams could operate apart from the political issues, but they were not immune from the tensions and mistrust,” (pers. comm. 2007).<sup>26</sup>

Additionally, the heavily technical expertise of the consulting teams and the terms of reference set by the parties for the feasibility study influenced the ultimate design of the project. Because the major focus was on the technical aspects of water delivery, less attention was paid to environmental and displacement issues (Horta 1995). In line with World Bank protocols at the time, the treaty ultimately included clauses for the protection of displaced communities and the environment, but there was not a significant amount of attention given to these issues (Scudder 2005; Willemse 2007). In fact, consultants initially concluded that there would be no major environmental

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<sup>26</sup> Chapter 7 shows that similar patterns hold true for consultants operating in the basin today.

impacts from the first phase of the scheme (LHDA 1986; Hoover 2001). The treaty for the LHWP states that all “members of local communities in the Kingdom of Lesotho, who will be affected by flooding, construction works, or other similar Project related causes, will be enabled to maintain a standard of living not inferior to that obtaining at the time of first disturbance” (Treaty 13, 1986, art. 7, sec. 18).

Given the overwhelming focus on the engineering and water delivery components, social and environmental protections were not widely regarded as a primary goal of the project. As Hiddema remarked, “[adequate compensation and development] was not really an objective of the project; the main objectives were to get water to South Africa and revenue and energy to Lesotho. Everything else was a secondary consideration” (pers. comm. 2007). Thus, the breadth of the expertise included in the expert network was reflected in the project design. The implications of this for the implementation and effects of the LHWP are discussed in more detail in chapter 7.

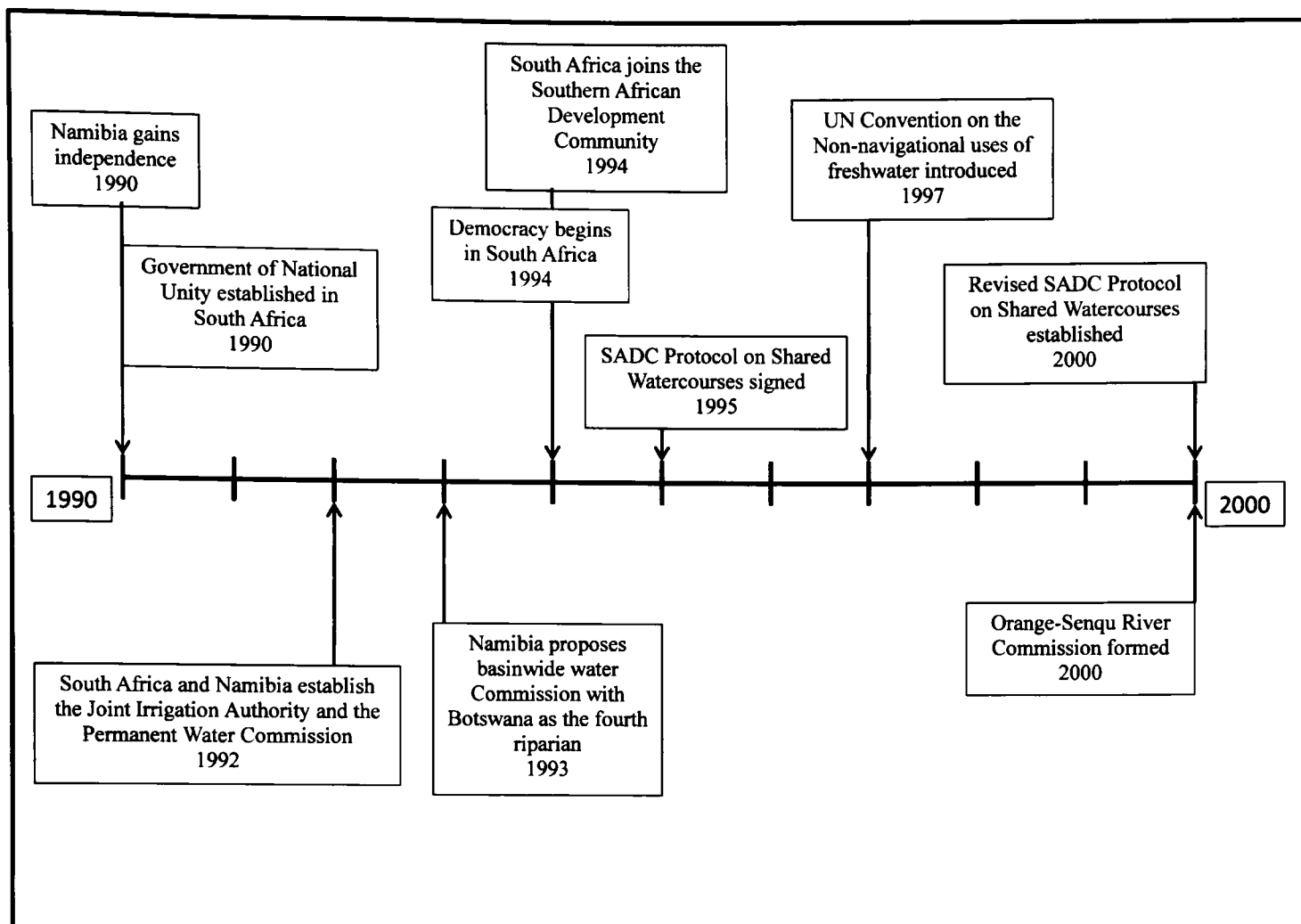
## **5.2 Later Stage of Water Regime Formation (1990–2000)**

This section evaluates the driving forces behind the formation of the three most recent international water management institutions created in the Orange-Senqu basin: (1) the Joint Irrigation Authority (JIA), established in 1992 between Namibia and South Africa to operate and maintain the Vioolsdrift/Noordower Joint Irrigation Scheme (VNJIS); (2) the Permanent Water Commission (PWC), established in 1992 between Namibia and South Africa to advise parties on shared waters; and (3) the Orange-Senqu River Commission (ORASECOM), established in 2000 between Botswana, Lesotho, Namibia, and South Africa to advise parties on water management in the

basin. This analysis demonstrates a degree of congruity between the expectations generated by the theory and the observations gleaned from the later stage of water regime formation with a notable difference in the explanatory value of the power-based hypothesis.

### ***5.2.1 Political context***

Dramatic shifts in interstate relationships, marked by Namibia's independence, South Africa's transition to democracy, and the expansion and strengthening of the Southern African Development Community (SADC), characterise the later stage of water regime formation in the Orange-Senqu basin (figure 5.3). These shifts in the political context influenced the formation of water regime components in two key ways: (a) The *disintegration* of Namibia from South Africa transformed the Orange-Senqu into a multilateral basin and significantly shaped the demand for the JIA and the PWC, and (b) South Africa's transition to democracy and the expansion and strengthening of the SADC contributed to a regional focus on transboundary water management.



**Figure 5.3** Schematic timeline showing the later stage of water regime formation and the historical context in which regime components emerged. *Note:* OTVS = Orange-Vaal Transfer Scheme. SADC = South African Development Community.

Namibia's independence in 1990 split the lower basin into two distinct states and directly influenced the formation of all three water regime components established during this stage. The bifurcation of the VNJIS that straddled the new international border necessitated international coordination for continued water delivery (DWAf 2004b). The second agreement, creating the PWC, reflected Namibia's desire to renegotiate the bilateral JTC established during occupation to provide advice to parties on waters of mutual interest (Heyns, pers. comm. 2007). Finally, Namibia's independence shifted the Orange-Senqu from a bilateral to a multilateral basin. As section 5.3.2 will discuss in more detail, Namibia played a fundamental role in the establishment of the basin-wide ORASECOM (ORASECOM 2000).

South Africa's transition to democracy and termination of the total national strategy signalled an end to competitive efforts for regional integration. In 1994, shortly after holding democratic elections, South Africa joined the revamped SADC.<sup>27</sup> Significantly, the first protocol signed by the revamped regional organisation addressed the joint management of transboundary water in the region.<sup>28</sup> "The first protocol was significant for a variety of reasons," explained Phera Ramoeli, current director of the SADC water sector, "because regional integration was important for commitments to water governance, but also because water governance was important for uniting regional parties" (pers. comm. 2007).

As parties in the SADC sought to define a new unifying mission postapartheid, the issue of water resources governance was seen as crucial common ground (Mochebelele. pers. comm. 2007). What this suggests is that the spillover between regional integration and water cooperation flowed in both directions with improved political relationships in the region providing an opportunity for states to come together around water issues and water issues providing a key component of the rationale for states to come together (Lieberman 1997). The regional focus on transboundary water management around the 1995 SADC protocol contributed to the formation of ORASECOM by making water a high profile issue (Heyns, pers. comm. 2007). As section 5.2.3 will show, this focus contributed to the perceived costs for South Africa if they did not cooperate.

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<sup>27</sup>For more on the transition from the SADCC to the SADC, see Lee 2003.

<sup>28</sup>As noted in chapter 4, the Protocol on Shared Watercourse Systems in the SADC Region was signed in 1995 by all four riparian states in the Orange-Senqu basin as well as Angola, Malawi, Mozambique, Swaziland, Tanzania, Zambia, and Zimbabwe. The protocol focused on regional expectations for data sharing and outlines types, objectives, and functions of river basin organisations.

### *5.2.2 Power Asymmetry*

The transformations marking this later stage of water regime formation contributed to a subtle shift in the relative power of the parties within the basin. Namibia's independence diminished South Africa's ability to set the agenda downstream. Yet South Africa's position as the basin hegemon remained secure, if not strengthened. With the transition to democracy, South Africa maintained its economic and military strength in the region while increasing its legitimacy, international support, and institutional linkages.<sup>29</sup> The power asymmetry hypothesis would lead us to predict that South Africa, as the hegemonic force, continued to drive the process of water regime formation. However, empirical evidence from the basin shows that Namibia and South Africa both drove the formations of the bilateral JIA and PWC and that Namibia acted as the principal driver behind the formation of ORASECOM. This section focuses on the application of power underpinning the negotiation of ORASECOM. In doing so, it demonstrates how Namibia's use of bargaining and ideational power and South Africa's use of material and bargaining power influenced the process and output of water regime formation.

Namibia leveraged both bargaining and ideational power to drive the formation of ORASECOM. In 1993, at the inaugural meeting of the bilateral PWC, the Namibian government proposed the creation of a basin-wide commission to advise parties on water management in the Orange-Senqu basin. The proposal incorporated plans to

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<sup>29</sup> In 1995, the United States granted 134 million US dollars (USD) in direct aid to South Africa as opposed to 3.5 million to Botswana and 12 million to Namibia. South Africa's accession to the SADC provided further institutional linkages for pursuing its policy agenda (Lieberman 1997).

include Botswana as the fourth riparian state (ORASECOM 2000). The credibility of this proposal hinged on two ideological shifts in the basin: the first was about what constituted good transboundary water governance, and the second was about what constituted the geographic boundaries of the river basin.

To substantiate these claims, Namibia drew on the 1966 Helsinki Rules. The Rules, published by the ILA, reflect a set of international guidelines for the use of rivers and groundwater that cross national boundaries (ILA 1966).<sup>30</sup> In chapter 1, article II, of the Helsinki Rules, an international drainage basin is defined as “a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.” The rules recommend that, in addressing issues of water utilisation and pollution, the concerns of each state be taken into account. Namibia used the Helsinki Rules as the basis for defining good governance and to give legitimacy to its arguments for both the importance of a basin-wide commission and the inclusion of Botswana as a fourth riparian state (Heyns, pers. comm. 2007).

Namibia’s efforts to establish a basin-wide commission reflected a strategic interest in “providing a forum in which smaller basin states could engage more effectively with South Africa” (Biggs, pers. comm. 2007). Cognizant of the power asymmetry between basin states, Namibian officials “hoped that by increasing the number of states and getting everyone together at the same table, we might open up the possibility of forming alliances if necessary” (Heyns, pers. comm. 2007). The

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<sup>30</sup> As McCaffrey (2001) illustrated, the Helsinki Rules formed the basis of the 1997 UN Convention.

proposal thus signalled Namibia's attempt to shift the sanctioned discourse in the basin from a status quo of bilateral management with South Africa at its centre, to a basin-wide approach with Botswana in the fold.

Both Lesotho and Botswana supported the proposal, but initial reactions from the South African delegation were mixed. Opposition to the proposal stemmed from two primary concerns. First, given the existing bilateral arrangements in the basin, members of the South African delegation felt a basin-wide organisation would be redundant and too complex (Van Niekerk, pers. comm. 2007). Particular concern surrounded the possibility that a basin-wide commission would complicate the construction of further phases of the LHWP. Second, members of South Africa's technical task force questioned the scientific merit of expanding the commonly accepted basin boundaries to include Botswana as a riparian state (Pyke, pers. comm. 2008). Noting that "in living memory," the Molopo-Nossob system in Botswana made no effective contribution to the Orange River, the technical staff recommended that Botswana be included on a conditional basis, with permanent membership pending additional evidence of Botswana's contribution to the river's flow (Van Niekerk, pers. comm. 2008).

Ultimately, however, South Africa agreed to the establishment of the four-party commission, with reputational benefits from participation trumping power, organisational, and scientific concerns. "Kader Asmal, [the South African minister for water affairs], quickly rejected the idea of conditional membership for Botswana. He believed it sounded 'too second-class citizen' and was contrary to South Africa's

political interests at the time,” recalled Peter Van Niekerk, head of the South African delegation to ORASECOM. “South Africa was the new kid on the block at that stage, and a very big kid on the block, so it was critical to demonstrate our capacity to cooperate with others” (Van Niekerk, pers. comm. 2007).

In exchange for participation, however, South Africa utilised its power endowments to shape the terms of the treaty and the mandate of the new commission to protect its own interests. According to the treaty, ORASECOM has no formal oversight, advisory, or coordinating powers with respect to the preexisting bilateral commissions (see Treaty 2000, art. 1, sect. 3). Basin commissions that came into existence after 2000 would be subordinate to ORASECOM (Treaty 3, 2000, art. 1, sect. 4), but previously established institutions, including the LHWC, PWC, and JIA, would continue to operate as separate entities.

South Africa introduced this clause to preserve the bilateral management structures in the basin and prevent “unnecessary complications” to the management of the LHWP (Dlamini, pers. comm. 2007). In evoking a discourse of efficiency and technical expedience to challenge Namibia’s notion of good governance, South Africa gained the political benefits of participation in the basin-wide body while functionally maintaining the status quo. Understanding these limitations, and perhaps more importantly, South Africa’s disinterest in basin-wide planning, is important for understanding the regimes’ effects on adaptive capacity and the allocation of water and related benefits discussed in chapters 6 and 7.

Overall, this section showed the influence of power asymmetry on water regime formation in its later stage. In doing so, it drew attention to the fact that interests within each country, and even within each ministry, were not homogenous and highlighted the potential for weaker riparian states to influence the process of regime formation. By drawing on international water management guidelines and exploiting the reputational costs of noncooperation, Namibia was able to shift the boundaries of the basin and convene all four riparian parties into a single commission. However, while not driving the formation of ORASECOM, South Africa still exerted significant power in shaping the terms of the treaty and mandate of the commission to protect its interests in the basin. This section also reinforced the recognition that basin boundaries are not a thing of scientific fact, but rather, political interpretation (Wester and Warner 2002).

### ***5.2.3 Problem Structure***

Riparian states confronted a range of problem structures in the later stage of water regime formation. In line with theoretical expectations, the lower commitment requirements and interest asymmetry of the parties in the formation of the JIA and the PWC contributed to a relatively easy convergence of parties. The formation of ORASECOM, wherein interest asymmetry and normative uncertainty were high, proved more difficult. Through the bargaining process, the parties adjusted the commitment requirements to align divergent interests and reach agreement on the formation and governance of the basin-wide commission.

### *Problem Structures of the Joint Irrigation Authority and the Permanent Water Commission*

Low levels of riparian commitment, interest asymmetry, and uncertainty underpinning the formation of the JIA and the PWC contributed to a relatively easy convergence of riparian states, which were South Africa and Namibia. Like the advisory bodies established in the early stage of water regime formation, the stated purpose of the PWC was to collect and exchange information and to advise riparian parties on water management strategies (Treaty 84, 1992). As such, acceding to the committee did not require either party to change existing water management practices, expend significant financial resources, or make large political sacrifices. Additionally, because the VNJIS was already operational, the establishment of the JIA required little project investment on the part of either party. In fact, part of the rationale for creating the JIA was to decrease the commitment requirement of the central governments by making the farmers in the basin more self-sufficient in terms of financing and maintaining the scheme (Liebenberg, pers. comm. 2007).<sup>31</sup>

In both cases, the parties shared similar interests in institutional formation. The location of the VNJIS, which straddled the new national boundary between South Africa and Namibia, necessitated international coordination for continued water delivery. Severe drought in the common border region throughout the early 1990s further contributed to the need to seek joint management strategies (Heyns, pers. comm. 2007).

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<sup>31</sup> During apartheid, the South African government heavily subsidized agricultural projects throughout the country to support economic development in Afrikaans communities. After the changes in government in both South Africa and Namibia, “there was still a desire to support agricultural production, but these types of large-scale subsidies were gone” (Liebenberg, pers. comm. 2007).

The levels of normative uncertainty influencing the formation of the PWC and the JIA were also relatively small. Like the committees established in the early phase of water regime formation, the PWC was designed to decrease the level of informational uncertainty in the lower basin (Treaty 84, 1992, art. 2). Given this prescribed aim, the normative uncertainty about how to share information and advise parties was small. Similarly, decisions facing parties about management strategies for the VNJIS were aided by the fact that the small-scale scheme was already fully operational. The parties agreed to assign water allocation to it based on a straightforward calculation of the land currently under production by both sides (Basson, pers. comm. 2007). Parties further granted the JIA substantial power to adjust management and financial strategies as needed (Treaty 84, 1992, art. 6).

#### *Problem Structure and the Orange-Senqu River Commission*

In contrast to the other agreements established during this later stage of water regime formation, convergence on the establishment of ORASECOM proved more challenging to obtain. In line with the problem structure hypothesis, this difference can be explained in part by the higher levels of interest asymmetry and uncertainty surrounding the formation of a basin-wide advisory body. First, the problem structure posed by the ORASECOM encompassed a greater divergence in riparian interests than the bilateral agreements created previously between Namibia and South Africa. Namibia's desire for an expanded, basin-wide advisory body clashed with South Africa's preference for bilateral water management (see section 5.2.2).

The structural preferences of both riparian states reflected efforts to protect their own interests and gain or maintain a certain degree of control over the water management process. Namibia hoped that alliances forged through a basin-wide commission would increase the power of the smaller states in the basin, while South Africa, for similar reasons, wanted to maintain bilateral arrangements.<sup>32</sup>

Second, the divergence in interests was compounded by high levels of both informational and normative uncertainty. None of the parties had clear data on the hydrological interconnectivity between the Molopo-Nossob tributary in Botswana and the Orange River. “There was no strong evidence of connectivity but also insufficient information to fully refute the link between the systems,” explained Othusitse Katai, director of Botswana’s International Water Unit (pers. comm. 2007). Namibia leveraged this informational uncertainty to protect its interests and bolster the argument for including Botswana. The general lack of knowledge regarding the extent of the river system contributed to normative uncertainty about whether or not Botswana should be included as a full member of the commission (see section 5.2.2).

Negotiations on ORASECOM lasted seven years as parties sought to reconcile these competing interests.<sup>33</sup> During the prolonged bargaining process, South Africa eventually agreed to admit Botswana and participate in the four-party commission as long as ORASECOM would have no authority over existing bilateral organisations

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<sup>32</sup> Significantly, the interest of both parties was constructed not in terms of specific water resources, *per se*, but rather the ability to control or influence decision-making processes in the basin.

<sup>33</sup> Beyond the key issues of inclusivity and organisational mandate, the issue of naming the basin commission also delayed the final agreement. The initial proposal was for the Orange River Commission, but Lesotho proposed the Senqu-Orange Commission to reflect the local name for the river upstream. Ultimately, the parties compromised on rebranding the river the Orange-Senqu River (Nthathakane, pers. comm. 2007).

(see Treaty 2000, art. 1, sec. 3). The other parties agreed to this compromise, hence adjusting the commitment requirements to reach agreement. Additionally, as a first step in decreasing informational uncertainty in the basin, the four parties committed to prioritise a joint study of the hydrology of the Molopo-Nossob tributary (Katai, pers. comm. 2007).

This section showed the influence of commitment requirements, asymmetrical interests, and uncertainty on the different processes of institutional formation in the later stage of water regime formation. In line with the problem structure hypothesis, low commitment requirements, asymmetrical interests, and uncertainty contributed to an easier convergence of parties than experienced in the formation of ORASECOM, wherein interest asymmetry and uncertainty were high. In addition, this section clearly illustrated the malleable nature of problem attributes, with states utilising bargaining and ideational power to shape interests, reduce normative uncertainty, and adjust commitment requirements. This process ultimately facilitated agreement on the establishment of ORASECOM as a basin-wide commission with a limited mandate.

#### ***5.2.4 Expert Networks***

Similar to the findings from the early stage of water regime formation, the later stage provided no strong evidence of an independent, epistemic community influencing the formation of bilateral agreements in either 1992 or during the negotiation of ORASECOM between 1993 and 2000.<sup>34</sup> However, policy norms and water

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<sup>34</sup> Nonstate actors, particularly donor organisations, became increasingly active in the basin after ORASECOM was formed in 2000. As chapter 8 will show, these organisations share a relatively

management principles were diffused through what Jorgens called horizontal channels of communication. According to Jorgens, they are developed when state and nonstate actors meet regularly in international issue-arenas to exchange information and coordinate policies (2004).

During this later stage, policy diffusions through the arenas of international water conferences and negotiations in other regional basins influenced the formation of ORASECOM, in particular. As section 5.2.2 discussed, Namibia drew on the 1966 Helsinki rules and the concept of river basins as a management unit to support its proposal for a basin-wide water commission. Throughout the 1990s, both regional and international forums reinforced the concept and validity of basin-wide management. The development of basin-wide commissions for transboundary water management was heavily supported at the 1997 SADC/European Union Conference on the Management of Shared River Basins, the 1998 SADC/UNDP Water Sector Round Table Conference, and the Second World Water Forum held in March of 2000 (Granit 2000). While the negotiations for ORASECOM were already well underway at this point, “the international recognition of inclusivity as best practice helped move the negotiation process along” (Heyns, pers. comm. 2007).

The diffusion of policy ideas was further facilitated by what Turton (2003) described as a cascade effect of institution building in SADC river basins. Because many basin states in the region share multiple international rivers with different constellations of neighbouring states, water managers in each country drew on their experience in other

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similar worldview and constitute a significant epistemic community shaping decision making and the implementation of the water regime.

basins to inform the formation and implementation of water governance arrangements. As a result, Turton (2003) suggested, ideas and strategies for basin management could spill from one basin to the next.

Of course, the flow of ideas does not happen spontaneously, and diffusion depends strongly on individual representatives responsible for negotiations and management in multiple shared basins. In regards to the Orange-Senqu basin, Namibian representatives drew heavily on their experience negotiating bilateral and basin-wide agreements on the Cunene and Okavango rivers to inform the formation of the PWC and ORASECOM (Heyns, pers. comm. 2007). As chapter 4 showed, Namibia entered into bilateral water agreements with Angola and Botswana in 1990 shortly following independence.<sup>35</sup> Shortly after the riparian states established bilateral organisations, the Namibian government invited the Botswanan commissioners of the Joint Water Commission and the Angolan commissioners of the JPTC to attend a joint meeting in Windhoek and discuss the possibility of forming a tripartite water commission for the Okavango River basin (Pinheiro, Gabaake, and Heyns. 2003, 115). The three parties first met jointly in 1991 and finalised the agreement establishing the Okavango River Basin Water Commission (OKACOM) in 1994 (Pinheiro, Gabaake, and Heyns 2003). When the Namibian delegation to the PWC proposed a basin-wide commission for the Orange-Senqu River in 1993, they presented a draft agreement based heavily on the treaty establishing OKACOM (Heyns, pers. comm. 2007).

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<sup>35</sup> In 1990, Namibia and Botswana established the Joint Water Commission to advise on waters of mutual interest. Angola and Namibia used a general cooperation agreement to restore the JPTC to advise on waters of mutual interests and the Joint Operating Authority to manage joint infrastructure in the Cunene basin.

Furthermore, having been through the negotiation process, both Namibia and Botswana vouched for the feasibility of moving from bilateral to multilateral management structures. As Katai noted, “The experience [in the Okavango basin] gave credibility to the fact that [basin-wide management] was not just some theoretical European concept but a real doable strategy” (pers. comm. 2007). Testimony regarding the “doability” of basin-wide management was used to counteract the discourse promoted by South Africa regarding the efficiency and superiority of bilateral management.

In sum, the later stage of water regime formation provides little evidence of a classic independent, epistemic community feeding scientific information to government decision makers. Nonetheless, the diffusion of policy ideas through international and regional conferences and the cascade of experience between basins influenced the formation of the PWC and ORASECOM.

Of course, ideas and information will not transform the output of a negotiation process unless they are adopted and used by basin parties. Despite the growing international support for the concept of river basins as the ideal unit of management and the regional experience with basin-wide management in the Okavango River basin, South Africa’s interest in maintaining decision-making control in the basin contributed to their enduring preference for bilateral governance arrangements. This played out in a competition between the discourses of efficiency and inclusivity, with parties eventually promoting an outlook that both basin-wide and bilateral governance arrangements were suitable in different circumstances.

### **5.3 Conclusion**

This chapter explained the formation of six international water management institutions comprising the Orange-Senqu water regime. In doing so, it demonstrated how the consideration of political context, power asymmetry, problem structure, and knowledge all help in understanding the emergence of the Orange-Senqu water regime. The examination of the four core categories of determinants provides important insight into understanding how riparian states formed the international water management institutions comprising the existing Orange-Senqu water regime. A moderate degree of congruity is evident between the expectations generated by the theory and the observations gleaned from the basin's history, but there are some important differences as well.

First, consideration of the political context in which water regime components emerged provides important insights. Components of the Orange-Senqu water regime cannot be fully understood without considering the significant transitions from colonialism to independence and apartheid to democracy. Much of the experience in the basin resonates strongly with the hypothesis that strong political relationships can enable the establishment of agreements while wider tensions can stall the processes of cooperation. This reminds us that state interaction over water resources is embedded in a much wider sphere of interstate relations, and that the formation of water regimes may be influenced by a range of other motives and goals. Water governance was not always the prime motivation for water agreements in the Orange-Senqu basin.

However, the hydropolitical history of institutional formation also shows the use of water agreements as a tool to influence regional integration. This was true for South Africa during apartheid but also for the SADC region after South Africa's transition to democracy when the 1995 regional water protocol was seen by many as a powerful tool for converging states. What this suggests is that the spillover between regional integration and water cooperation may flow in both directions with wider political and economic relationships affecting the prospects for water cooperation and water cooperation affecting the wider prospects for political and economic relationships.

Second, power asymmetry played an important role in water regime formation. The hypothesis that regime components will emerge when demanded by a basin hegemon provides partial explanatory power for the Orange-Senqu basin water regime. South Africa's dominance in the basin and its dual demand for water and national security were instrumental in the formation of early water regime components. Over the last five decades, South Africa used both infrastructure and international agreements to capture and control water resources.

However, the case of the Orange-Senqu basin also highlights ways in which the weaker riparians blocked, shaped, and initiated proposals and agreements. Lesotho derived bargaining power from its position as the upstream riparian as well as from external financial and technical assistance. Namibia drew on international guidelines and exploited the reputational costs of noncooperation to initiate ORASECOM. The case of the Orange-Senqu water regime suggests caution in assuming that a basin

hegemon always calls the shots and opens up space for exploring options for weaker states to challenge the status quo.

Third, in accordance with the problem structure hypothesis, situations in which riparian states faced lower commitment requirements, interest asymmetry, and uncertainty proved easier to reach convergence in than in those situations characterised by high levels of each problem attribute. Of course, in the early stage in particular, the political context also played a role in slowing the negotiation process of the LHWP.

Most significantly, the analysis presented in this chapter confirmed that none of the attributes comprising problem structure were static and that states manipulated or addressed them in different ways to reach agreement. Commitment requirements were adjusted to account for uncertainty (e.g., LHWP) or as a compromise on competing interests (e.g., ORASECOM). The process of constructing and adjusting interests was influenced by fluctuations in the political context, the power asymmetries underpinning the bargaining process, and information and strategies provided by quasi-internal, epistemic communities. Importantly, water regime formation was facilitated when states reached common, but not necessarily identical, interests (e.g., Lesotho and South Africa shared common interests in the LHWP but for different reasons). Parties acknowledged both informational and normative uncertainty and made efforts to address them by creating organisations tasked with information gathering, adjusting commitment requirements, and incorporating flexibility mechanisms into the agreements.

Fourth, the experience of water regime formation in the Orange-Senqu basin provides only partial support for the expert networks hypotheses. Independent, epistemic communities as described by Haas (1993) did not play a substantial role in the formation of water regime components. However, the quasi-internal network of consultants contracted by parties to perform the joint feasibility study provided information and strategies that enabled the formation of the LHWP. Additionally, the diffusion of policy ideas through vertical and horizontal channels of communication influenced the formation of the PWC and ORASECOM.

Analysing the variance in the determinants over time and comparing their impact on multiple water regime components highlights the crucial role that political context, power asymmetry, problem structure, and knowledge played in mobilising cooperation over shared waters. Considering the interaction between each hypothesis suggests that understanding relative power and riparian interests is at the core of understanding the formation of international water institutions.

Political context and power asymmetry in the basin were mutually influential. Power asymmetry shaped the political context: South Africa applied material power in the form of economic and military capabilities to influence the selection of political leadership in neighbouring states and territories. Political context also influenced power asymmetry in the basin: Namibia's independence decreased South Africa's bargaining power and its ability to set the agenda downstream. In terms of explanatory value, knowing whether or not riparian states had strong political

relationships could not predict the formation of water governance regimes unless more was known about the states' interest in joint water management and their capabilities of leveraging material, bargaining, or ideational power to achieve specific aims.

Power asymmetry influenced the problem structure underlying the formation of water regime components in the basin. As noted previously, the core attributes of a problem structure—commitment requirements, interest asymmetry, and uncertainty—were adjusted through interaction, negotiation, and bargaining, all processes heavily influenced by power asymmetry. In terms of commitment requirements, South Africa used its bargaining power to limit ORASECOM's the mandate by rejecting any oversight authority of existing bilateral organisations. Additionally, South Africa's significant financial resources and the high priority placed by the government on water management meant that South Africa's commitment to joint studies was financially less significant than that of some of the other basin states. For example, it took Lesotho two years to come up with the funds for the joint study in the 1970s.

The interests of the riparian states also changed throughout the process of negotiations. The ideational power to frame the project as mutually beneficial was significant in the cases of both the LHWP and ORASECOM. In terms of uncertainty, South Africa's economic resources and water expertise allowed them to collect a substantial amount of information about water resources in the basin. Similar to the explanatory value of political context, an understanding of problem structure is complimentary to understanding power asymmetry. Yet low interest asymmetry,

uncertainty, and commitment requirements alone won't lead to the establishment of institutions unless one or more parties have a strong interest and are willing to use power and resources to make it happen.

## CHAPTER 6: ADAPTIVE CAPACITY

### Introduction

This chapter analyses the effects of the Orange-Senqu transboundary water governance regime on adaptive capacity by examining the influence of international water management institutions and interstate interactions on treaty flexibility, information management, actor networks, and financial resources. It tests the hypothesis that cooperation between riparian states will enhance the ability of parties to recognise and respond to changing circumstances and examines the factors enabling and constraining reflexivity and joint planning in the basin.

### 6.1 Institutional Flexibility<sup>36</sup>

Flexible water treaties that anticipate the possibility of gradual and sudden changes in shared basins and incorporate mechanisms to allow parties to adjust management practices to changing circumstances are important for adaptive water management (McCaffrey 2003). Countries may employ a variety of mechanisms for enhancing the flexibility of a water treaty including (a) *allocation strategies* that divide resources not on the basis of fixed volumetric allocations but according to alternative measures such as the flow percentage contributed by each party and the river flows' timing and duration (Fischhendler 2004), (b) *drought response provisions* to allow for diminished water deliveries in exceptional circumstances and to give states time to respond to crises while keeping the existing agreement intact (McCaffrey 2003), (c) mechanisms for *amendment and review* to provide parties with an opportunity to establish

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<sup>36</sup> An earlier version of this section was previously published as Kistin and Ashton 2008.

guidelines for unforeseen circumstances and resynchronise national and basin-wide strategies with new knowledge and changing circumstances (Susskind 1994), (d) *revocation clauses* to allow countries to terminate their involvement with the treaty in order to renegotiate rules and regulations better suited to present and future scenarios, and (e) *adaptation responsibilities* conferred upon joint organisations by the cooperating parties to undertake and adjust management practices as necessary (Feitelson and Haddad 1999).

Institutional flexibility also requires that adaptation opportunities embedded in formal governance structures be accompanied by the willingness of joint organisations to recognise and respond to changing circumstances. As my previous study (Kistin 2006) showed, discursive structures that lock in the status quo can neutralise the flexibility mechanisms built into formal treaties.

The Orange-Senqu water regime contains a variety of flexibility mechanisms (table 6.1). Project-oriented agreements (i.e., the LHWP and the VNJIS) tend to include more specific flexibility mechanisms, but overall, the parties rely heavily on joint organisations to guide the adaptation process. Discursive structures also play a significant role in shaping actual opportunities for recognising and responding to changing circumstances.

**Table 6.1** Flexibility mechanisms embedded in the Orange-Senqu basin's water governance agreements.

Flexibility Mechanisms	Relevant annexes, articles, and protocols from Orange-Senqu agreements			
	2000	1992	1992	1986
Allocation				Art. 7 (2) Annex II
Drought Provisions		Art. 3	Art. 3 (5)	Art. 7 (2) Art. 9 (19) Art. 14 (1)
Amendments/Review	Art. 11	Art. 5	Art. 14	Art. 6
Revocation Clause	Art. 9	Art. 5	Art. 14	Art. 9 (7, 8)
Institutional Responsibilities	Art. 1 [ORASECOM]	Art. 1 [PWC]	Art. 5 [JIA]	Art. 9 [JPTC] Protocol 6 [LHWC] Art. 7 [LHDA] Art. 8 [TCTA]

*Source:* Previously published in Kistin and Ashton 2008. *Note:* Section numbers given in parentheses. Water governance organisations created by treaties given in brackets. Art. = Article, JIA = Joint Irrigation Authority, JPTC = Joint Permanent Technical Committee, LHDA = Lesotho Highlands Development Authority. LHWC = Lesotho Highlands Water Commission, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, TCTA = Trans-Caledon Tunnel Authority, VNJIS = Vioolsdrift/Noordoewer Joint Irrigation Scheme.

### *Allocation Mechanisms*

As Section 4.3.2 discussed, volumetric water allocations are specified in only two of the four agreements, though the levels of flexibility differ in both agreements. The VNJIS agreement dedicates 20 Mm<sup>3</sup> of water annually to the scheme as a whole, with 11 Mm<sup>3</sup> allocated for farmers in South Africa and 9 Mm<sup>3</sup> designated for those in Namibia. This fixed volumetric allocation provides water managers with no guidelines for adjusting the allocations to each country over time. The agreement does not, however, eliminate the possibility of adjusting that allocation, but it leaves the issue to the two bilateral institutions, the JIA and the PWC, for investigation, negotiation, and recommendation to parties.

In contrast, the 1986 treaty couples progressive volumetric allocation with a clause that allows future modifications. The agreement specifies the amount of water to be delivered annually for the years from 1995 to 2020 (see Annex II). It also provides for

gradual increases in the allocated water quantities as each phase of the project is completed. Additionally, it provides for the future modification of specified quantities pending changes in projected water requirements in South Africa (art. 7, sec. 2). This system provides more flexibility than simple fixed-volumetric allocations and has allowed the joint commissions to alter the original delivery schedule to respond to changing levels of South African water demand (Hiddema, pers. comm. 2007).

### *Drought Provisions*

Drought conditions are acknowledged in the four basin agreements. The 1992 agreement establishing the PWC requires that commission to advise the parties on measures to alleviate short-term problems resulting from water shortages during droughts (art. 3, sec. 1f). Similarly, the 2000 agreement requires ORASECOM to advise the parties on contingency plans for responding to drought situations (art. 5, sec. 2.7).

The project-focussed agreements establish more specific procedures for responding to drought events. In the case of extreme events, which include both drought and armed insurrection, the 1986 treaty calls for parties to take the necessary measures of “palliation and restoration . . . and subsequently agree on joint action” (art. 14, sec. 1). This vaguely-worded provision is coupled to a more detailed procedure for dealing with annual water delivery shortfalls. According to the agreement, Lesotho is required to recoup the amount of water shorted through excess deliveries in the six months following the shortfall year (art. 7, sec. 2; art. 9, sec. 19). In contrast, the VNJIS agreement contains no specific stipulations for responding to the impacts of droughts. However, the parties do acknowledge that the diversion and abstraction of water

agreed to within the scheme may be subject to restrictions imposed by the PWC whenever drought conditions occur in the lower basin.

No mechanisms for drought response have been invoked to date (Hiddema, pers. comm. 2007; Liebenberg, pers. comm. 2007). Nevertheless, the six-month grace period and repayment mechanism established for the LHWP provide flexibility to cope with short-term changes while keeping intact both the delivery schedule and wider agreement. In both the 1992 agreements, the drought references do little to guide the parties in their response or adaptation to a drought. Instead, the joint institutions are required to analyse the situation, consider the need for curtailments, advise the parties, and implement subsequent decisions.

#### *Amendment and Review Processes*

All four agreements include basic provisions for future amendments. However, unlike the other agreements, the 1986 treaty contains three additional mechanisms for reviewing and amending the original agreement. The first is a requirement for parties to review the treaty at twelve-year intervals (art. 18, sec. 1). The second is the phased framework in which the parties outlined five potential phases of the joint project, but only bound themselves, under the original agreement, to the implementation of the first phase. This structure allows parties to reassess objectives and opportunities before proceeding with subsequent phases, though the flexibility is tempered by monetary penalties imposed if one or both parties withdraw before the completion of Phase 5. These penalties were included in the 1986 agreement in recognition of the financial commitments made by both parties and the anticipated need to recover the investments over the lifetime of the project. South Africa took advantage of the

phased framework to delay discussions regarding Phase 2 of the project after recalculating projected water demands and determining that additional supplies would not be necessary until 2020 (Government of South Africa 2008; section 7.1.2).

The third mechanism, a procedure for amending the original agreement through mutually agreed-upon protocols, allows parties to create or alter rules to address any unforeseen or changing circumstances related to the project (table 6.2). The protocols were used by the parties to address unresolved disputes (e.g., customs revenue and tax policies) at the time the treaty was signed. Lesotho and South Africa also used the protocol system to update the governance structure of the joint project. Protocol VI, for example, refines the institutional responsibilities and mandates to reflect the project's transition from the construction to the management stage (Mwakalumbwa, pers. comm. 2007). The parties used this amendment to replace the JPTC, which was established under the original agreement to oversee the development and implementation of the project, with the LHWC, an institution designed to extend beyond the technical aspects of the project to address the social, environmental, and economic issues involved in maintaining the scheme.

**Table 6.2** Protocols to the 1986 treaty for the Lesotho Highlands Water Project.

<b>Date</b>	<b>Protocol</b>	<b>Scope</b>
1988	I: Royalty Manual	Elaborates on the methodology for calculating the net benefit of the project and related royalty payments
1988	II: SACU Study	Examines Lesotho's share in the common revenue pool of the Customs Union (between South Africa, Botswana, Lesotho, and Swaziland) and specifies the advance payment to Lesotho as a fixed percentage of the present value of the initial development's total cost
1988	III: Apportionment of the Liability for the Costs of Phase 1A Project Works	Clarifies each country's payment responsibility for the construction costs of water delivery and hydropower infrastructure
1991	IV: Supplementary Arrangements Regarding Phase 1A	Establishes processes and expectations regarding cost allocation reports, royalty payments, reimbursement, loans, and insurance
1992	V: Supplementary Arrangements with Regard to Project Related Income Tax and Dues and Charges Levied in the Kingdom of Lesotho in respect of Phases 1A and 1B of the project	Examines the different types of water-related contracts issued in Lesotho and the need to track the amount of income tax paid; Specifies provisions to regard income tax as project costs
1999	VI: Supplementary Arrangement Regarding the System of Governance for the Project	Redefines the functions and responsibilities of the board of directors of the LHDA, the TCTA, and the JPTC; Renames the JPTC the LHWC; Redefines hierarchical relations between the LHDA, TCTA, and LHWC, and between the LHWC and parties

*Source:* Previously published in Kistin and Ashton 2008. *Note:* JPTC = Joint Permanent Technical Committee. LHDA = Lesotho Highlands Development Authority, LHWC = Lesotho Highlands Water Commission, SACU = Southern Africa Customs Union, TCTA = Trans-Caledon Tunnel Authority.

### *Revocation Clauses*

All four agreements contain clauses that allow the parties to terminate or withdraw from the treaty. Under the 2000 agreement, basin parties are permitted to withdraw from the agreement, but no sooner than three years after the agreement had entered into force. Once written notice has been supplied to the other parties, a withdrawal is only permitted after twelve months to prevent parties from absconding before complying with existing commitments. In the 1992 agreements, termination of the treaty requires the exchange of written notices between parties, and termination will be enacted six months after the request. The 1986 treaty also includes cancellation clauses, though parties may be deterred from choosing this option due to the monetary

penalties imposed for cancellations before the completion of Phase 5 (see art. 6, sec. 1; art. 12, sec. 7–8). To date, no riparian state has ever requested the termination of a joint water treaty in the Orange-Senqu basin, but these clauses also provide parties with options to renegotiate rules and regulations that reflect present circumstances.

### *Institutional Responsibilities*

As section 4.3.2 noted, the mandates and jurisdictions of basin organisations vary widely. The project-related organisations, the LHWC and the JIA, are both granted substantial powers to design and implement policies and procedures. The other two commissions, the PWC and ORASECOM, serve as advisory bodies designed to counsel parties on issues related to the development and utilisation of shared waters. The advisory body mandates are broad; both agreements include clauses allowing the joint organisations to advise on “such other matters as may be determined” by the riparian parties (Treaty 3, 2000, art. 5, sec. 2). These flexible mandates allow the existing institutions considerable scope to recognise the need for management changes and advise the parties accordingly (Kistin and Ashton 2008).

One important change made by ORASECOM was the establishment of a secretariat to assist with communication between states and coordination among the growing number of donor organisations operating in the Orange-Senqu River basin. In its early configuration, ORASECOM relied on a system of rotating leadership under which the departments of water affairs in each riparian state took turns hosting Commission meetings. “The rotating system was designed with the idea of promoting equality,” explained Peter Pyke, a member of South Africa’s technical task team for the

ORASECOM, “but the side effect was that we had very little continuity and poor communication” (pers. comm., 2007). With financial and organisational assistance from the German Technical Cooperation Agency (GTZ), the position of Secretariat was formally established in 2007.

According to Piet Heyns, a former head of the Namibian Department of Water Affairs and a commissioner in the PWC and ORASECOM, the establishment of the secretariat “provides a strong example that these countries can come together to solve recognised problems even where no precedent exists in rules and agreements” (pers. comm. 2008). Basin managers hold high expectations for the improvements the organisational alterations will bring for joint planning in the basin. “Once the Secretariat is in place,” forecasted Thato Setloboko, Botswana’s principle hydrologist and a member of the ORASECOM technical task team, “The Commission will be able to move beyond just data collection and top-level studies towards decision making on some of the meatier, more controversial issues” (pers. comm., 2007).

In summary, the existing agreements pertaining to the Orange-Senqu River basin contain several flexibility mechanisms, some of which have not yet been needed or used by the parties. Others, such as the progressive allocation and protocol amendment strategies adopted for the LHWP, provide specific guidelines that may help parties adapt to changing circumstances by requiring management policies and procedures be reviewed, and if necessary, modified over time. The institutions that have been established to oversee basin projects and advise parties are enabled by the existing agreements to help drive the adaptive process. In particular, the broad

mandates of the PWC and ORASECOM to advise parties on several specific issues, plus any other matter deemed important by the commissions, allow these institutions to recognise the need for change and advise the parties to take appropriate action.

### *Discursive Structures*

Yet, while the agreements themselves do not restrict adaptive capacity, discursive structures within the basin prevent meaningful discussion of major infrastructure projects at ORASECOM meetings, limiting opportunities for basin-wide planning and consequently constraining adaptive capacity.

One manifestation of South Africa's efforts to restrict dialogue within ORASECOM occurred at a meeting jointly organised by the GTZ and the UNDP/Global Environment Facility (GEF). It was attended by myself, representatives of all four riparian states, and donor organisations and consulting firms active in ORASECOM activities.<sup>37</sup> As a GEF consultant from the UK progressed through PowerPoint slides, explaining their preliminary diagnostic analysis of the basin, he mentioned Phase 2 of the LHWP and asked the assembled audience when they expected the feasibility studies to be completed. The response from Peter Van Niekerk, South Africa's chief delegate to ORASECOM, was brief and resolute. "We don't discuss those matters here," he explained. "This is the ORASECOM."

While the reply gave slight pause to the consultant, it did not surprise the representatives from the riparian states who, according to Othusitse Katai, director of Botswana's international waters unit, have become accustomed to South Africa's

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<sup>37</sup> ORASECOM Workshop, 24–26 October 2007, Benoni, South Africa.

reluctance to openly discuss the bilateral infrastructure projects (i.e., Phase 2 of the LHWP and the proposed re-regulating dam on the border between South Africa and Namibia) within the basin-wide forum (pers. comm. 2007). As a result, Van Niekerk's response sparked some friendly jeering from the other participants. One Namibian representative assured the presenter sarcastically, "but don't worry; they'll be sure to provide the rest of us with prior notification as soon as they've already decided what they're going to do." There was no serious challenge to Van Niekerk's comment from any of the other riparian state representatives. After a long and awkward pause, the consultant resumed his presentation and clicked along to the next slide.

What this exchange illustrated is that, despite the ample flexibility afforded in the formal water governance structures, the South African delegations' broader efforts to restrict the boundaries of what can and cannot be discussed limits the ability of ORASECOM to engage in serious basin-level planning or recognise and respond to changing circumstances.

Accounting for the discursive structures limiting dialogue calls into question popular perceptions of ORASECOM as the overarching planning authority in the basin. Analysts like Malzbender and Earle recognised that ORASECOM's formal mandate precludes official oversight of the bilateral organisations, yet they claimed that "increasing efforts are being made in practice to include all basin management issues under the auspices of the basin-wide Commission" (2009, 31). A closer look at the actual performance of the water regime, however, reveals that the South African delegation actively restricts the content of discussions held within the Commission.

These restrictions have become engrained in the other representatives' expectations, and consequently, they are now part of the governance structures influencing adaptive capacity within the regime.

In sum, the formal governance structures comprising the Orange-Senqu water regime contain ample flexibility mechanisms that provide riparian states with opportunities to recognise and respond to changing circumstances. Yet, discursive structures establishing what can and cannot be discussed within ORASECOM limit dialogue and multilateral planning at the basin level and constrain adaptive capacity by limiting the ability of the joint commissions and riparian states to recognise and respond to changing circumstances.

## **6.2 Information Management**

As chapters 1 and 2 described, the process of adaptation in transboundary basins requires the collection, exchange, and utilisation of information. For shared data to be used fully, issues of compatibility and credibility must be addressed. In addition to hydrological information, data on the full range of changing circumstances (climatic, economic, social, and political) are critical for developing a shared knowledge base and mutual understanding of the system and supporting decision making within shared basins (Le Marquand 1977; Timmerman and Langaas 2005; Goulden, Conway, and Persechino 2008).

Over the last four decades, the collection, exchange, credibility, and compatibility of data and information related to water resources in the Orange-Senqu basin have

increased (table 6.3). The execution of joint studies, the adoption of and compliance with requirements for information exchange, and the development of interpersonal relationships have all contributed to this trend.

**Table 6.3** Impacts on the collection, exchange, credibility, and compatibility of data and information.

	<b>Observed Changes</b>	<b>Regime Contributions</b>	<b>External Factors</b>	<b>Remaining Barriers</b>
<b>Collection</b>	Increased	Joint studies	Studies by national governments, parastatal organisations, private sector companies, and scientists	Financial resources, political priorities
<b>Exchange</b>	Increased	Treaty requirements, interpersonal relationships, joint studies	Change in regional political context, technological advances, regional monitoring initiatives	Political reluctance, staff capacity, competition within the private sector
<b>Credibility &amp; Compatibility</b>	Moderately increased	Technology trainings, interpersonal relationships, joint studies	Change in regional political context, regional monitoring initiatives	Lack of data protocol or minimum standards guidelines, cost of new equipment and training, political reluctance

The bilateral, basin-wide, and regional agreements signed by riparian states in the Orange-Senqu basin require them to exchange data and information and provide prior notification of any activity having a significant impact on the quantity, quality, or flow of the basin. As table 6.4 shows, the bilateral agreements between Namibia and South Africa include fairly general expectations, while the bilateral agreement regarding the LWHP and the basin-wide treaty establishing ORASECOM outline more detailed requirements for riparian parties. In addition to the basin-specific agreements, all riparian states are also party to the SADC Revised Protocol on Shared Watercourses, which reiterates the prior notification and information exchange

requirements. Basin managers report a high level of compliance with formal requirements and increasing openness on information issues over time.

**Table 6.4** Capabilities and requirements embedded in Orange-Senqu basin water treaties for the collection and exchange of information.

<b>Treaty</b>	<b>Capabilities and Requirements</b>
1986 LHWP	<ul style="list-style-type: none"> <li>• LHDA and TCTA must provide the JPTC with all information regarding the construction and operation of project components (art. 7, sec. 15; art. 8, sec. 4)</li> <li>• LHDA and TCTA must establish “effective and comprehensive information management systems” to track studies and progress indicators (art. 7, sec. 20; art. 8, sec. 8)</li> </ul>
1992 PWC	<ul style="list-style-type: none"> <li>• Each party is required “to the extent permitted by its own laws and procedures to provide such information and authorisations as the Commission may require for the performance of its functions” (art. 1, sec. 3)</li> <li>• The joint commission has the power to appoint consultants to assist in gathering and processing information (art. 3, sec. 2)</li> </ul>
1992 JIA	<ul style="list-style-type: none"> <li>• Parties are required to share data regarding in-scheme allocation with the joint authority (art. 4)</li> <li>• The joint authority has the power to appoint consultants for information collection and processing (art. 7, sec. 1)</li> </ul>
2000 ORASECOM	<ul style="list-style-type: none"> <li>• “The parties shall exchange available information and data regarding the hydrological, hydrogeological, water quality, meteorological and environmental condition of the river system” (art. 7, sec. 4)</li> <li>• “A party planning any project programme or activity with regard to the river system that may have a significant adverse effect upon any one or more of the other parties, or which may adversely affect the river system shall forthwith notify the council and provide all available data and information” (art. 7., sec. 5). Notified parties get 6 months to reply (art. 7, sec. 6)</li> <li>• “The Parties shall employ their best efforts to collect and, where appropriate, to process data and information with regard to the River System, in a manner which facilitates its utilisation by the other Parties, technical experts or consultants who may be appointed by the Council. The Parties shall make every effort to employ the standardised form for collecting, processing and disseminating data and information, where appropriate” (art. 7, sec. 11)</li> </ul>

*Note:* JIA = Joint Irrigation Authority, JPTC = Joint Permanent Technical Committee, LHDA = Lesotho Highlands Development Authority, LHWP = Lesotho Highlands Water Project, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, TCTA = Trans-Caledon Tunnel Authority.

In addition to the contributions made by formal data-sharing requirements, several basin managers credited the increased interaction and improved interpersonal relationships with counterparts in neighbouring countries as a key factor underpinning improvements in the level of information exchange. “Once you get to know these

guys face to face,” explained Othusitse Katai, the director of the international waters unit in Botswana’s Department of Water Affairs, “it’s much easier to call them up with questions, if necessary, or make small requests for information that would otherwise get bogged down in bureaucratic formalities” (pers. comm. 2007).

The South African DWAF also offered technology trainings to water ministries in neighbouring countries as a means of increasing the transparency of the modelling methods it uses domestically to manage water resources. According to Dudley Biggs, the former head of Namibia’s technical task team to ORASECOM, the week-long training sessions provided interesting information but served largely as a symbolic gesture of openness. “You would have to spend a year or two to understand the complexities of their systems,” Biggs explained. “But we don’t have that kind of expertise here or the resources to invest in that kind of technology . . . nevertheless, it demonstrated a willingness to share and contributed to levels of trust and credibility between our departments” (pers. comm. 2007).

The execution of joint studies in the basin has augmented the collection and compatibility of valuable data and information. Major joint studies include the Lower Orange River Management Study, the first phase of the ORASECOM Integrated Water Resources Management Plan (IWRMP), and the Phase 2 feasibility study for the LHWP. The Commission has also ordered studies on the wetlands at the river’s source and the hydrology of the Molopo-Nossob system in Botswana.

Beyond the water regime, additional factors influencing improvements in information management include the data and information collected at the national level, political transformations in the region, technological advances, and regional-level efforts (table 6.3).

Several basin managers described the high degree of tension, mistrust, and secrecy that developed between riparian states during the domestic and interstate conflicts of the 1980s. Parties viewed all shared data with great suspicion, diminishing the utility of information exchange. “The overwhelming sense of doubt caused us to check numbers constantly,” recalled Neil van Wyk, a member of South Africa’s technical task team. “The base assumption was that the other side was manipulating the figures to get a better deal” (pers. comm. 2007). The basin managers credited political transformations in the region for increasing the openness between governments and the information exchange level. Political transitions to democracy in both South Africa and Lesotho thus contributed to a decline in secrecy and suspicion regarding water resources data and increased openness between riparian states (Lesoma, pers. comm. 2007; Pyke, pers. comm. 2007).

Efforts to create a regional database of hydrological data and the ability to access and transfer data via the Internet have also contributed to improvements in information availability. The regional SADC Hydrological Cycle Observing System is designed to serve as a central depository for regional water data. Though it faced technical and political roadblocks limiting its effectiveness in its early stages (see Ratashobya and

Wellens-Mensah 2002), the SADC water sector is currently in the process of planning for Phase 2 of the system (Ramoeli, pers. comm. 2007).

Despite these important advancements in data collection and exchange, limitations are evident on the willingness of upstream riparian states to share information openly. In 2007, the Namibian delegation to ORASECOM requested permission to participate as an observer in bilateral planning sessions regarding Phase 2 of the LHWP. Disappointed with the lack of meaningful discussion in ORASECOM regarding the development of major infrastructure in the upper basin, the Namibian delegation proposed the arrangement as an alternative avenue for communication. Although the exact wording of the appeal is unclear, retellings suggest the request was framed by Namibian representatives as a minor procedural modification to existing efforts to share information in the basin. According to Piet Heyns, the basic question posed to South Africa and Lesotho was, “Given that we are all committed to sharing information, what difference would it make if we were in the room while the planning was taking place?” (Heyns, pers. comm. 2007).

For South Africa and Lesotho, the difference was significant. Delegations from both countries rejected Namibia’s appeal and remain reluctant to alter current protocols for communication and information sharing between riparian states and basin commissions (Heyns, pers. comm., 2007). The rejection stemmed from concerns by both upper riparian states that involvement of a third party during the planning process would jeopardise their interests in the negotiation and implementation of Phase 2. “The primary concern,” explained Peter Nthathakane, “was that the inclusion

of Namibia would stall the already delayed process. For us, that means a delay in payment, and for South Africa, a delay in water, and both resources our countries urgently need” (pers. comm. 2007).

Basin managers in South Africa and Lesotho provided a range of reasons to explain their rejection of Namibia’s request including the efficiency of bilateral partnerships for project implementation (Mwakwalumbwa, pers. comm. 2007), the logistical complexities of including additional states (Lesoma, pers. comm. 2007), and the belief that the current levels of communication and interaction with ORASECOM provided sufficient opportunities for the involvement of downstream states (Dlamini, pers. comm. 2007). South African leaders also framed their position as benefiting Namibia by saving them from wasting their time at multiple meetings or getting too bogged down in inconsequential details (Heyns, pers. comm. 2007). But as Heyns put it. “We asked in the first place because we know that we will feel the consequences here of their decisions upstream” (Heyns, pers. comm. 2007).

Additional barriers described by basin managers to the accumulation of accessible and compatible information to support adaptive capacity in the basin include the lack of human, financial, and technical resources<sup>38</sup>; the lack of political will and data protocols<sup>39</sup>; and competition among private consultants.<sup>40</sup>

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<sup>38</sup> Several basin managers in nonhegemonic riparian states noted the lack of funding for data gathering and processing as a significant barrier to information management. The high levels of staff turnover in each riparian country were also noted as a significant obstacle.

<sup>39</sup> The establishment of data protocols is a politically sensitive issue in the basin. Certain political representatives are reluctant to have someone else dictate their procedures for collecting and analysing data. On a pragmatic level, representatives from nonhegemonic states worry that the costs of retraining personnel will too high if significant changes are made.

Of networks

### **6.3 Actor Networks**

Recognising the need for change, gathering information on it, making decisions about what needs to be changed and how to do it, and implementing and monitoring strategies depend on numerous actors (Smit and Wandel 2006). The stronger the linkages between different actors involved in different aspects of governance, the more equipped the regime is for recognising and responding to changing circumstances (Yohe and Tol 2002).

Because there are a variety of networks influencing transboundary basins' adaptive capacity, this chapter considers four types of networks identified by interviewees as crucial linkages for recognising and responding to changing circumstances in the Orange-Senqu River basin. These networks interact through communication, data collection and dissemination, and policy development, implementation, and monitoring. They are (a) international basin managers who serve on joint water commissions and authorities that facilitate communication and planning across national boundaries; (b) technical and political representatives within joint commissions who influence the way in which data and information are translated into goals and strategies; (c) representatives who act intersectorially within the water ministries and related government sectors (e.g., agriculture, energy, and environment)

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<sup>40</sup> Beyond the riparian states, private consultants also play an important role in water resources information collection and exchange. Because their wealth of data and information determines their ability to win public and private contracts in the region, these consultants do not have strong incentives to share data and information openly, nor are they bound by the same governance rules mandating exchange between states.

and who influence how problems are framed, data are collected and disseminated, and policies are implemented; and (d) basin organisations and stakeholders who exchange information and implement policy.

Actor networks related to water governance in the Orange-Senqu basin have grown in strength and scope over the last four decades (table 6.5). In particular, the networks between basin managers from each riparian state have grown stronger as the result of basin-specific governance initiatives and regular meetings of commissioners and technical task teams. Regional efforts to support dialogue and planning among water managers, international conferences, and donor-sponsored field trips also contribute to the development of these networks. In a few cases, basin managers developed relationships before assuming leadership roles in their respective countries.<sup>41</sup>

**Table 6.5** Actor networks' impact on water governance in the Orange-Senqu basin

Type of Network	Impact	Regime Contributions	External Factors	Remaining Barriers
Basin Managers	strong	Regular meetings	Conferences, field visits, prior relationships	Staff turnover
Technical and Political Representatives	mixed	Meetings	National departmental structures	Communication
Intersectoral	weak		Workshops	Time and resources
Basin Organisations & Stakeholders	weak	Roadmap (ORASECOM); NGO forum (LHDA)	NGO partnerships, donor funding, political context	Political reluctance, institutional design

*Note:* LHDA = Lesotho Highlands Development Authority, NGO = Nongovernmental organisation, ORASECOM = Orange-Senqu River Commission.

<sup>41</sup> Most notably, South African delegate to ORASECOM, Peter van Niekerk, and former Namibian delegate, Piet Heyns, knew each other as college friends before assuming leadership roles in their respective countries' water ministries. The Stockholm International Water Institute and Ramboll Natura have designed their joint, young professionals' education program to help create similar relationships between future water managers.

Beyond the networks linking joint commission representatives, other types of actor networks expected to support adaptive capacity remain variable or weak within the Orange-Senqu basin. Discussion and decision making regarding water management is concentrated heavily within the departments of water and agricultural affairs in the four riparian states, with little engagement with other governmental departments. In some cases, the representatives to the joint commissions oversee broader ministries, but thus far there has been no formal participation from departments of mining, environment, or tourism.<sup>42</sup>

In general, basin managers noted that the lack of intersectoral actor networks for transboundary water management reflects general levels of interdepartmental disconnect within the government systems. As Peter Pyke, a South African member of ORASECOM's technical task team noted, "Different departments will come together around a specific project. There is not a strong system yet for intersectoral planning and with everyone so busy on their own tasks, there is no time for dialogue for the sake of dialogue" (pers. comm. 2007). Interestingly enough, efforts to streamline water management in Lesotho by consolidating all water-related offices under a single umbrella organisation, the Water Commission, has effectively isolated water issues from other departments and decreased crossdepartmental communication (TAMS 1995; Lesoma, pers. comm. 2007).

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<sup>42</sup> Representatives from the joint UNDP/GEF programme caused significant controversy in the basin by getting project approval for the Transboundary Diagnostic Analysis's scoping phase from the environment ministers in each of the riparian states despite the fact that the environmental ministries play no significant role in ORASECOM.

Stakeholder engagement in the basin varies by joint institution. The Commission has made a nominal commitment to promoting public participation in decision making around basin resources, but there has been no implementation of it to date (ORASECOM 2007). In contrast, the JIA was designed to delegate water resources management in the binational irrigation scheme to direct stakeholders. As such, the authority is comprised of three farmers from each side of the border and one representative each from the South African and Namibian governments. Although the JIA has historically recognised farmers as its primary stakeholders in the region, discussions started in 2007 about expanding outreach (and membership on the JIA) to allow participation from a wider body of stakeholders including business owners and tourism operators (Liebenberg, pers. comm. 2007).

Finally, the turbulent relationship between the LHWC and communities affected by the construction of the joint project is well documented (and will be discussed in more detail in chapter 7). The network between the LHDA and affected communities started off poorly with little communication between the two groups in the planning and early implementation of Phase 1A (Hoover 2001; Panel of Experts [POE] 2002). Yet after a network of local and international NGOs joined affected communities in launching protests, the parties negotiated new strategies for communication, consultation, and compensation (LHDA 2008; section 7.1.2). It has yet to be seen how the evolving network between the LHDA and various stakeholders will influence the implementation of Phase 2 of the LHWP.

#### **6.4 Financial Resources**

Finally, financial capital is widely regarded as a critical component of adaptive capacity (Allan 2001; Turton and Ohlsson 2000; Yohe and Tol 2002). Levels of economic development in the Orange-Senqu basin states vary greatly, affecting the distribution of wealth and the capacity of each country individually to recognise and respond to changing circumstances (section 4.2.2). South Africa's relatively high gross domestic product (GDP), for example, enables the country to invest in human, technological, and infrastructure resources to support advanced water management and adaptation at a level beyond that of its neighbouring states. Cognisant of this interstate disparity, this chapter examines two additional facets of financial resources affecting adaptive capacity in the basin: the effect of the water regime on cost saving and revenue generation and access to financing for transboundary water governance initiatives.

Joint governance initiatives in the Orange-Senqu basin contribute variably to the financial resources available to the riparian states (table 6.6). At the basin level, ORASECOM has yet to make major, on-the-ground impacts, but it has contributed to cost savings by engaging parties in joint studies (Tompkins 2007). At the project level, the joint governance of the VNJIS allowed farmers on both sides of the border to continue production after Namibia gained independence. Agricultural production and employment linked to the scheme contribute only marginally to national incomes in South Africa and Namibia, but they make a significant impact on the producers and labourers in the border region (PWC 2005). The LHWP, by contrast, contributes more substantially to resource generation for upper riparian states by enabling a reliable supply of water to support agricultural, mining, and industrial production in South

Africa and generating hydropower and royalty payments for Lesotho (LHDA 2008). The allocation of water and related benefits at the national and subnational levels is discussed in more detail in chapter 7.

**Table 6.6** Impact of joint water governance initiatives on cost savings and revenue generation in the Orange-Senqu basin.

<b>Joint Initiative</b>	<b>Resource Generation</b>	<b>External Factors</b>	<b>Remaining Barriers</b>
Studies	Cost saving	Donor funding	Eliminating overlap & redundancy
VNJIS	Continued water delivery/agriculture production	Processing/marketing	Allocating water within the scheme
LHWP	Royalties, hydropower and infrastructure to Lesotho; reliable water supply to South Africa	Additional water transfers	Phase 2: compensation/distribution of wealth

*Note:* LHWP = Lesotho Highlands Water Project, VNJIS = Vioolsdrift and Noordoewer Joint Irrigation Scheme

Over the last four decades, the Orange-Senqu water regime has played an important role in attracting investment and donor support in the basin and the region. In the early 1980s, the partnership between Lesotho and South Africa opened doors to financing from the World Bank and other international donors that otherwise might have been impossible given sanctions against the apartheid regime (Hoover 2001). Moreover, since 2000 and the establishment of ORASECOM, the Orange-Senqu basin has attracted substantial support for transboundary water governance initiatives from multiple international partners (SADC 2008; table 6.7).

Donor support in the basin bolsters the resources available to ORASECOM, in particular, and helps to facilitate adaptation by financing joint studies, meetings, trainings, and workshops. Yet basin managers also report duplication and overlap as a

result of the influx of external donor partners with some suggesting that donor saturation diminishes adaptive capacity in the basin. Furthermore, as Chapter 8 explains in greater detail, donor initiatives in the basin tend to focus on technocratic approaches to enhancing cooperation and overlook the political barriers constraining adaptive capacity in the basin.

**Table 6.7** Donor contributions to the Orange-Senqu River Commission 2007–2012.

<b>Donor Organisation</b>	<b>Priority Themes</b>	<b>Contribution (USD)</b>
European Union	Institutional strengthening, capacity building, information systems, conservation, and environmental strategies	2,170,101
German Technical Cooperation Agency	Institutional strengthening, capacity building, shared information systems, conservation, and environmental strategies	4,080,808
French Global Environment Facility	Joint studies, information systems, capacity building, conservation, and environmental strategies	964,646
United Nations Development Program and Global Environmental Facility	Institutional strengthening, capacity building, shared information systems, conservation, and environmental strategies	2,571,679
United Kingdom's Department for International Development	Delegated support to German Technical Cooperation Agency	5,050,505

*Source:* Data taken from ORASECOM 2009. *Note:* USD = United States Dollar

## **6.5 Cumulative Effects on Adaptive Capacity**

The previous four sections have shown that the Orange-Senqu water governance regime both enables and constrains different aspects of adaptive capacity. Table 6.8 provides a summary of the regime's positive and negative effects on institutional flexibility, information management, actor networks, and financial resources.

In terms of institutional flexibility, the analysis showed that the formal treaties do not restrict the ability of riparian states to recognise and respond to changing

circumstances. They contain multiple flexibility mechanisms. Joint authorities were granted broad powers for adapting management strategies and joint commissions were granted broad mandates to advise on all matters deemed important to cooperating parties. However, discursive structures established by South Africa, which keep major, bilateral, infrastructure projects beyond the realm of acceptable discussion at ORASECOM meetings, limit the opportunities for meaningful basin-wide planning, and consequently, constrain the ability of riparian states to recognise and respond to changing circumstances. This finding also challenges the assumption held by many donor organisation that ORASECOM serves as the overarching planning organisation in the basin.

**Table 6.8** Cumulative effects of the Orange-Senqu water regime on adaptive capacity in the basin.

Component	Regime Contributions	
	(+)	(-)
Institutional Flexibility	<ul style="list-style-type: none"> <li>• Multiple flexibility mechanisms embedded in basin treaties</li> <li>• Joint authorities granted broad powers for adapting management strategies</li> <li>• Joint commissions granted mandate to advise on all matters deemed important to cooperating parties</li> </ul>	<ul style="list-style-type: none"> <li>• Discursive structures prevent basin-wide dialogue regarding major infrastructure in the basin, restricting ORASECOM's advisory ability</li> </ul>
Information Management	<ul style="list-style-type: none"> <li>• Procedural compliance with exchange requirements</li> <li>• Overall increase in openness</li> </ul>	<ul style="list-style-type: none"> <li>• South Africa and Lesotho rejected Namibia's request to participate in the LHWP's Phase 2 discussions</li> </ul>
Actor Networks	<ul style="list-style-type: none"> <li>• Strengthening of interstate networks of government water officials</li> </ul>	<ul style="list-style-type: none"> <li>• South Africa and Lesotho privilege bilateral networks, limiting strategic planning at the basin-wide level</li> </ul>
Financial Resources	<ul style="list-style-type: none"> <li>• Joint studies save money</li> <li>• Joint projects make major (i.e., LHWP) and minor (i.e., VNJIS) contributions to national wealth</li> <li>• Cooperative governance arrangements help states secure financing and donor support</li> </ul>	<ul style="list-style-type: none"> <li>• The LHWP, while mutually beneficial at the national level, is not necessarily a win-win scenario at the regional or subnational level</li> <li>• Donor saturation in the basin leads to overlap and duplication of efforts to support adaptive management</li> <li>• Donor initiatives tend to overlook the political barriers constraining adaptive capacity in the basin</li> </ul>

*Note:* LHWP = Lesotho Highlands Water Project, ORASECOM = Orange-Senqu River Commission, VNJIS = Vioolsdrift/Noordower Joint Irrigation Scheme.

The analysis of information management showed that the water governance regime made important contributions to data collection and exchange. Parties have largely complied with procedural requirements for data sharing and prior notification of projects in the basin. Yet there is a reluctance to engage the basin-wide commission in discussions about bilateral infrastructure projects and refusal to allow Namibia to participate as an observer in Phase 2 deliberations regarding the LHWP. The recalcitrance signals limitations to the willingness of upstream riparians to share information openly.

A similar trend emerged in the analysis of actor networks. Overall, the water governance regime contributed to the strengthening of relationships and communication between basin managers in all four riparian governments. Efforts to avoid undue interference with the LHWP, however, meant that Lesotho and South Africa privileged bilateral networks as the primary means for water resources planning.

In terms of wealth and financial resources, collaboration between riparian states has contributed to various levels of cost savings and revenue generation. The costs and benefits of transboundary water cooperation, however, have not always been distributed evenly at the subnational scale (see section 7.1.1). The ORASECOM's formation has also attracted significant financial support from bilateral and multilateral donors. However, as chapter 8 discusses in more detail, donor initiatives tend to focus on technocratic approaches to enhancing cooperation and overlook the political barriers constraining adaptive capacity in the basin.

Overall, the hypothesis that ongoing, hydropolitical cooperation enhances adaptive capacity by enabling information exchange and use and facilitating joint planning cannot be fully corroborated. Although the regime contributes to both to a certain degree, discursive governance structures limiting the scope of discussions within ORASECOM constrain the parties' abilities to recognise and respond to changing circumstances and engage in joint planning at the basin scale.

## 6.6 Causal Factors

Multiple factors contribute to the Orange-Senqu water governance regime's influence on adaptive capacity components (table 6.9). This section takes a closer look at the influences of power asymmetry, problem structure, expert networks, and political context on the ability of riparian states to recognise and respond to changing circumstances in the basin.

**Table 6.9** Factors enabling and constraining adaptive capacity in the Orange-Senqu basin.

<b>Component</b>	<b>Enabling Factors</b>	<b>Constraining Factors</b>
Institutional flexibility	Uncertainty	Power/interests
Information management	Riparian resources External support Political context	Riparian resources Power/interests
Actor networks	Institutional design External support	Institutional design Riparian resources Power/interests
Financial resources	Institutional design External support	Institutional design Riparian resources Power/ interests

### *Power Asymmetry*

Power asymmetry in the Orange-Senqu basin plays a significant role in shaping the water regime's effects on adaptive capacity. This section takes a deeper look at the

political nature of flexibility mechanisms, information management, actor networks, and financial resources and examines how South Africa's dominance in the basin influences each core component of adaptive capacity. It illustrates the South African government's behaviour as both a pusher and a laggard with respect to different aspects of information sharing and joint planning, and discusses the implication of this behaviour for the prospects of recognising and responding to changing circumstances in the basin.

First, the formal governance structures comprising the Orange-Senqu water regime contain ample flexibility mechanisms that provide riparian states with opportunities to recognise and respond to changing circumstances over time. However, the ability to invoke and operationalise these mechanisms is dependent on power endowments and political negotiation. South Africa's dominance in the basin has allowed the hegemon to invoke certain flexibility mechanisms embedded in the institutional structure while obstructing others. For example, South Africa delayed discussions of Phase 2 of the LHWP after recalculating projected water demands and determining that additional supplies would not be necessary until 2020 (Government of South Africa 2008; section 6.1, 7.1.2). Using a combination of hegemonic tactics including silence and sanctioned discourse however, South Africa also obstructs the ability of ORASECOM to advise riparian governments on "any matter deemed important" by restricting the scope of discussion in the basin-wide forum. These covert efforts to shape the decision-making process are often overlooked by donors and analysts who assume that ORASECOM serves as the overarching planning organisation in the basin (Malzbender and Earle 2009; French Global Environment Facility [FFEM] 2009).

Second, decisions about whether and how to collect and exchange information related to shared water resources are fundamentally political and driven by the power and interests of riparian parties. South Africa can be seen as both a pusher and a laggard in this area. Given the importance of transboundary water resources in sustaining its economy, the South African government has long prioritised the collection of data and information related to water resources and continues to lead globally in the development of highly sophisticated tools for adaptive water management in arid and semiarid climates (Tompkins 2007). Since the transition to democracy in 1994, South Africa has complied with its commitments to transparency and regional cooperation by sharing existing data, leading joint studies, and offering free personnel training and technology transfers to other water ministries within the SADC (Biggs, pers. comm. 2007; van Niekerk, pers. comm. 2007). Together, these efforts have had a substantial impact on the breadth, depth, and compatibility of water resources information in the region. Yet, the refusal to engage in project discussions at the basin-wide level and the reluctance to include Namibia at the table for discussions regarding Phase 2 of the LHWP signals limitations to South Africa's willingness to share information openly.

Third, South Africa's relative power endowments and the use of utilitarian tactics allow the hegemon to choose what kind of actor networks to pursue and privilege. South Africa's strong bilateral alliance with Lesotho and the benefits provided by the hydrohegemon to the upstream riparian state have made Lesotho a significant ally to South Africa in the perpetuation of the bilateral planning model. The potential provision of water supplies from the LHWP through a bilateral deal with South Africa

has also rendered Botswana unlikely to push for more substantive engagement at the basin scale. South Africa also uses discursive tactics to downplay the significance of Namibia's request for observer status while emphasising its procedural compliance with notification and exchange requirements, and the basin-wide benefits generated by the LHWP.

Finally, in terms of attracting and securing international financing and donor assistance, South Africa plays an interesting role. Following its transition to democracy in 1994, international donors sought to engage in a wide range of national and regional issues. In addition to democratisation, donors viewed water resources management as a critical action area linked to issues of growth, poverty, health, redistribution, and capacity building. As such, officials within the South African DWAF have been able to leverage strong relationships with international donors to secure financial support for transboundary water governance initiatives.

However, South Africa's relative wealth in the region also makes them more of a laggard when it comes to the general pursuit of international donor funds. As a result, when donor saturation emerged as an issue in the Orange-Senqu basin, members of the South African delegation felt more comfortable speaking up on the issue. As one official noted anonymously, "They are less dependent on donor assistance than we are so it's easier for them to recognise the point when too much help becomes counterproductive." Indeed, while the smaller states in the basin perceive themselves to need donors to cover the cost of both domestic and international water projects, the perception among many South African representatives is that the dependence runs the

other way (i.e., that the donors actually need recipients of funds to endorse and legitimise their projects). This dynamic has allowed South Africa to take the lead in demanding better coordination among donor partners to avoid the duplication and overlap of transboundary water governance initiatives. This dynamic will be discussed in more detail in chapter 8. Overall, analysing the influence of power asymmetries on adaptive capacity in the Orange-Senqu basin illuminates South Africa's significant ability to control the agenda and shape boundaries for discussion and planning.

### *Problem Structure*

Intertwined with the influence of power asymmetry, the combination of interest asymmetry and uncertainty and commitment requirements also play an important role in shaping the influence of the Orange-Senqu water regime on adaptive capacity.

The analysis of the Orange-Senqu water governance regime's effects on adaptive capacity demonstrated that the competing interests that characterised the formation of ORASECOM (i.e., Namibia's desire for basin-wide planning and South African interest in maintaining bilateral organisations as the core planning mechanisms) continue to influence the implementation of governance arrangements. As chapter 5 described, South Africa acted as a pusher in establishing bilateral institutions in the basin (e.g., the LHWC and PWC) but engaged in ORASECOM's formation as a more reluctant participant due to its lack of interest in planning or allocating water at the basin-wide level. Since the basin-wide Commission emerged in 2000, South African delegates to ORASECOM have been active participants in meetings and activities, and

they contribute significantly to strengthening the professional relationships between political and technical representatives in all four riparian states. In terms of strategic planning, however, the South African government continues to privilege the bilateral network upstream.

Unpacking the components of problem structure reveals that South Africa's preference for bilateral planning is linked to both commitment requirements and uncertainty associated with the prospect of basin-wide planning. As section 6.2 demonstrated, parties have performed well in collecting and exchanging information when commitment requirements are perceived to be low (e.g., the execution of joint studies or the compilation of existing information). However, when commitment requirements are perceived as more substantial (e.g., establishing a basin-wide data protocol, opening Phase 2 discussions, or engaging in planning at the basin level) progress has been blocked, stalled, or slower to materialise. Combined with the high levels of normative uncertainty and the intangibility of what basin-wide planning might entail, the perception of high commitment requirements contributes to South Africa's zero-sum mentality. They are concerned that efforts to engage in significant planning or water allocation at the basin scale will threaten their current and future access to water resources.

Recognising the existence of interest asymmetry within the wider context of riparian cooperation draws attention to the fact that problem structures are not always resolved in the formation of agreements and organisations. Consequently, efforts to motivate a hydrohegemon's engagement in certain issues may require the structuring of

incentives and the adjustment of commitment requirements in a way that entices powerful actors to take part in envisioning a more regional approach.

### *Expert Networks*

Adaptive capacity in the Orange-Senqu basin has been influenced by two primary clusters of expert networks: private consultants and donor organisations. Both of these networks have played a significant role in enabling the collection, exchange, and utilisation of information in the basin. Experience from the Orange-Senqu basin, however, cautions against broad assumptions that involvement by expert networks will necessarily bolster the implementation of transboundary water governance arrangements.

Like the riparian states, the quasi-internal network of consultants operating in the Orange-Senqu basin also demonstrated reluctance to share information openly with competitors in their field. This can diminish the ability of riparian states to recognise and respond to changing circumstances. Although the data and information collected through joint studies technically belongs to the joint commissions and contracting states, the capacity to interpret, utilise, and integrate the data frequently lies outside of riparian governments and within the consulting firms.<sup>43</sup>

Donor organisations within the basin have also played a substantial role in decreasing informational uncertainty through the financing of joint studies. However, less

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<sup>43</sup> On a practical level, this draws attention to the need for bolstering linkages between the departments of water affairs and the consulting firms and curbing the high rates of staff turnover within government ministries.

attention is paid to the political barriers obstructing issues like basin-wide planning. Without acknowledging or addressing these important obstacles, interventions by this network may simply reinforce the status quo.

### *Political Context*

The shift in politics following South Africa's transition from apartheid to democracy contributed significantly to the levels of openness between riparian states and their opportunities and willingness to exchange information. This has increased adaptive capacity in the basin by allowing states to construct a more complete picture of basin resources and changing circumstances. Increasing levels of regional integration have not, however, significantly increased South Africa's willingness to engage in planning at the basin level, which limits the extent to which adaptive capacity can be achieved.

### **6.7 Conclusion**

This chapter set out to analyse the effects of the Orange-Senqu transboundary water governance regime on adaptive capacity by examining the influence of international water management institutions and interstate interactions on treaty flexibility, information management, actor networks, and financial resources. It showed that the water governance regime has both enabled and constrained adaptive capacity in the basin. While international water management institutions and riparian interactions have made valuable contributions to information exchange and joint planning, discursive structures limiting the scope of discussions within ORASECOM constrain the parties' abilities to recognise and respond to changing circumstances and engage in joint planning at the basin scale.

The analysis further illustrated how power asymmetry, problem structure, expert networks, and political context all influenced adaptive capacity in the basin. What this analysis suggests is that efforts to envision alternatives to the current planning model in the Orange-Senqu basin and influence change will require a firm understanding of the multilayered and power-laden processes that influence the negotiation and implementation of transboundary water governance regimes.

## **CHAPTER 7: ALLOCATION OF WATER AND RELATED BENEFITS**

### **Introduction**

Previous chapters have already touched on allocation issues in the Orange-Senqu basin. Chapter 5 illustrated the causal factors shaping the negotiation and content of key international treaties, and chapter 4 showed that, although project-related treaties in the basin specify volumetric water allocation requirements and joint commissions articulate a commitment to equitable and reasonable utilisation, the riparian parties have yet to specify water entitlements for the basin as a whole.

This chapter takes a deeper look at the distributional effects generated by the Orange-Senqu water regime. It challenges popular perceptions of the regime as a win-win scenario by exposing the negative impacts of interstate cooperation at the subnational level and highlighting the asymmetries underpinning the persistent uncertainty about water allocation at the bilateral and basin-wide levels.

### **7.1 Allocation at National and Subnational Scales**

The celebration of mutual benefit from international water agreements is most pronounced within the LHWP, which is frequently described by basin managers, prominent politicians, and analysts as an exemplary win-win scenario (Mirumachi 2006; Lindemann 2008). Lesotho's minister of natural resources and the environment described the LHWP as "a smart partnership between small and big, between less and more developed . . . where no one loses and both countries benefit" (Mokhehle 1997, 2). At the opening of Katse Dam in 1998, the South African president, Nelson

Mandela, remarked, “Here in southern Africa we have worked for our mutual benefit. We have turned a scheme conceived in the previous unhappy era of our region’s history into a fine instrument for development and progress for all” (Mandela 1998, 1). A decade later, announcing plans to proceed with Phase 2 of the LHWP, South Africa’s water minister, Lindiwe Hendricks, again emphasised the “mutual benefit” of the joint project, not only for South Africa and Lesotho, but for the region as a whole (Government of South Africa 2008, 2).

That emphasis on the mutual benefit provided by the LHWP suggests resoundingly successfully water cooperation free from negative effects, discontentment, or related disputes. This section, however, draws attention to the varied subnational impacts of the project and the layered asymmetry in power and interests shaping its observed outcomes.

### ***7.1.1 Institutional Performance***

The governments of South Africa and Lesotho designed the LHWP to achieve three primary distributional goals: to deliver water to South Africa and to generate hydroelectricity and revenue for Lesotho (see chapter 5). At the time the project treaty was signed, the parties also committed to maintaining the affected populations’ standards of living and mitigating adverse impacts on the environment (table 7.1)

**Table 7.1** Commitments to social and environmental protection within the Lesotho Highlands Water Project.

Document	Commitment
1986 Treaty, Article 7	“The LHDA shall effect all measures to ensure that members of the local communities in the Kingdom of Lesotho, who will be affected by flooding, construction works or similar project-related causes, will be able to maintain a standard of living not inferior to that obtaining at the time of the first disturbance, provided that such Authority shall effect compensation for any loss to such member as a result of such project related causes not adequately met by such measures.”
LHDA Order, Article 15	“The Parties agree to take all reasonable measures to ensure that the implementation, operation and maintenance of the Project are compatible with the protection of the existing quality of the environment and, in particular, shall pay due regard to the maintenance of the welfare of persons and communities immediately affected by the project.”

*Note:* LHDA = Lesotho Highlands Development Authority.

The following analysis shows that by the completion of Phase 1, the LHWP fulfilled general expectations for water delivery, power production, and revenue generation. The performance of the parties’ with regard to social and environmental commitments, however, proved less successful. Although the distribution of costs and benefits at the national level proved mutually beneficial, the LHWP’s effects at the subnational level have been more skewed.

### *Project Overview*

In the 1986 treaty, the parties committed to constructing the first phase of a potentially four-phase project. Phase 1A, built between 1988 and 1997, included the 185-metre-high, concrete Katse Dam; the 72 Megawatt, Muela hydropower station; a network of transfer and delivery tunnels; and a range of supplementary infrastructure. Phase 1B, constructed between 1997 and 2004, consisted of the 145-metre-high, rock-fill Mohale Dam; the Matsoku Weir; transfer and delivery tunnels; and supplementary infrastructure. Phase 1’s projects deliver approximately 29 m<sup>3</sup> per second to South Africa’s Gauteng province (LHDA 2006).

The project is overseen by the binational Lesotho Highlands Water Commission (LHWC). It is managed and implemented by the Lesotho Highlands Development Authority (LHDA) in Lesotho and the Trans-Caledon Tunnel Authority (TCTA) in South Africa. As per the cost-sharing agreement discussed in chapter 5, the countries divided project expenses based on each party's demand for different components of the scheme (Treaty 13, 1986, protocol III–IV). South Africa covered all water delivery costs, which totalled roughly 1.56 billion USD for Phase 1A and 1.06 billion USD for Phase 1B. Lesotho covered all expenses related to the construction of the hydroelectric dam, which amounted to 195 million USD (Wallis 2000; World Bank 2007).

#### *Water, Electricity, and Revenue*

At the completion of Phase 1, the project fulfilled general expectations for water delivery, revenue generation, and power production, providing significant ongoing benefits to both countries (tables 7.2 and 7.3). South Africa benefits from a secure water supply for Gauteng province, which encompasses roughly 70% of the national work force and produces over 40% of the country's GDP (TCTA-LHDA 2003). Estimates suggest that the augmented water supply from the LHWP helped South Africa avoid costly water shortages that could have cost the country between 244 million and 1.3 billion USD per year (TCTA-LHDA 2003). Indirectly, South Africa also benefited from employment opportunities generated by the LHWP and the high demand for project-related exports (LHDA 2005).

**Table 7.2** Water deliveries and royalty payments between 1999 and 2005.

Year	Anticipated delivery (million m <sup>3</sup> )	Actual delivery (million m <sup>3</sup> )	Variance in delivery (%)	Royalty payments (million USD)
1999/2000	538	540	0.4	23.97
2000/2001	573	574	0.2	25.78
2001/2002	591	584	-1.2	30.66
2002/2003	615	585	-4.9	33.59
2003/2004	695	687	-1.2	33.90
2004/2005	695	693	-0.3	36.88

*Source:* Data obtained from LHDA 2003 and LHDA 2005. *Note:* USD = United States Dollar.

For Lesotho, the project generates substantial government revenue. The government receives between 45 and 47 million USD per year in water royalties as a result of Phase 1, which accounts for roughly 2–3% of Lesotho's total GDP (LHDA 2005). The government also benefits from the sale of electricity domestically to the Lesotho Electricity Corporation (LEC) and across the border to South Africa (table 7.3). During the construction of Phase 1B, estimates suggested that the project contributed an additional 42.4 million USD to government revenue as a result of project-related taxes and duty receipts (LHDA 2005). In addition to these primary benefits, the project also provided Lesotho with paved roads, bridges, and clinics and generated a wide range of job opportunities from engineering contracts to manual labour for citizens of both Lesotho and South Africa (Hoover 2001).

**Table 7.3** Hydroelectric power production at Muela Dam and related energy sales.

Year	Anticipated generation (GWhrs)	Actual generation (GWhrs)	Variance in generation (%)	LEC sales revenue (million USD)	% Exports of total production
1999/2000	369	386.44	4.7	6.79	16.8
2000/2001	387	371.57	-4	7.19	3.4
2001/2002	391	372.95	-4.6	7.30	5.6
2002/2003	389	377.93	-2.8	7.05	9.4
2003/2004	436	428.79	-1.7	7.94	9.3
2004/2005	424	419.83	-0.9	9.19	0.6

*Source:* Data obtained from LHDA 2003 and LHDA 2005. *Note:* GWhrs = GigaWatt hours, LEC = Lesotho Electricity Corporation, USD = United States Dollar.

### *Social and Environmental Protection*

Despite the generation of these important benefits at the national level, the LHWP proved less successful in fulfilling its obligations for maintaining the social welfare of affected populations and minimising environmental impacts. Thus, while the project had positive effects at the national level, the distribution of costs and benefits at the subnational level was mixed, with many individuals and communities feeling worse off.

The LHWP directly affected 1,883 households in the vicinity of Katse Dam, 489 near Muela and 802 near Mohale (LHDA 2003). Studies showed that an additional 155,000 people located downstream of the project dams were affected by diminished in-stream flows (LHDA 2002b). The LHDA deployed four core programmes to address these social and environmental impacts (table 7.4). Although each of these programmes made some impact on social and environmental protection, the efforts were, in general, poorly planned and implemented. Consequently, they failed in many cases to meet targets for livelihood maintenance and impact mitigation (Mafisa 2003; World Bank 2007).

**Table 7.4** Lesotho Highlands Development Authority programmes designed to fulfil the social and environmental obligations of the Lesotho Highlands Water Project (LHWP) treaty.

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**Compensation and Resettlement Policy:** Launched in 1987, it entitled individuals to yearly deliveries of maize and beans over a 15-year period to compensate for crops lost to construction and inundation. New houses were provided, and one-time payments were made for small plots, commercial property, and residential gardens.

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**Water Revenue Development Fund:** Introduced in 1991, it was designed to invest water royalties in the provision of basic services (e.g., potable water, sanitation, clinics, and schools) for communities affected by the LHWP construction.

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**Rural Development Program:** Initiated in 1992, it aimed to provide skills training to help displaced and affected individuals diversify their income generating opportunities.

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**Natural Environment and Heritage Plan:** Started in 1992, it was charged with mitigating the effects of LHWP construction on the natural environment and cultural heritage sites.

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The Compensation and Resettlement policy was revised in 1997 and 2002 to extend the provision of grains for those who had lost crop-land from 15 to 50 years, allow for annual or lump sum cash payments, and compensate for lost communal resources (LHDA 1997; LHDA 2002a). Implementation of the policy, however, continued to suffer. Drastic underestimations of the number of households affected by the project infrastructure contributed to rushed resettlement efforts and the slow disbursement of compensation payments (Hoover 2001; Mafisa 2003; Scudder 2005).

The Water Revenue Development Fund succeeded in supplying water, sanitation, education, and health facilities to some highland communities but repeatedly fell short of its service provision targets. It was rated “highly unsatisfactory” by the World Bank for poor project planning and implementation. After a failed attempt to restructure and improve performance in 1999, the fund closed in 2003 (World Bank 2007, 19).

The Rural Development Programme (RDP) suffered from a slow start and limited implementation in resettled highlands communities. It generated little impact on the expansion and restoration of incomes and livelihoods (Horta and Pottinger 2006; Tilt, Braun, and He 2009). In 1995, the World Bank’s POE found it “hard to detect any economical effects of the Rural Development Programming” (POE 1995, 34). A follow-up evaluation of the RDP one year later showed that “although there is some potential for the program in the Highlands, it cannot be trusted to restore incomes and

sources of livelihoods as required by the treaty and Bank resettlement policy” (POE 1996, 24).

The Natural Environment and Heritage Plan succeeded in the establishment of environmental reserves within Lesotho, but inadequate in-stream flow requirements (500 litres per second downstream of Katse Dam and 300 litres per second downstream of Mohale Dam) contributed to severe impacts on water quality and ecological resources downstream of project infrastructure. It also had substantial welfare effects for over 39,000 people living within 100 km downstream of the LHWP infrastructure (LHDA 2002b). Augmented in-stream flows to ameliorate downstream impacts commenced in 2003.

Efforts to track the distributional effects of the LHWP at the subnational level are complicated by the lack of baseline data reflecting affected individuals and communities’ standards of living prior to the construction and inundation of the dams. Without this information, it is difficult to rigorously assess the direct and indirect impacts of resettlement and compensation on specific individuals, households, or communities (LHDA 2000). Nevertheless, surveys analysing broad trends in average income and studies tracking small groups of households and affected communities provide insight into the mixed impact of the project on the affected populations’ livelihoods.

National surveys conducted after the completion of Phase 1A showed that the average income of households affected the Katse and Mohale dams declined (LHDA 2000).

What this suggests is that in the early phases of implementation, the parties failed to maintain the standard of living as it was articulated they would in the LHWP treaty. However, the decline in average income observed between 1986 and 1995 is unlikely the result of the LHWP alone. The average annual income for control populations (i.e., highland communities not affected by the dam) declined at a similar rate (LHDA 2000). The general rise in rural poverty during this period is attributed to a combination of South African mine retrenchment and the corresponding loss of remittances, the rising rates of HIV/AIDS, and the occurrence of extended droughts (Sechaba Consultants 2000; May et al. 2000; Gill-Wason 2004).

Studies focused on tracking changes in consumption, employment, service provision, and subjective well-being for smaller sets of households and communities showed that some individuals and households believed they were better off as a result of the project while many others believed their standard of living had declined (Matlosa 1998, 2000; Stott, Sack, and Greeff 2000; Thabane 2000; Tshabalala and Kisubi 2003; Braun 2006; Thamae and Pottinger 2006; Kotelo-Molaoa 2007; Tilt, Braun, and He 2009). Studies also reported decline in income sources and consumption and psychological effects from social networks loss and host-settler conflicts. Thus, although it is clear that the LHWP produced mutual benefits at the national scale, poor institutional performance regarding social and environmental protection left many individuals and communities feeling worse off because of it.

### ***7.1.2 Explaining Outcomes***

Asymmetric power and interests at the national and subnational level heavily influenced the allocation of water and related benefits within the LHWP. Weaker parties (i.e., Lesotho at the national level and affected communities at the subnational level) were able to mobilise bargaining and ideational power to affect the flow of resources. As the parties moved into negotiations for Phase 2, however, South Africa leveraged ideational power to re-exert its control.

Throughout the implementation of Phase 1, South Africa's primary objective was to ensure the maximum delivery of water resources at minimum cost. Lesotho, in contrast, sought to maximise the resources flowing into it in exchange for the water flowing out. The struggle to achieve these competing interests reflected Warner's (2005) observation that downstreamers use power to get more water, and upstreamers use water to get more power.

South Africa's focus on augmenting water supplies made infrastructure and engineering top project priorities. From the early stages of project design, the resources dedicated to social and environmental protection paled in comparison with those dedicated to the technical challenges of water delivery and hydropower production (Tompkins 2007). Thus, the countries paid far less attention to investigating the social or environmental characteristics of the basin, though they did hire a cadre of consultants to undertake extensive and detailed surveys of the geological and hydrological characteristics of the same locale. The lack of energy and expertise dedicated to the assessment of possible social and environmental impacts

contributed to a weak understanding of the affected populations' baseline characteristics and poorly tailored programmes to assist them.<sup>44</sup>

South Africa's efforts to minimise project costs further constrained the scope of compensation offered to affected individuals and delayed the design and implementation of supplementary programmes aimed to aid them in generating income and maintaining livelihoods. In the early years of implementation, the South African delegation to the LHWC repeatedly refused responsibility for cofunding the RDP. Compensation alone, they argued, would be sufficient for meeting their obligations under the 1986 treaty (POE 1989, 6; Scudder 2005, 12).

Despite South Africa's relative power advantage, Lesotho leveraged a range of resources to secure cofinancing from South Africa for the RDP and additional government revenue streams from customs and tax agreements. Drawing on a combination of the power in its upstream position, South Africa's urgency for water resources, fear of project delays, and growing evidence from the World Bank that compensation alone was an insufficient strategy for restoring livelihoods (see Cernea 1990), Lesotho convinced South Africa to match its 2.93 million USD contribution to the RDP (Scudder 2005).

Negotiation assistance from international consultants also helped Lesotho secure favourable arrangements in terms of customs duties accrued from LHWP-related

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<sup>44</sup> The original estimate was that only 495 people would need to be resettled for Phases 1A and 1B, with a total of 1,365 requiring resettlement for Phases 1, 2, and 3 combined. Yet over 3,000 people were relocated in Phase 1 alone (Scudder 2005). Hoover (2001) illustrated how the miscalculation of affected households contributed to rushed resettlement and delayed compensation.

imports (Treaty 13, 1986, protocol II) and tax revenue from LHWP labour and expenditures (Treaty 13, 1986, protocol V; Lesoma, pers. comm. 2007). After South Africa's transition to democracy, Lesotho also leveraged the notion of reciprocity to encourage continued support for the LHDA's social and environmental programmes. The reciprocity narrative was grounded in stories of sacrifice made by the Basotho people on behalf of the ANC members hiding during apartheid. "Many here took substantial risks to provide safe haven for our neighbours," explained Manuel Lesoma, Lesotho's water commissioner. "As a result we expected and asked for some special consideration in return" (pers. comm. 2007).

Understanding the power dynamics at the binational level, however, provides only a partial explanation of the negative impacts generated by the LHWP subnationally. For deeper insight, we must also look to patterns of coercion, consent, and resistance between the government of Lesotho and the LHWP-affected populations.

In Lesotho, efforts to maximise resources flowing into the country required property appropriation and households and communities' displacement. The government of Lesotho succeeded in capturing these resources and coercing community consent through promises of compensation and a discursive emphasis on contributions to the greater good (i.e., that resettlement would enable the development and prosperity of the country as a whole). After South Africa's transition to democracy, the LHDA also emphasised that cooperation in the resettlement process was required for the good of South Africa and the stability of the region. As Malisemelo Tau, an individual displaced by the construction of Phase 1B, explained it, communities were told that

their move would save lives in South Africa and enable their neighbour's factories and industries to continue to produce (Thabane 2000, 56). Similarly, Lesotho's minister of natural resources told participants at a 1997 workshop on the social and environmental impacts of the LHWP

In Basotho culture and custom, when a neighbour asks for water, he is not denied water because water is life. In the same token, considering our country has water as an abundant and most important natural resource, our neighbour, the Republic of South Africa, needs our help. It needs water for the development of its industry and to meet the water demands of millions of its people who were denied access to drinking water under apartheid. (Mokhehle 1997, 1)

Shortcomings in the design and implementation of social programmes within the LHDA were linked to the government's primary focus on revenue-generating activities, a disconnect between the central government and rural communities, and the diversion of resources intended for affected communities for personal or political gains (Horta and Pottinger 2006; World Bank 2007). Designed from desk studies, the original compensation policy reflected only a partial understanding of livelihood portfolios including assumptions that highland communities had little or no exposure to cash economies (LHDA 1997; Thlomola, pers. comm. 2008). Yet households in affected communities had long relied on remittances from wage labour in South African mines and on the commercial, albeit clandestine, sale of marijuana. They were no strangers to monetary currency (Ramoetlets, pers. comm. 2008). Such assumptions, and the general lack of prior consultation with affected communities,

compromised the design of compensation policies, livelihood rehabilitation programs, and rural investment funds.

Though relatively weak in relation to the LHDA, affected communities, in conjunction with an advocacy coalition of local and international NGOs, leveraged their own power endowments to influence the scope and implementation of social and environmental programmes. Though coalition members<sup>45</sup> maintained different interests and objectives (international organisations tended to be more anti-dam than local organisations), the group coalesced around a common desire to ensure that “the individuals who paid the greatest cost for the project received appropriate and promised compensation” (Seqhee, pers. comm. 2007). By monitoring the implementation process, facilitating intercommunity communication, mobilising protests, and orchestrating international awareness campaigns, the coalition drew attention locally and globally to the gaps between resettlement and compensation promises and actual service and payment deliveries (Meissner 2005). Together with communities, the advocacy coalition proposed alternative compensation strategies and lobbied the LHDA directly and indirectly, through pressure on the World Bank to implement policy changes and service improvements (TRC 2006; von Tonder, pers. comm. 2007).

The coalition achieved significant policy adjustments but suffered from what Motlatsi Seqhee, program director for the TRC, one of the leading advocacy organisations in Lesotho, referred to as the “integration of local NGOs into the service delivery

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<sup>45</sup> For a detailed list of coalition members and an analysis of their various interests and roles, see Meissner 2005.

component of the social and environmental action plans” (pers. comm. 2007). Seqhee explained that by offering contracts to local NGOs to assist in project implementation with water safety and swim lessons, agricultural extension services, and financial planning support, the LHDA bolstered its capacity while simultaneously dampening the level of internal criticism. Ben von Tonder, a founding member of the Highland Church Action Group (HCAG) and the current executive director of the Environmental Justice and Advocacy Centre, noted that resources available from external partners for continued advocacy work on behalf of affected populations dwindled after the completion of Phase 1B, “making it difficult for [advocacy groups] to prepare for any sort of proactive role in trying to shape the planning process for Phase 2” (pers. comm. 2008).

At the national level, South Africa’s need for increased water supplies declined over the course of Phase 1 due to a combination of previous miscalculations, demand management, and slow population growth due to high rates of HIV/AIDS (DWA 2004a; Ashton and Ramasar 2002). Recognising that the country would not need additional water supplies until 2020, the South African government delayed the planning and negotiation of Phase 2 (TCTA 2003). This decline in water demand diminished Lesotho’s bargaining power as the sense of urgency in this interim period shifted from South Africa’s need for water to Lesotho’s need for revenue. “It was a stark reminder,” Lesoma explained, “that while we will always be upstream in terms of river flow, South Africa is upstream in terms of cash flow” (pers. comm. 2007).

In the period between calling off negotiations and re-engaging with Lesotho around feasibility studies for Phase 2, the government of South Africa emphasised its access to multiple sources for augmenting the water supply of Gauteng province<sup>46</sup> and its commitment to pursuing the most cost-effective options (Heyns 2003; DWAF 2004a, b; TCTA 2003; Government of South Africa 2008). Made credible by the government's ongoing studies of multiple supply options, this discursive strategy reflected the perception held by many South African officials involved with the negotiation and implementation of the LHWP that South Africa was "outmanoeuvred by Lesotho once the treaty was signed" (Claasens, pers. comm. 2007). "Given the circumstances," explained Ugo Hiddema, a senior lawyer for the TCTA, "Lesotho was able to take advantage of South Africa's urgency for water supplies by introducing multiple additional project costs after the treaty was already signed" (pers. comm. 2007).

The implication of South Africa's strategy to stress their alternative water resources was that Lesotho would have to make a competitive offer for Phase 2 to move ahead. "Making [Phase 2] attractive," suggested Zodwa Dlamini, a South African delegate to the LHWC, "might involve an adjustment in the responsibility for different costs or the reduction in the size of [the LHDA's] staff" (pers. comm. 2007). Although gravity aided the delivery of water in the LHWP scheme, giving the project significant cost advantages over other pumped transfer options, the new discourse proved successful. South Africa's access to alternative supply options surfaced in nearly all my conversations with water officials in Lesotho and reshaped, for many, the way they

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<sup>46</sup> Alternative options included augmenting the Thukela transfer, implementing the Orange-Vaal transfer, or implementing the Mzimvubu scheme (DWAF 2004a, b).

conceptualised Phase 2. Njekwa Mumbuna, manager of strategic and corporate services for the LHDA, stated that “Lesotho has to be careful moving into Phase 2 negotiations . . . given South Africa’s range of options, we may need to come in with an open mind and a blank slate about how we handle the cost of compensation” (pers. comm. 2008).

South Africa has formally committed to moving ahead with Phase 2, but the operational terms of the agreement have yet to be decided. Mumbuna’s comments, however, suggest that South Africa has effectively limited Lesotho’s bargaining options before formal negotiations even begin.

## **7.2 Water Allocation at the Bilateral and Basin Levels**

Like the LHWP, the wider Orange-Senqu water governance regime is often celebrated as a win-win scenario (Conely and van Niekerk 2000; Turton and Funke 2008). Turton and Funke (2008, 60) described the regime as one that produces “mutual benefit for all riparian states.” Among these benefits, they suggested, is Namibia’s secure entitlement to sufficient water resources for current and future needs (63–5). This section challenges that assertion by illustrating the persistent uncertainty about and contested nature of Namibia’s water allocation in the lower basin. It also demonstrates how allocation uncertainty at the bilateral level has stalled cost-sharing agreements for joint infrastructure and the reallocation of water assigned to the Vioolsdrift/Noordoewer joint irrigation scheme (VNJIS).

### *7.2.1 Contested Allocation in the Lower Basin*

A quick read through the PWC's "prefeasibility study into measures to improve the management of the lower Orange River" presents a confusing picture of water allocation in the lower basin (PWC 2005). In section 10 of the study, "full Namibian participation in agreeing to water allocations between RSA and Namibia" was described as a fundamental resources management goal for riparian states (PWC 2005, 29). There is, after all, no formal specification of interstate water allocation in either the 1992 PWC treaty or the 2000 ORASECOM agreement. Yet eight sections later, the PWC study based cost-sharing principles for proposed joint infrastructure on the assumption that "at the time of independence it was agreed that Namibia would receive 50 million m<sup>3</sup>/a from existing infrastructure and South Africa's equitable share of the water resources of the Orange River was 1,999.1 million m<sup>3</sup>/a" (PWC 2005, 68).

These seemingly contradictory statements are not a typographical error. Rather, they represent divergent opinions among the riparian states regarding the nature of water allotments and the meaning of the 50 million m<sup>3</sup> noted in the joint study and referred to in other South African reports (e.g., DWAF 2004b). For South Africa, the 50 million m<sup>3</sup> represents Namibia's equitable entitlement to water resources in the basin. Namibian officials, however, contest this claim. According to Maria Amakali, a deputy director of Namibia's Department of Water Affairs, the 50 million m<sup>3</sup> per year "is not only not equitable, but it was never a formal allocation either" (pers. comm. 2007).

As Piet Liebenberg, a Namibian delegate to both the PWC and the JIA, explained it, the 50 million m<sup>3</sup> per year reflects a calculation of general water use at the time of independence, but does not adequately account for any broader notions of entitlement to water resources or real thought about potential future use within Namibia” (pers. comm. 2007). According to Tertius Basson, a colleague of Liebenberg’s in Namibia’s Department of Agriculture, “the persistent uncertainty about actual water entitlements affects development along [Namibia’s] southern border . . . it’s not just a question of having the water to expand production. The lack of clarity makes it hard to attract business to the border area because our uncertainty about water translates into high risk for them and they decide to look elsewhere to invest” (pers. comm. 2007). This persistent uncertainty regarding bilateral water allocations further complicates the resolution of emerging issues in the VNJIS and the development of a re-regulating dam along the Namibia-South Africa border.

In late 2007, declining water demands within the South African portion of the VNJIS brought forth questions about selling water allocated to the VNJIS. South African farmers within the joint irrigation scheme were interested in selling their excess 2 million m<sup>3</sup> of water per year to South African users upstream for domestic, mining, or irrigation use. Namibian farmers, in contrast, believed the water should remain dedicated to the scheme and be offered to Namibian farmers interested in expanding existing production (Liebenberg, pers. comm. 2007). The treaty establishing the joint scheme provides no specific guidelines for redistributing the allotted water within or beyond the irrigation scheme, leaving the issue open for the parties to discuss and decide. Yet, as representatives from both Namibia and South Africa noted, questions

about reallocation within the joint irrigation scheme are linked to larger questions about the overall division of water resources between the lower riparian states (Basson, pers. comm. 2007; Pyke, pers. comm. 2007). “It’s difficult to determine where this water can go if it’s not being used [within the scheme] because the wider picture of water allocation between states remains unclear” explained Basson.

Uncertainty surrounding interstate allocations is further reflected in the different cost-sharing principles suggested for the joint re-regulating dam proposed by South Africa and Namibia for the common border region. The first option, cost-sharing based on savings from cooperation, divides project costs based on the benefit to each party of not having to build separate dams. The calculations, based on estimated costs, indicate a total benefit of roughly 37.8 million USD (PWC 2005, 70). The result of sharing this benefit is shown in table 7.5.

**Table 7.5** Indicative and percentage costs based on various principles.

<b>Cost- Sharing Options</b>	<b>South Africa</b>	<b>Namibia</b>
1: Savings from cooperation		
Capital cost (million USD)	43.88	47.63
% share	48	52
2a: Incremental use 1990–2025		
Capital cost (million USD)	36.78	54.73
% share	40	60
2b: Incremental use 2005– 2025		
Capital cost (million USD)	43.01	48.49
% share	47	53
3: Partial system use		
Capital cost (million USD)	81.17	10.34
% share	89	11

*Source:* Data obtained from PWC 2005. *Note:* USD = United States Dollars.

The second option, cost sharing based on incremental use, divides the cost of joint infrastructure based on the increase in water use by each party. Given the range of

normative uncertainty regarding water allocation between the lower riparians, identifying the appropriate starting point for calculating incremental water use remains a contentious issue. The study put forth two possibilities, incremental use since 1990, which reflected South African perceptions about the beginning of equitable distribution in the basin, and incremental use since 2005, which came closer to what Namibian officials regard as a fair starting point (Liebenberg, pers. comm. 2007).

The third option, cost sharing based on system use, divided project costs based on the proportion of water used by each country in the portion of the Orange-Senqu basin downstream from Gariep Dam, excluding the Vaal system. According to the PWC (2005, 72) this approach is “commonly adopted by a country when developing the water resources of a basin within its borders . . . this option would not normally be pursued by two independent countries but may be considered in view of the fact that Namibia used to be part of South Africa when the existing water supply systems were developed” (PWC 2005, 73). Taken together, these options illustrate that no simple, value-free formula exists for dividing the cost burden of the joint re-regulating dam proposed by South Africa and Namibia.

Thus far, no specific action has been taken to resolve the allocation of water resources between Namibia and South Africa or the division of costs for joint infrastructure, but a critical look at the underlying principles shaping these options draws attention to the competing discourses the riparian states have leveraged to promote their normative preferences and position themselves for future negotiation.

### *7.2.2 Duelling Discourses*

South Africa's control of water resources in the Orange-Senqu basin reflects a combination of resources capture, normative engagement, and sanctioned discourse. Within the lower basin, this includes a few key, discursive strands. First, South Africa de-emphasised uncertainty (and potentially, inequity) by asserting that equitable distribution already exists (PWC 2005, 68; DWAF 2004a, D14). At the same time, they emphasised their acquired rights by granting Namibia a temporary use allowance of 60 million m<sup>3</sup> per year for use through December 31, 2007 (DWAF 2004a, D14). What better way to show you own something than to give it away, temporarily at least. That allowance not only established South Africa as a generous neighbour but also reinforced two important pieces of their water allocation discourse: (a) Water resources within South Africa are in high demand (which is why the allowance expired in 2007 when the water would be needed by previously disadvantaged communities within South Africa); and (b) Long-term augmentation of water supplies in the lower basin would require investments in new and existing infrastructure.

Indeed, within the wider basin, South Africa still justifies its significant water use by emphasising infrastructure development as the basis of its earned right to water resources, highlighting the high value of water use in both moral and economic terms and reinforcing notions that a stable and prosperous South Africa is beneficial for the region as a whole (DWAF 2004a, b; PWC 2005; Government of South Africa 2008). The basin hegemon's corresponding expectation of fellow riparian states is that any

additional water allocation must be earned, a process most likely achieved by (co)investing in new or existing infrastructure.

That is South Africa's dominant stance taken with Namibia, and it influences its relationships with Botswana and Lesotho regarding sharing in the LHWP's benefits as well. Preliminary discussions between South Africa and Botswana regarding Botswana's potential access to water stored from the LHWP, for example, centred on whether Botswana had sufficient means to buy in to the scheme (Katai, pers. comm. 2009). Upstream, the government of Lesotho is also considering a small diversion from the LHWP infrastructure (in lieu of constructing a separate storage dam) to augment water supply for the growing lowlands population (Government of Lesotho 2004). The primary barrier, thus far, has been the cost of becoming a recipient of the scheme's benefits (Government of Lesotho 2004).

Despite its significant influence, South Africa's stance on water allocation within in the basin is not uncontested. Significantly, however, Namibian officials don't challenge the general principle that riparian states should be expected to buy in to new and existing infrastructure. Rather, they argue they've already paid their dues. "If you go back to the history our countries share," suggested Liebenberg, "it's clear that we've already paid significantly for the existing water supply systems in the basin" (pers. comm. 2007). Basson concurred, explaining that "the existing dams in the Orange basin were built during the occupation and paid for with diamonds from our mines" (pers. comm. 2007).

In addition to challenging the legitimacy of South Africa's sanctioned discourse, Namibia's efforts to create ORASECOM was an attempt to form coalitions and engage in allocation discussions with the bargaining support of the other two nonhegemonic states (Heyns, pers. comm. 2007). As the next section shows, however, the constellation of interests among riparian states has provided Namibia with no strong allies in their desire for the determination of a basin-wide flow plan.

### **7.3 Interests, Uncertainty, and Power at the Basin Level**

A popular perception linked to previously described assumptions about the mutual benefits provided by the Orange-Senqu water regime is that riparian states are on track to determine equitable water allocation at the basin level. This perception is promoted primarily by donor organisations operating in the basin and stems from a belief that the high number of water agreements and joint management organisations, and the formal commitments they embody for equitable and reasonable utilisation, represent great levels of "political will" (EU 2005, 8) and "country drivenness" (UNDP/GEF 2005, 7) for addressing water allocation and other governance challenges at the basin scale.

This section argues, however, that within the wider context of cooperation, the significant asymmetry in power and interests and high levels of normative uncertainty preclude significant discussion of water allocation at the basin scale. Together, these characteristics contribute to a pervasive, zero-sum mentality, marked by concerns that changes to the status quo will threaten certain countries' access to sufficient water supplies.

### *7.3.1 Interest Asymmetries*

Despite the general commitments to equitable and reasonable distribution embodied in the Orange-Senqu basin treaties, the actual desire to specify clear entitlements to water resources within the basin varies significantly by country. As the downstream riparian, Namibia is the most interested in resolving the uncertainty of water entitlements in the basin as a whole (Conely and van Niekerk 2000; Heyns, pers. comm. 2007). South Africa, by contrast, maintains significant control over basin resources under the present arrangements and is the most reluctant to alter the status quo. South Africa's disinterest in determining water allocation at the basin scale is evident in efforts to block significant discussions of bilateral projects and infrastructure development in ORASECOM (see chapter 6).

Lesotho and Botswana fall somewhere in between. Lesotho has expressed interest in specifying water entitlements (Conely and van Niekerk 2000; Lesoma, pers. comm. 2007). Unlike Namibia, the upper riparian is less concerned with dwindling water quality or quantity, per se, but believes that clear entitlements may help them leverage additional resources from South Africa. As Lesoma argued,

If we really want to talk about equitable distribution, then we have to talk about compensating states in the basin that have not yet taken their fair share. Right now our water use is restricted because South Africa developed quickly and put the majority of water in the basin to use. For us not to embark on activities like expanding irrigation there should be an acknowledgement of the foregone benefits

and some type of appropriate compensation, some concession perhaps that makes South Africa's agricultural products cheaper for us to import. (pers. comm. 2007)

Lesoma's comments raise the important issue of benefit sharing and the use of intersectoral linkages to expand the range of options for balancing incentives and achieving equitable resources distribution. Yet despite Lesoma's posturing, the government of Lesotho remains reluctant to engage in any negotiation process that might put future phases of the LHWP in jeopardy (see chapter 6).

Finally, Botswana has only recently expressed interest in obtaining water resources from the Orange-Senqu basin to augment its supplies in Gaborone (see chapter 4). The government initially reached out to South Africa, as opposed to ORASECOM, to explore opportunities for obtaining access to water currently stored and delivered through the LHWP. That reflected a lack of confidence that basin-wide negotiations present an attractive or efficient means for securing the desired resources. As section 7.2.2 noted, the interests of Lesotho and Botswana in maintaining strong bilateral relationships with South Africa make the other nonhegemonic states unlikely bargaining allies in Namibia's push for the specification of a basin-wide flow plan.

### ***7.3.2 Uncertainty and Commitment Requirements***

Many donors operating in the Orange-Senqu basin explain ORASECOM's lack of action on allocation determination as a function of time and information (see chapter 8). The expectation is that once the young commission has collected a significant foundation of information on which to base its decisions, it will be equipped to tackle

the contentious issue of allocation (FFEM 2009). The lack of agreement on cost-sharing principles for joint infrastructure described in section 7.2.1 illustrated, however, that even when informational uncertainty is low, normative uncertainty regarding the principles of equitable and reasonable allocation can pose significant barriers to decision making. After all, the ORASECOM agreement and the SADC water protocol both embody broad commitments to the equitable and reasonable utilisation of water resources, but the selection and application of specific allocation principles are left to riparian states to determine.<sup>47</sup>

According to Paul Taylor, director of the UNDP's capacity-building network in South Africa, this normative uncertainty makes it hard to get riparian states back to the negotiating table. "If they don't have a solid sense of what they're going to gain in the distribution process, there's a very low incentive to participate," Taylor explained. "The difficulty is that without engaging in these sorts of discussion, there's no way to determine the principles they'll use" (pers. comm. 2007).

Overcoming normative uncertainty about water allocation principles within the Orange-Senqu basin is complicated by the high level of commitment requirements riparian parties attach to even preliminary discussions about water allocation. As Othusitse Katai, a member of Botswana's delegation to ORASECOM explained, "The

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<sup>47</sup> The revised SADC protocol lists the following considerations for specifying equitable and reasonable use: (a) the geographic, hydrographic, hydrologic, climatic, ecologic, and other factors of a natural character; (b) the social and economic needs of the watercourse nations concerned; (c) the effects of the use or uses of the watercourse in one watercourse nation on other watercourse nations; (d) the past, existing, and potential uses of the watercourse; (e) the conservation, protection, development, and economy of use of watercourse resources, and the costs of measures taken to that effect; and (f) the availability of alternatives of corresponding value to a particular planned or existing use of resources (SADC 2000).

issue of allocation in a water-scarce environment like ours is so charged that it doesn't leave much room for casual brainstorming" (pers. comm. 2007). Katai, echoed by many other interviewees, stated that delegates to the joint management organisations feel significant pressure to continuously position themselves, their ministries, and their countries for future negotiations. As a result, suggested Peter Nthathakane, a member of Lesotho's technical task team for the ORASECOM, "There is a real concern that agreeing to consider alternatives means you're bound to give something away" (pers. comm. 2008).

Combined, the divergent interests, normative uncertainty, and full allocation of existing water resources contribute to a zero-sum mentality among South African officials, and to a lesser extent, their colleagues in Lesotho and Botswana, that reflects concerns that significant alterations to the status quo will threaten their country's access to sufficient water supplies.

#### **7.4 Conclusion**

This chapter explained the distributional effects of the Orange-Senqu water regime and the causal determinants influencing its institutional performance. In doing so, it challenged popular perceptions of the regime as a win-win scenario by exposing the negative impacts of the LHWP and drawing attention to the contested nature of water allocation in the lower basin and the zero-sum mentality constraining discussions at the basin level.

Most significantly, the chapter showed how power interests and uncertainty shaped the allocation of water and related benefits and discussions, or lack thereof, regarding allocation issues at the basin, bilateral, and subnational levels. It demonstrated that weaker parties were able to mobilise power endowments to affect the flow of resources, but the basin hegemon's influential and enduring promotion of discursive strategies to maintain the status quo continues. What this suggests is that agendas for challenging the status quo of water allocation in the Orange-Senqu River basin will require a firm understanding of the power-laden processes that contribute to both overt and covert structures of governance.

## **CHAPTER 8: DONOR ENGAGEMENT**

### **Introduction**

This chapter further analyses international donor organisations' perceptions of and prescriptions for strengthening joint planning in the Orange-Senqu basin and assisting riparian states in achieving goals of equitable distribution of water, poverty reduction, environmental protection, and conflict avoidance. The analysis shows how pressure on donor organisations to "sell" their services perpetuates a technocentric approach for analysing and addressing shortcomings in the level of joint planning that currently exists. As such, the influences of power and politics on the outcomes of ORASECOM are often overlooked.

This chapter argues that by framing the problem of transboundary water management as a technical issue, the deeply political nature of transboundary water cooperation and its outcomes are overlooked. In doing so, possibilities for altering the trajectory of the policy process and improving the ability of ORASECOM to engage in joint planning and management are sidelined. This chapter asserts that in a river basin where outcomes are heavily shaped by the power and political interests of riparian states, information sharing and capacity building alone will be insufficient preparation for achieving the joint planning goals. What this suggests is that efforts to improve transboundary water cooperation, achieve stated goals, and alter the status quo must be cognizant of power asymmetries and riparian interests when constructing strategies for assistance.

## **8.1 Donor Organisations**

Between 2000 and 2008, ORASECOM received support from five major donor organisations: the European Union (EU), the French Global Environment Facility (FFEM), the German Technical Cooperation Agency (GTZ), the United Kingdom's Department for International Development (DFID), and the United Nations Development Program and Global Environmental Facility (UNDP/GEF). Throughout the study period, donors to the Commission provided financial resources to cover the cost of joint studies, training sessions, and institutional reforms. Additionally, as shown in table 6.7, all five donor organisations pledged continued support through at least 2012 (ORASECOM 2009).

The donor organisations supporting ORASECOM do not constitute a homogenous group, but they do share the same basic goal: to improve the implementation and effects of transboundary water cooperation in the Orange-Senqu basin. Thus, while they differ slightly in thematic priorities (FFEM and GEF give slightly more attention to environmental issues while GTZ and EU express poverty reduction as their primary goal), the general activities of the organisations tend to coalesce around institutional strengthening, information gathering, and capacity building. According to interviews and project documents, each donor organisation selected the Orange-Senqu basin as a target area for reasons ranging from its economic importance to the regional political stability and the noted political commitment to cooperate by all four riparian states, as evidenced by the formation of ORASECOM.

The following analysis provides insight into the role donor organisations play in shaping the technical narrative of problems and solutions for transboundary water cooperation in the Orange-Senqu water regime. After examining the diagnoses and prescriptions they put forward, an attempt is made to explain how pressures on donor representatives to sell their services perpetuate their technocentric approach to supporting joint planning. Understanding the kaleidoscope of interests including those of donor organisations and the riparian states is an important first step for envisioning alternative approaches that integrate a consideration of power asymmetry and riparian interests in shaping tools for engaging with basin states.

## **8.2 Diagnosing Problems and Assigning Prescriptions**

Donor organisations active in the basin rely on five basic categories of causes to explain the discrepancies between the expectations of transboundary water cooperation and the outcomes observed (table 8.1). These causal explanations contribute to an entrenched and rigid narrative assigning technical solutions to the problems of joint planning. As table 8.1 illustrates, this practice relies on time, institutional structures, information, human capacity, and financial resources to explain the shortcomings of interstate water cooperation. Power asymmetries and riparian interests are notably absent from the list. The technocentric approach to defining the problems also shapes the prescriptions and programs donors design to “close the gap between the stated objectives of the countries, as articulated in the Agreement creating the ORASECOM, and the reality on the ground” (UNDP/GEF 2005, 11).

**Table 8.1** Causes of the Orange-Senqu River Commission’s shortcomings per donor organisations.

<b>Causal factor</b>	<b>Explanation</b>	<b>Prescription</b>
Time	It takes a long time to develop riparian cooperation and reap the benefits	Patience
Institutional structure	Lack of central organisation (i.e., secretariat), public participation, and cross-sectoral partnerships diminish the ability of ORASECOM to recognise and respond to changing circumstances	Establish secretariat. develop outreach and public participation strategy
Information	Lack of data constrains the ability to understand changes and make and implement plans	Joint studies, information exchange, joint protocols, and minimum standards
Human capacity	Lack of long-term personnel and appropriate skills impede the ability of states to jointly plan and manage shared resources	(Technical) training and exchange, technical advisors
Financial resources	Lack of human, technical, and financial resources limit ability to meet, plan, and implement policies	Grants and loans

*NOTE:* ORASECOM = Orange-Senqu River Commission.

### **8.2.1 Time**

One of the most pervasive explanations donor organisations give for the discrepancies between the expectations for ORASECOM and its outcomes is time. This commonly cited cause emerges in their descriptions of the Commission as a “young organisation” (EU 2005, 6) at the “very early stages” (FFEM 2009, 4) of building and strengthening interstate partnerships. The assumption is that, over time, the Commission will evolve naturally, or at least with a little help from donor support and technical fixes, into a powerful and overarching decision-making body capable of recognising and responding to changing circumstances in the basin and equipped to jointly plan and manage shared water resources.

The assumption that ORASECOM will mature into an organisation of authority over time stems from two primary suppositions. The first is that the Commission already serves as the primary planning institution in the basin and receives strong political

support from all riparian parties to pursue joint planning efforts. Both components of that assumption are called into question by the analysis presented in section 8.3.

The second supposition is that the process of developing and implementing joint strategies relies on building trust and relationships between basin managers. “The process of relationship building is not something that happens overnight. It can be encouraged but not rushed” explained Sechoocha Makoalibe, the program manager for FFEM (pers. comm. 2007). The second supposition also comes from reflection on the infrequency of ORASECOM’s commissioners’ meetings. According to the founding treaty, commissioners are only formally bound to meet twice a year. “When you think about the life span of this Commission in terms of fourteen meetings as opposed to seven years you begin to realise, perhaps, why things haven’t moved so quickly.” said Charles Reeve of the European Commission (pers. comm., 2008).

The only concrete prescription offered by donors and analysts for the identified time barriers is patience. As Horst Vogel of the GTZ reflected, “One has to learn patience in this kind of work. You quickly come to understand that the business of building real cooperation and partnerships is one that probably takes decades, not years, to fully come to fruition” (pers. comm. 2007).

### ***8.2.2 Institutional Structure***

Beyond the relative youth of ORASECOM, donors and analysts fault its early institutional structure for delaying the Commission’s progress in joint planning and

water allocation. Specific critiques relate to the lacks of central organisation, public participation, and intersectoral collaboration.

### *Central Organisation*

In its early configuration, ORASECOM relied on a system of rotating leadership under which the departments of water affairs in each riparian state took turns hosting Commission meetings (chapter 6). Host delegations were responsible for making all of the logistic arrangements for the meetings as well as documenting and circulating minutes from the gathering and handling any follow-up requests. Donors and analysts blamed this early institutional structure for delaying the exchange of information between parties, diminishing the capacity of the Commission to implement agreed-on activities, and decreasing the Commission's ability to monitor donor initiatives (Mashuari and Makhoalibe 2005). To help address the shortcomings identified in the institutional structure of the Commission, the GTZ funded a feasibility study to investigate the establishment of a permanent secretariat. They also financed a 2004 workshop to discuss details for setting up the secretariat (Mashuari and Makoalibe 2005).

In September 2007, ORASECOM established a permanent secretariat and hired Lenka Thamae to fill the new role (ORASECOM 2007). Each riparian state contributes an equal amount of funding to support the operations of the Secretary and his small staff. The GTZ continues to provide financing to cover the costs of facilities and meetings (table 8.2). Donor organisations have high expectations for the improvements the permanent secretariat will provide for the operation of

ORASECOM. According to the UNDP/GEF, the establishment of the position would “significantly boost the capacity of countries to jointly manage shared water resources” (UNDP/GEF 2005, 18).

**Table 8.2** Institutional strengthening initiatives and allocated funds in the Orange-Senqu River Commission’s 2007–2012 Programme Implementation Plan.

Theme	Subactivity	Donor Support (USD)				
		ORASECOM	FFEM	GTZ	EU	UNDP/GEF
Review legal issues	Identify potential legal constraints and opportunities for implementing recommendations				66,868	
Review institutional arrangements	Identify roles, responsibilities, mandates, and operational procedures				50,505	
	Investigate international best practices for transboundary water management				97,171	
Establish and support Secretariat and other ORASECOM institutions	Secretariat operations	1,631,321				
	Office establishment and facilities			101,010		
	Procedure and systems			15,151		
	Regular and extra meetings			75,757		
Establish and support ORASECOM technical working groups	Establish and support intersectoral committees					150,000
Define ORASECOM’s relationship with other basin bodies	Review <i>Roadmap</i> and establish stakeholder forum in each state				126,262	
	Evaluate relationship with bilateral organisations				29,595	
Develop			142,424			

mechanism to mobilise funds for conservation of the basin catchment		
Build capacity for technical staff and water resources practitioners in IWRM	Establish basin-wide and national stakeholder forum	100,000
	Support the establishment of sub-basin councils	300,000
Develop EIA procedures for transboundary context		100,000

*Note:* EIA = Environmental Impact Assessment, EU = European Union, FFEM = French Global Environment Facility, GTZ = German Technical Cooperation Agency, IWRM = International Water Resources Management, ORASECOM = Orange-Senqu River Commission, UNDP/GEF = United Nations Development Program/Global Environmental Facility, USD = United States Dollar..

### *Public Participation*

Donors' second major critique of ORASECOM's institutional structure centred on the lack of public outreach or engagement. The general assumption underpinning their recommendations for increasing public participation is that enhanced stakeholder involvement will improve both the formulation and implementation of water management plans and policies. As one document produced by consultants on behalf of ORASECOM explained,

The greater involvement of stakeholders promotes good governance and sustainability by improving accountability, encouraging support for decisions taken, improving the quality of those decisions, assisting with monitoring and bringing early warning of potential challenges. Participatory approaches enhance project quality, ownership and sustainability, with stakeholders

becoming active contributors to basin development and management.  
(ORASECOM 2007, 4)

Given the full allocation of water resources in the basin and the anticipated need for demand-side management, donor organisations believed increased public participation was critical for improving joint planning efforts within ORASECOM. “As supplies in relation to current and projected uses continue to narrow and as the need to adjust to predictable and non-predictable use questions arise and need to be addressed at all levels,” noted the UNDP/GEF (2005, 18), “the provision of effective and ongoing public information systems and comprehensive public involvement vehicles for all affected stakeholders will become management imperatives.”

In 2005, ORASECOM, with the support and encouragement of the GTZ, contracted a group of local consultants to prepare the *Roadmap to Stakeholder Participation* (ORASECOM 2007). The UNDP/GEF and the EU also proposed strategies for enhancing stakeholder involvement at roughly the same time. The *Roadmap* outlines steps ORASECOM can take to co-develop public participation mechanisms with stakeholders. Eventually, the UNDP/GEF and the EU both revised their original proposals to fit with the approach articulated in the *Roadmap*. However, by the end of 2008, no direct steps had been taken by the Commission to pursue concrete efforts to expand public participation.

### *Cross-Sectoral Collaboration*

The final core critique donor organisations made of the Commission’s institutional structure revolved around the hydrocentricity of ORASECOM. Comprised entirely of

members from each riparian state's department of water affairs, ORASECOM focuses on the water sector with little direct input from related departments like energy, agriculture, environment, and tourism. The concern within the developmental community (and derived from the normative principles of IWRM) is that planning amongst water experts alone will be insufficient to compose the kind of integrated strategies required to address changing circumstances in the Orange-Senqu basin. As Akiko Yamamoto, project director for the UNDP/GEF reflected, "It's become clear that we are going to need creative solutions to issues of water scarcity and transboundary management in a place like the Orange-Senqu; these sorts of solutions are likely to be found at the nexus of the water, energy, environment, and agricultural sectors . . . the challenge is how do you get that mix of expertise together in one room for meaningful activity?" (pers. comm. 2007). Beginning in 2009, the UNDP/GEF dedicated 150,000 USD to the establishment of intersectoral working groups for ORASECOM.

### ***8.2.3 Information***

Beyond institutional structures, the developmental community explained discrepancies between the expectations and outcomes of ORASECOM thus far as a function of data and information, or lack thereof. Despite noted achievements, donor organisations and the Commission found significant gaps in the types of information collected and compiled and shortcomings in the systems and protocols used to collect, exchange, and utilise information.

Donor organisations contributed significantly to efforts to fill information gaps by compiling existing information, financing new studies, and developing shared systems for the collection, storage, and use of information (tables 8.3 and 8.4). The core assumption underpinning these efforts was that improving the availability and compatibility of data and information would provide the necessary foundation “for making difficult decisions about water allocation, uses, and tradeoffs” (Ridout, pers. comm. 2008). Yet such assumptions often overlook the critical role of power and politics in the decision-making process.

**Table 8.3** Information systems initiatives in the Orange-Senqu River Commission’s 2007–2012 Programme Implementation Plan.

Theme	Activity	Donor and Contribution (USD)			
		FFEM	GTZ	EU	UNDP/ GEF
Integrated GIS-based database	Develop Orange-Senqu Basin Awareness Kit		404,040		
	Contribute to GIS system and website content				300,000
	Create fitness for use display system			64,949	
	Develop integrated basin model available to all states		303,030		
Review and provide quality assurance of existing databases for future data exchange and integration	Review databases on groundwater in the Molopo-Nossob tributary	79,797			
	Review and develop water quality database			96,969	
Design a common basin observation and monitoring system	Design data acquisition and display system		252,525		
	Update and extend Orange-Senqu River hydrology		505,050		
	Determine sites and methods for water quality monitoring			54,545	

*Note:* EU = European Union, FFEM = French Global Environment Facility, GIS = Geographic Information System, GTZ = German Technical Cooperation Agency, UNDP/GEF = United Nations Development Program and Global Environmental Facility, USD = United States Dollar.

**Table 8.4** Specific studies in the Orange-Senqu River Commission's 2007–2012 Programme Implementation Plan.

Theme	Project/Study	Donor and Contribution (USD)			
		FFEM	GTZ	EU	UNDP / GEF
Assessment of water demand in all sectors and potential for savings through demand management	Water conservation and quality control in the irrigation sector/A demonstration project in the lower Orange				900,000
	Assessment of water demand management potential for in the irrigation sector		202,020		
Surface water yield assessment (accounting for climate change)	Assessment of climate change's impact on the Orange-Senqu River basin		303,030		
	Water demand forecasting accounting for climate change				200,000
Determination of catchment boundaries based on base flow groundwater contribution			50,505		
Groundwater Review and Feasibility Study of the Molopo-Nossob	Feasibility study of water resources development	215,151			
	Detailed groundwater review for rural communities	222,222			
Assessment of Environmental Water Requirements in the Lower Orange	Assessment of environmental requirements of the estuary			1,161,616	
	Assessment of environmental requirements of other hot spots		1,010,101		
	Strategic environmental assessment of the river mouth			154,545	
Assessment of marginal waters' development and use	Assessment of marginal waters' development and use	121,212			
Assessment of water quality and catchment degradation issues	Assessment of persistent organic pollutants in the Orange-Senqu				21,000
	Scoping study on urban water pollution's transboundary nature			82,828	
	Review of artisanal mining's impact on the middle and lower Orange-Senqu				60,000
	Protection of Orange-Senqu river water sources/sponges	120,202			
	Requirements to carry out an integrated water resources quality management plan		50,505		

*Note:* EU = European Union, FFEM = French Global Environment Facility, GTZ = German Technical Cooperation Agency, UNDP/GEF = United Nations Development Program and Global Environmental Facility, USD = United States Dollar.

#### **8.2.4 Human Capacity**

Donors and analysts frequently invoke a broad concept of the human capacity, or lack thereof, to explain the shortcomings of ORASECOM. This concept has no agreed-upon definition among the donor organisations, and it leads to what Teskey (2005) described as general calls for more individuals to be trained or more technical people from developed countries to come to “help out.” For most of the donor organisations, the lack of human capacity to properly run ORASECOM reflects issues of time, personnel, and the nature of expertise.

The amount of time that members of the Commission and technical task teams have to dedicate to it is limited by their already existing, full workloads of domestic issues. “For almost everyone,” explained Peter Nthathakane, a member of Lesotho’s technical task team, “work on the ORASECOM and other interstate commissions is something we take on as something extra, in addition to a regular job” (pers. comm. 2008). Additionally, each riparian state’s department of water affairs reported high turnover rates due to transfers into the private sector and/or out of the country as well as high mortality rates among employees due to HIV/AIDS (van Niekerk, pers. comm. 2007; Lawless 2008). The older generation of each country’s water managers, many of whom participated in the establishment of the original transboundary water treaties, have also reached or are nearing retirement.

In addition to high turnover rates, members of the developmental community link the lack of expertise within government water agencies to the high level of private sector involvement in hydrological studies. According to Paul Taylor, program director of

Cap-Net for southern Africa, the “consultant culture in the region means that most joint studies are contracted out to private consultants either regionally or internationally. What this means is that while the riparian states may own that piece of work, the real expertise for conducting the study, accessing the database, and interpreting the results may lay outside of the government or joint Commission” (pers. comm. 2007). Ironically, many human capacity building programs in the basin are built on models of bringing outside officials in to offer training sessions or to fill longer-term posts as technical assistants.

The nature of expertise in southern Africa’s private and public sector remains highly technical. Many of the existing training programs aim to develop a wider array of technical expertise, but they focus particularly on the use of hydrological modelling tools. However, some organisations also recognise the need for more diverse types of expertise. Malcolm Ridout of the DFID noted that ORASECOM, like other transboundary water institutions in the region and worldwide, has many individuals with technical expertise, “but lack(s) individuals that can bridge sectoral divides or the links between the scientific and political aspects of their work” (pers. comm. 2008).

Donor organisations’ responses to human capacity deficits include a range of training sessions and exchange programs (table 8.5). Early program models relied primarily on consultant-led technical assistant support and workshops. Emerging plans, however, include increasing use of exchange programs to facilitate learning between ORASECOM representatives and other regional and international basin managers and

attending courses offered locally by university professors (FFEM 2009). The hope, as articulated by the FFEM (2009, 4), is that “ideally once capacitated, the Commission should be in a position to stimulate and coordinate development within the Orange-Senqu Basin by advising member states about the availability of water, the results of feasibility studies and the most viable options for infrastructure development.”

**Table 8.5** Human capacity development initiatives in the Orange-Senqu River Commission’s 2007–2012 Programme Implementation Plan.

Theme	Subactivity	Donor Support (USD)			
		FFEM	GTZ	EU	UNDP/GEF
Development of national coordination framework for implementation	Strengthen national institutions				80,000
	Formulate national action plans				250,000
Building skills for technical staff and water resources practitioners	Needs assessment	307,070		28,282	
	Training on decision support models and systems		60,606		
	Training on IWRM and institutions			287,878	
	Training on water resources management				180,000
International Congress on Basin Commissions	RBO exchange programme		202,020		
	GEF biennial international waters conference				20,000

*Note:* EU = European Union, FFEM = French Global Environment Facility, GEF = Global Environmental Facility, GTZ = German Technical Cooperation Agency, IWRM = International Water Resources Management, RBO = River Basin Organisation, UNDP/GEF = United Nations Development Program and Global Environmental Facility, USD = United States Dollar.

### 8.2.5 Financing

The final category donor organisations recognised as a causal factor impeding ORASECOM’s performance is the lack of financial resources within riparian states to cover the substantial costs of prescribed technical fixes. This is, of course, where the donor organisations come in. As Tompkins (2007) noted, external funding from

international donors enables the Commission to take up recommendations for institutional strengthening, information gathering, and capacity building (37).

Although international donors in the Orange-Senqu basin contributed a significant amount of money to the operational budget of the Commission, they also placed significant emphasis on contributions made by member states. Some degree of co-financing by riparian states is seen by donors as a signal of the states' commitment to the Commission and insurance that it will continue once the donors have moved on. As table 8.2 indicates, each riparian state pledged 407,830 USD to support the operations of the ORASECOM secretariat between 2007 and 2012. The FFEM is also working with ORASECOM to identify more revenue-generating opportunities that might help cover future operational costs and support water conservation efforts when donor funding is no longer so plentiful (FFEM 2009, 32).

#### **8.2.6 Power**

The previous sections illustrated the donor organisations' technocentric approach to defining the problems of transboundary water cooperation and using joint planning and designing programs to address them. What is largely missing from their prevailing perceptions about and prescriptions for ORASECOM's challenges, however, is in-depth consideration of how the power asymmetries and riparian interests have influenced its formation, process, and outcomes. Yet the concepts of power and interests are not totally ignored. Donor organisations generally recognised South Africa's hegemonic status in the Orange-Senqu basin and noted in both reports and conversations that "political will" is vital for the successful formation and

implementation of transboundary cooperation (FFEM 2009, 16; Mashuari and Makhoalibe 2005, 6).

Yet neither power asymmetries nor the diversity of riparian interests are perceived as significant explanations for the discrepancies between expectations and outcomes for ORASECOM. Rather, donor organisations' assessments revolve around two different, but related, sets of popular perceptions. The first set of perceptions emerges from assumptions that riparian states in the Orange-Senqu basin share common interests and strong commitments to joint planning. The possibility of competing interests or wavering commitment within the context of ORASECOM is largely overlooked.

The second set of popular perceptions acknowledges power asymmetries and diverse riparian interests as influential factors. It asserts, however, that such asymmetries have not hindered either the process or the outcomes of interstate water cooperation (EU 2005; Turton and Funke 2008) Yet looking at the issue from Namibia's perspective clearly challenges notions that riparian parties share control of the decision-making process in ORASECOM and that all strategic interests, like discussing bilateral projects or clarifying water allocation, are met (chapters 6 and 7).

In sum, this section explored the way donor organisations frame problems and solutions for joint planning within ORASECOM. It illustrated a general oversight of power asymmetries and riparian interests amidst the technocentric approach used by donor organisations to diagnose problems and develop projects.

### **8.3 Understanding Oversights**

This section explores why the influence of power and politics on the operation and outcomes of ORASECOM is not incorporated into mainstream development interventions in the Orange-Senqu basin. Is it that donor representatives and organisations don't see these dimensions of the water governance process or that they feel incapable of addressing such issues even if they do? The answer is both. The ability of donor organisations to see these critical elements of the governance process is restricted due to shortcomings in analytical efforts as well as power and interest dynamics that often minimise bold action in challenging the status quo.

Drawing on insights from Ferguson (1990), the analysis shows how the pressure on donor representatives and organisations to "sell" their services to riparian states and their projects to supervisors and home-country constituencies contributed to the perpetuation of a technocentric approach to both diagnosing and addressing the problems of joint planning for Orange-Senqu water resources management.

According to Ferguson (1990), developmental agencies are in the business of trying to sell a package of services aimed at improving some identified aspect of underdevelopment. Examined through this lens, the process of assessing needs in a river basin or management organisation and the process of justifying intervention with existing skills and frameworks are often rolled into one. "The problem is to find the right kind of problem," Ferguson explained. "The kind of problem that requires the solution they are there to provide" (69).

These dual processes are evident in the Orange-Senqu basin. Scoping studies conducted by donor organisations have assessed existing shortcomings while making the case for specific forms of intervention. As a result, the analyses are geared, in part, to make ORASECOM out as an ideal candidate for “the sort of intervention the organisations are capable of launching: an apolitical, technical intervention” (Ferguson 1990, 69). Towards this end, several donor organisations have tended to cast the issue of political will as a challenge that has already been solved (FFEM 2009, 16; Mashuari and Makoalibe 2005, 6). One reason why is to satisfy organisational prerequisites limiting intervention to basins where riparian states are already committed to the cause (UNDP/GEF 2005; FFEM 2009). Assumptions of political commitment and shared control also allow the organisations to focus on the less complex technical tasks for which they have developed expertise. By relying on the ORASECOM treaty as a sufficient signal that all parties are fully committed to joint planning and management, donor organisations thus diminish the need to further investigate or address asymmetries in interests and power.

The process of shaping needs assessments to justify the application of specific services is also evident within the context of ORASECOM. In a scoping study released by the UNDP/GEF, the authors noted, “There is no Transboundary Diagnostic Analysis (TDA) for the Basin or a Strategic Action Plan (SAP), although a considerable amount of data and information exists and this accumulated data and information will serve as a ‘springboard’ for TDA and SAP development” (UNDP/GEF 2005, 21). Yet, this observation should have come as no surprise to the

authors or the organisation given that the terms *TDA* and *SAP* are essentially registered trademarks of the GEF.

What the author failed to mention, however, was that though no TDA or SAP, per se, had been conducted in the basin, a very similar effort, the first phase of the Integrated Water Resources Management Plan (IWRMP), was already underway. Supported with funding from the GTZ and carried out by a consortium of regional consultants, the IWRMP aims to compile existing data, assess institutional needs, and form the foundation for strategic planning in the basin (ORASECOM 2007). While the authors of the UNDP/GEF report consulted preliminary documents from the IWRMP as part of their background research, they made no explicit mention of the initiative (or any other donor activity in the basin) in the report. It is, after all, harder to sell your services to basin managers or your project to supervisors if you acknowledge that the “competition” has already beat you to the task. What this suggests is that the pressure to sell services in a crowded field of providers contributes to the targeted production of basin reviews. Consequently, what emerge are tailored accounts of basin needs and ongoing activities that present information in a way that makes space for the donor organisation and their specific tools.

Asymmetries in power and interests are also left out of formal analyses and project documents in an attempt to bolster rapport with the clientele. Eager to protect their role in the cooperative process, donor representatives and organisations are hesitant to criticise continuing cooperative efforts in a way that upsets riparian states or jeopardises their own jobs. As such, donors supporting ORASECOM are particularly

cautious about offending South Africa. Mikael Melin, a program officer for the EU noted, “Calling South Africa the basin hegemon is not a good way to endear yourself or your organisation to your most powerful partner” (pers. comm. 2007).

South Africa’s relationship with donor organisations is also very different than that of other riparian states. The funding provided to South Africa by international donors is a small percentage of South Africa’s overall budget, while in countries like Lesotho, donor money is a much more substantial portion of the total budget. Thus, it is hard for any of the smaller riparian states to fathom the political consequences of rejecting donor funding, but South Africa’s economic strength gives it more leverage.

Additionally, as its regional lending portfolio expands, many international donor organisations view South Africa as a fellow donor partner as opposed to a more traditional recipient (Ridout, pers. comm. 2008). “This balance affects the way that donor organisations and states interact and the outcomes of these relationships,” explained Charles Reeve, program director with the EU (pers. comm. 2008). Consequently, donor organisations may need the approval of South Africa for selling services more than South Africa needs the donors. Understanding the dynamics of these relationships sheds important light on why power asymmetries and South Africa’s stalling tactics for joint planning within ORASECOM are not discussed more explicitly by donor organisations.

## **8.4 Conclusion**

This chapter further analysed the role of international donor organisations in the basin and demonstrated how pressures to sell services contribute to a technocentric approach that overlooks the influences of power and politics on the outcomes of the Commission. The narrative of providing technical solutions to transboundary water cooperation problems has thus become entrenched in the policies and programs of the Orange-Senqu water regime. The resulting simplification translates into a narrow set of management and policy options in the basin.

What this analysis suggests is not that the technical prescriptions proposed by the development community have no impact on moving countries closer to effective cooperation, but rather, that without accounting for the power asymmetries and riparian interests that deeply influence the operation and outcomes of the commission, prescribed strategies are likely to continue to fall short of their articulated goals.

## **CHAPTER 9: CONCLUSIONS**

### **Introduction**

The purpose of this study was to develop a deeper understanding of the formation, performance, determinants, and effects of the international water management institutions comprising the Orange-Senqu water regime. The analytical chapters have demonstrated that water cooperation in the region has had both positive and negative effects. It has enabled and constrained adaptive capacity and contributed to the asymmetrical allocation of water-related benefits at subnational levels. More importantly, the analysis has illuminated the influence of power asymmetry, problem structure, expert networks, and political contexts in shaping the wide range of governance structures and outcomes. It has shown that asymmetries in power and interests, in particular, are critical factors for understanding the emergence and effects of the multiple institutions comprising the wider water regime.

The study has also provided fresh insight into the dynamic relationships of power, interests, and water governance structures in the Orange-Senqu basin. In doing so it has challenged previous characterisations of the water regime as one of shared interest, shared control and mutual benefit perceived as positive by all (Turton and Funke, 2008; section 2.3.3). The analytical chapters demonstrated that neither power nor interests nor governance structures are static phenomenon. Although South Africa has achieved hydrohegemonic status through the deployment of overt and covert strategies to capture water resources and control decision-making processes, the hegemon's power has changed and been challenged over time. Attention to the

contestation of formal and discursive governance structures has illuminated not only the factors reinforcing the status quo but also the strategies and tactics leveraged by weaker parties to generate resistance, envision alternatives, and enact change.

This concluding chapter is divided into two parts. The first section summarises the main conclusions from the analytical chapters and their resonance with the research questions and hypotheses established at the outset of the study. It highlights the principle findings of the study regarding the influence of cooperation on adaptive capacity and the allocation of water and related benefits and the causal factors driving the formation, implementation, and effects of the transboundary water governance. The second section reflects on the analytical implications of the study and identifies key areas for future research.

### **9.1 Responding to Research Questions and Hypotheses**

The overarching research question established at the outset of this study was how and why different transboundary water governance arrangements emerge and produce differential effects. The analytical chapters illuminated the positive and negative effects of the Orange-Senqu water regime on adaptive capacity and the allocation of water and related benefits and generated a deeper understanding of the influence of power asymmetry, problem structure, expert networks, and the political context in shaping transboundary water governance's formation and implementation in the basin. This section draws together the empirical findings from the research and systematically addresses each of the seven subsidiary research questions and associated hypotheses established at the outset of the study.

### ***9.1.1 Adaptive Capacity***

*SQ1: How has the transboundary water governance regime in the Orange-Senqu basin influenced the adaptive capacity of riparian states and international water management institutions?*

The analysis presented in chapter 6 demonstrated that the water governance regime both enabled and constrained different aspects of adaptive capacity. It measured the Orange-Senqu water regime's impact on adaptive capacity by analysing changes in four core components—institutional flexibility, information management, actor networks, and financial resources—and determining the extent to which changes in each of these core components were generated by the water regime or other external factors.

In terms of institutional flexibility, the analysis showed that the formal treaties do not restrict the ability of riparian states to recognise and respond to changing circumstances. The treaties contain multiple flexibility mechanisms. Joint authorities were granted broad powers for adapting management strategies, and joint commissions were granted broad mandates to advise on all matters deemed important to cooperating parties. However, discursive structures established by South Africa, which keep major bilateral infrastructure projects beyond the realm of acceptable discussion at ORASECOM meetings, limit the opportunities for meaningful basin-wide planning, and consequently, constrain the ability of riparian states to recognise and respond to changing circumstances. This finding challenges the assumption held

by many donor organisations that ORASECOM serves as the overarching planning organisation in the basin (section 6. 1). It also emphasises the importance of looking beyond the text of agreements to understand the additional structures enabling and constraining resource management and riparian behaviours. As section 9.1.3 describes in more detail, ideational power, or the ability to shape discursive rules about what could and could not be done in the basin played a significant role in shaping outcomes.

The analysis of information management in the Orange-Senqu basin showed that the water governance regime made important contributions to data collection and exchange. Parties have largely complied with procedural requirements for data sharing and prior notification of projects in the basin. Yet there is reluctance to engage the basin-wide commission in discussions about bilateral infrastructure projects and refusal to allow Namibia to participate as an observer in Phase 2 deliberations of the LHWP. This recalcitrance signals limitations to the willingness of upstream riparian states to share information openly (section 6.2). Additionally, it draws attention to South Africa's complex and dynamic role as a pusher and a laggard with respect to different aspects of transboundary water governance.

A similar trend emerged in the analysis of actor networks. Overall, the water governance regime contributed to the strengthening of relationships and communication between basin managers in all four riparian governments. Efforts to avoid undue interference with the LHWP, however, meant that Lesotho and South Africa privileged bilateral networks as the primary means for water resources

planning (section 6.3). As mentioned previously, the emphasis on bilateral planning constrained the planning capabilities of ORASECOM at the basin scale. Beyond the network of basin managers, the establishment and implementation of the international water management institutions had a much smaller effect on other actor networks. Although the transboundary water governance regime has not actively constrained the linkages between technical and political representatives within each country, government departments, or joint organisations and stakeholder groups, it has not contributed to significant strengthening of them either (section 6.3).

Finally, the study showed that disparities in wealth between riparian countries significantly affected opportunities and options at the national level for recognising and responding to changing circumstances. At the project level, collaboration between riparian states has contributed to various levels of cost savings and revenue generation (section 6.4). However, the costs and benefits of transboundary water cooperation have not always been distributed evenly at the subnational scale (section 7.1.1).

The analysis of the Orange-Senqu water regime's impact on wealth and financial resources also demonstrated that ORASECOM's formation attracted significant financial support from bilateral and multilateral donors eager to support information gathering and institutional strengthening in basins where riparian parties had already signalled a willingness to cooperate. The financial assistance provided by these organisations have helped riparian states cover the costs of joint meetings and joint studies and are targeted at decreasing informational uncertainty and strengthening the institutional capacity of ORASECOM (section 6.4). As they are currently delivered,

however, these resources have not significantly altered the status quo from bilateral to basin-wide planning approaches (chapter 8).

Overall, the hypothesis that ongoing, hydropolitical cooperation enhances adaptive capacity by enabling information exchange and use and facilitating joint planning cannot be fully corroborated with evidence from the Orange-Senqu basin. Although interstate interactions contribute to both to a certain degree, discursive structures limiting the scope of discussions within ORASECOM constrain the parties' abilities to recognise and respond to changing circumstances and engage in joint planning at the basin scale. The responses to sub-questions 3 through 7 further address the determinants contributing to the water regime's positive and negative effects on adaptive capacity.

### ***9.1.2 Allocation of Water and Related Benefits***

*SQ2: How has the transboundary water governance regime in the Orange-Senqu basin influenced the allocation of water and related benefits?*

The analysis presented in chapter 7 showed that the international water management institutions comprising the Orange-Senqu water regime have had variable levels of influence regarding the allocation of water resources and related benefits. This study measured the allocation of water resources by examining the patterns of water utilisation within the basin and formal agreements specifying the terms of water allocation. In the case of the LHWP, special attention was paid to the allocation of

water, royalties, and hydropower at the national level and the disbursement of compensation payments and related services at the subnational level.

The study showed that the four riparian states in the Orange-Senqu basin exercise highly asymmetric control over their shared water resources. In 2005, estimates showed that South Africa utilised roughly 5,388 million m<sup>3</sup> of water per year from the Orange-Senqu basin. Namibia used 76 million m<sup>3</sup>, and Lesotho used 20 million m<sup>3</sup> per year. Botswana used only periodic surface runoff from the ephemeral Molopo-Nossob river system and has not, to date, received water from the main stem of the Orange-Senqu River (section 4.2.2).

The study demonstrated that water utilisation patterns in the Orange-Senqu basin have been shaped by a combination of resources capture and strategies for containment and integration. In the early twentieth century, South Africa embarked on a hydraulic mission marked by the widespread construction of dams, diversions, and irrigation districts. The deployment of significant engineering efforts to store and transfer water into and out of the Orange-Senqu basin was motivated by a combination of rainfall variability, the distance of rapidly urbanising mining towns, such as Johannesburg, from perennial water sources, and political efforts to create employment for white farmers and labourers (section 4.1.4). As water demand in present-day Gauteng province continued to grow, South Africa sought to secure resources through a combination of normative, utilitarian, and hegemonic tactics (chapter 5).

Significantly, only two of the four core agreements comprising the Orange-Senqu water governance regime—the treaty establishing the Vioolsdrift/Noordoewer Joint Irrigation Scheme (VNJIS) and the treaty establishing the Lesotho Highlands Water Project (LHWP)—contain specific commitments to water allocation (section 4.3.2). In the lower basin, the VNJIS treaty allocates 20 million m<sup>3</sup> per year to the overall scheme with 11 million m<sup>3</sup> designated for farmers on the South African side and 9 million m<sup>3</sup> for those on the Namibian side. Examination of actual water deliveries showed that compliance with water disbursements in the joint irrigation scheme was high. In 2007, declining water demands in South Africa brought forth questions about selling water allocated to them under the 1992 treaty. However, efforts to address the possibility of reallocating water within or beyond the joint scheme were constrained by the wider uncertainty regarding interstate allocations between South Africa and Namibia (section 7.2.1).

In the case of the LHWP, the study showed that by the completion of Phase 1, South Africa and Lesotho fulfilled general expectations for water delivery, electricity production, and revenue generation (section 7.1.1). The parties' performance on social and environmental commitments, however, proved less successful. As a result, the costs and benefits allocation at the binational scale proved mutually beneficial, while the distributional effects at the subnational level have been more skewed (section 7.1.1). In particular, many of the individuals and communities displaced by project construction have yet to benefit from the full disbursement of compensation or corresponding services and programs promised by the LHDA.

Beyond the project level, riparian states have yet to formally specify water allocations at the binational or basin-wide levels (sections 7.2 and 7.3). For the lower basin, South Africa claims that the equitable distribution of water resources was established at the time of Namibia's independence from South Africa. They claim that they were allocated 1,999.1 million m<sup>3</sup> per year, and that Namibia was allocated 50 million m<sup>3</sup> per year. In addition to this 50 million m<sup>3</sup>, South Africa granted Namibia a temporary use allowance, expiring December 31, 2007, for an additional 60 million m<sup>3</sup> per year. These figures do not, however, appear in formal bilateral agreements, and the figure of 50 million m<sup>3</sup> is actively disputed by Namibian officials (section 7.2.1). Within ORASECOM, riparian states have yet to determine or even meaningfully discuss the dimensions of a basin-wide flow regime (section 7.3.1).

Consequently, the hypothesis that ongoing, hydropolitical cooperation stabilises expectations by clarifying water allocation and enables riparian states to determine and implement the equitable distribution of resources cannot be fully corroborated. Although international water management institutions in the basin have clarified expectations in some cases about the delivery of water resources and related benefits, a significant amount of uncertainty remains at the bilateral and basin-wide levels. The study also clearly showed that the establishment of agreements and collaborative management organisations does not necessarily enable the determination and implementation of equitable resources distribution. A closer look at the determinants underpinning the basin's international water management institutions' formation and implementation helped explain why.

### **9.1.3 Power Asymmetry**

*SQ3: How do power asymmetries influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?*

Power asymmetries have had a profound effect on the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin. Drawing on the frameworks of hydrohegemony and counter-hydrohegemony, the analysis of power asymmetries focused on four dimensions of power influencing transboundary water management: geographically-based power, material power, bargaining power, and ideational power.

Chapters 5, 6, and 7 provided a comparative analysis of the resources and power endowments characterising each of the four riparian states. The analysis confirmed South Africa's position as the hydrohegemon in the Orange-Senqu basin. It further illustrated how South Africa compensated for its geographical weakness as a midstream riparian by leveraging its significant endowments of material, bargaining, and ideational power to secure a significant portion of water resources through strategies of resources capture and integration. The comparative analysis also discussed the power endowments of nonhegemonic riparian states. It drew attention to Lesotho's geographical advantages as the upstream riparian but also highlighted its smaller endowments of material, bargaining, and ideational capabilities. The comparative analysis also noted Namibia's vulnerability as the downstream state and Botswana's unique position as a middle riparian perceived, to date, as largely off

stream. Most significantly, the comparative analysis illustrated the fluctuations in material, bargaining, and ideational power for each riparian state over time.

The study provided an in-depth analysis of how the multiple dimensions of power and the asymmetries between riparian states affected international water management institutions' formations and implementations and their subsequent effects on adaptive capacity and the allocation of water and related benefits.

Power asymmetry played an important role in the Orange-Senqu water regime's formation. South Africa's dominance and its dual demands for water and national security were instrumental in the formation of early water regime components. The basin hegemon utilised both coercive and normative tactics for containment, deploying a range of economic and political resources to influence the selection and actions of political leadership in Lesotho and South West Africa and to establish JTCs with the other states. South Africa also deployed a combination of normative and utilitarian tactics to incentivise Lesotho's cooperation in constructing and implementing the LHWP (section 5.1.2).

Although South Africa's relative power in the basin allowed it to orchestrate the formation of early international water agreements, its control of regime formation was not absolute. Weaker riparian states also played a significant role by blocking, shaping, and initiating proposals and agreements. In shaping the terms of the LHWP, Lesotho derived bargaining power from its position as the upstream riparian and from external financial and technical assistance. Namibia initiated the formation of

ORASECOM by drawing on international guidelines, redefining the accepted boundaries of the basin to include Botswana, and emphasising the reputational costs to South Africa of noncooperation (section 5.1.2).

Power asymmetry between riparian states has also played a significant role in the parties' implementation of transboundary water arrangements. Chapter 6 demonstrated how South Africa's dominance in the basin and its preference for bilateral planning has contributed to the active obstruction of basin-wide planning. South Africa has exerted its power over the planning process using a combination of hegemonic and utilitarian tactics, including silence and sanctioned discourse to keep the discussion of bilateral projects off the agenda in the basin-wide forum while emphasising its procedural compliance with data sharing and prior notification. They have stressed the importance of handling detailed projects at the binational level (section 6.6).

Additionally, South Africa's strong bilateral alliance with Lesotho, and the benefits provided by the hydrohegemon to the upstream riparian state, has made Lesotho a significant ally to South Africa in the perpetuation of the bilateral planning model. The potential provision of water supplies from the LHWP through a bilateral deal with South Africa has also rendered Botswana unlikely to push for more substantive engagement at the basin scale (section 7.3.2).

Dissatisfied with the continuing pattern of bilateral planning in the basin, Namibia attempted to resist that dominant discourse by requesting to join Phase 2 discussions

of the LHWP as an observer. The request challenged the South African discourse that current modes of communication are sufficient for water resources planning and management and drew attention to the asymmetric control of decision making in the basin. Namibia's request, however, was declined by both South Africa and Lesotho, who reiterated their intentions to comply with requirements for information sharing and the supposedly regional benefits produced by the bilateral scheme (section 6.2).

Chapter 7 showed that power asymmetries at the international and subnational levels heavily influenced benefit allocation within the LHWP. The situation reflects what Warner (2005) referred to as a layer cake of hegemony and resistance operating at different scales. The powerful parties, South Africa at the binational level and the LHDA at the subnational one, exerted significant control over framing the project and capturing resources (section 7.1.2).

Weaker parties, Lesotho at the national level and affected communities at the subnational one, mobilised bargaining and ideational power to affect the flow of resources. Lesotho drew on a combination of its own upstream position, South Africa's urgent need for water resources and fear of project delays, and expertise from the World Bank and external consultants to secure South Africa's contribution to social programmes. They also developed favourable agreements allowing them to capture customs duties and tax revenue accrued from LHWP-related imports. Affected communities drew on an advocacy coalition of local and international NGOs to influence the scope and implementation of social and environmental programmes.

Despite these important contributions, South Africa and the LHDA still exert significant control over the water resources in the region (section 7.1.2).

Ideational power and discursive structures played a particularly critical role in shaping the formation and implementation of transboundary water management institutions and in reinforcing the status quo. This study drew attention to South Africa's influential use of ideational power to emphasise acquired rights, deemphasise allocation uncertainty in the lower basin, and deter discussion of a basin-wide flow regime. Despite its substantial influence, South Africa's water allocation discourses are not without contestation. Significantly, however, Namibian officials don't challenge South Africa's general expectation that riparian states should be expected to buy in to new and existing infrastructure. Rather, Namibians argue, they've already paid their dues.

In addition to challenging the legitimacy of South Africa's sanctioned discourse, Namibia's efforts to create and operationalise ORASECOM reflect an attempt to engage South Africa in allocation discussions with the bargaining support of the other two nonhegemonic states. Thus far, however, the constellation of interests among riparian states and international donor communities has provided Namibia with no strong allies in the push for the determination of a basin-wide flow regime (sections 7.3.2 and 8.3).

Together, these findings corroborate the hypothesis that basin hegemons and nonhegemonic states influence international water management institutions'

formations, implementations, and effects in the Orange-Senqu basin. South Africa's relative power in the basin and the country's interests over time in securing water resources and national security, protecting binational planning agendas, and maintaining the status quo are significant proof of that. Relatively weaker, nonhegemonic riparian states have also influenced the dimensions, processes, and outcomes of transboundary water governance by leveraging their own geographic, material, bargaining, and ideational powers to generate resistance, envision alternatives, and enact change.

#### ***9.1.4 Problem Structure***

*SQ4: How does problem structure influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?*

Attention to problem structure provided important insights into the formation, implementation, and effects of the Orange-Senqu transboundary water governance regime. This study focused on three key components of problem structure in the context of international water cooperation: interest asymmetry, uncertainty, and commitment requirements (section 2.5.2).

The study showed that situations in which riparian states faced lower commitment requirements, interest asymmetry, and uncertainty proved easier to reach convergence and maintain commitments in than in those situations characterised by high levels of each problem attribute. This made it relatively easier to form the JTCs, the PWC, and the JIA (section 5.1.3). In contrast, high commitment requirements, asymmetric

interests, and normative and informational uncertainty contributed to the difficulty parties encountered in negotiating the terms of both the LHWP and ORASECOM (section 5.1.3 and 5.2.3).

In terms of implementation, chapter 6 demonstrated that, when commitment requirements are perceived to be low (e.g., the execution of joint studies or the compilation of existing data), parties have performed well in collecting and exchanging information. However, when commitment requirements are perceived as more substantial (e.g., establishing a basin-wide data protocol, allowing Namibia as an observer in Phase 2 discussions, or engaging in planning discussions at the basin level) progress has been blocked, stalled, or slower to materialise (section 6.6).

Similar patterns were evident in the analysis of allocation. The combination of normative and informational uncertainty and the perception of high commitment requirements contributed to South Africa's zero-sum mentality, or the concern that efforts to engage in significant planning or water allocation at the basin scale will threaten their current and future access to water resources. South Africa's concerns are heightened by increasing levels of water scarcity in the basin and the tendency to view allocation issues narrowly in terms of surface water supplies. Within this frame of reference, water gains by other riparian states are largely viewed as water losses to the basin hegemon. The reluctance to consider water management alternatives is also linked to normative uncertainty and the intangibility of what a change in basin-wide allocation might entail (section 7.3.2). This emphasises the analytical importance of

distinguishing between informational and normative uncertainty for understanding the different, but interrelated barriers to collaborative decision making.

The analysis of the Orange-Senqu water regime formation illustrated the incentives and strategies used to overcome difficult problem structures. In the case of the LHWP, Lesotho and South Africa used a creative formula for defining the benefits of the scheme and developed a range of institutional mechanisms (i.e., extended investigation, phased framework, progressive allocation, periodic review, and amendment procedures) to address both informational and normative uncertainty. In the case of ORASECOM, Namibia emphasised the reputational costs to South Africa of noncooperation to incentivise their participation. Over the course of the negotiations, the parties also reduced commitment requirements by limiting the mandate of the basin-wide commission to an advisory body with no oversight powers regarding existing bilateral water management organisations operating in the basin (section 5.1.3).

Importantly, the analysis of the water regime's formation showed that none of the attributes contributing to problem structure were static. States manipulated or addressed interest asymmetry, uncertainty, and commitment requirements in different ways to reach agreement. The process of constructing and adjusting interests was influenced by the power asymmetries underpinning the bargaining process and the information provided by quasi-internal, epistemic communities (section 5.3). Parties acknowledged both informational and normative uncertainty and addressed them by delaying decisions, creating organisations tasked with information gathering,

adjusting commitment requirements, and incorporating flexibility mechanisms into the agreements (sections 5.1.3, 5.2.3, and 7.3).

The analysis of the water regime's effects on adaptive capacity and the allocation of water and related benefits also drew attention to the persistence of interest asymmetries after the establishment of cooperative agreements. In the case of the LHWP, the parties shared common, but not identical, reasons for implementing the joint project. South Africa entered that phase hoping to maximise water deliveries and minimise costs while Lesotho aimed to maximise resources flowing into the government (section 7.1.2). Similarly, South Africa and Namibia have common interests in the construction of a re-regulating dam in the lower basin but maintain divergent opinions on the appropriate method for dividing its costs. Asymmetrical interests are also evident in the operation of ORASECOM: Namibia wants riparian states to engage in more substantive planning while South Africa aims to maintain the status quo (section 6.6).

What this emphasises is that the political will to tackle certain water governance issues cannot be assumed even when states are party to water treaties or joint organisations. It also reinforces the importance of looking at the factors affecting international water management institutions' formations to get clues about their performances and effects, and it reminds us that cooperation is not achieved or missed in a moment of treaty ratification but rather through a complex and ongoing process characterised by fluctuations in the attributes contributing to problem structure.

The empirical analysis presented in this study corroborates the hypothesis that higher levels of interest asymmetry, uncertainty, and commitment requirements complicate the formation and implementation of transboundary water governance arrangements. It also shows that difficult problem structures can be overcome by strategies for improving communication and balancing incentives. Importantly, however, it reveals that problem attributes are not solved or resolved in a moment of treaty ratification but often extend and evolve throughout the implementation of cooperative arrangements. Addressing asymmetric interests, commitment requirements, and normative and informational uncertainty is an ongoing process in the formation and implementation of water regimes.

#### ***9.1.5 Expert Networks***

*SQ5: How do expert networks influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?*

This study showed that a variety of expert networks have influenced transboundary water governance arrangements' formation and implementation in different ways. Chapter 5 revealed sparse evidence in the Orange-Senqu basin of independent, epistemic communities as described by Haas (1993). However, the consultants contracted by riparian parties to conduct feasibility studies and design programmes for the LHWP served as a quasi-internal, expert network that, together with World Bank advisors, influenced decision makers through information collection and strategy design. Although these networks were contracted partly to represent the interests of their respective clients, the experts within the network were granted space

outside the formal negotiation process to envision strategies and incentives to balance competing interests and ensure mutual benefit at the binational level. Additionally, the diffusion of policy ideas through vertical and horizontal channels of communication translated principles established by a global-level epistemic community into agreements on the ground (section 5.1.4).

Beyond regime formation, chapters 6, 7, and 8 discussed three main network clusters influencing transboundary water governance arrangements' implementation in the Orange-Senqu basin. First, in the context of the LHWP, the coalition of local and international NGOs played a significant role in reshaping benefit allocation at the subnational level. They contributed to compensation policies' revision and the design of livelihood restoration strategies by monitoring the resettlement process, facilitating intercommunity communication, and mobilising local protests and international awareness campaigns. The coalition drew attention, locally and globally, to the gaps between resettlement and compensation promises and the actual services provided and payments dispersed. They also proposed alternative strategies and lobbied the LHDA directly and indirectly through pressure on the World Bank to motivate change (section 7.1.2).

Second, riparian parties continue to rely on a consortium of regional consultants to conduct joint studies in the basin. As such, this network cluster contributes significantly to the collection of data and information, and in certain cases, to the development of cooperative strategies (e.g., cost-sharing principles for the proposed re-regulating dam in the lower basin). However, the involvement of these quasi-

internal expert networks does not necessarily lead to the strong implementation of transboundary water governance arrangements. For example, efforts to compile the transboundary diagnostic analysis sponsored by the UNDP/GEF revealed reluctance amongst consulting firms to share information openly with competitors in their field. Although the data and information collected through joint studies technically belong to the joint commissions and contracting states, the capacity to interpret, utilise, and integrate the data frequently lies outside of riparian governments and within private consulting firms (section 6.3). Additionally, as the cases of the LHWP and the PWC illustrated, the transfer of knowledge from these expert networks to decision makers is never a one-way street. The goals and priorities of the contracting governments and commissions also played a significant role in setting the scope and expectations for research and data collection (section 5.1.4 and 7.2.2).

Bilateral and multilateral donors constitute the third network cluster influencing the performance of international water management institutions in the basin. This network of donor organisations has focused primarily on providing financial and technical support to ORASECOM (section 8.1). The resources have enabled riparian states to conduct joint studies, attend exchanges and fieldtrips, and fund commission meetings. Most significantly, the study demonstrated how the pressure on donor organisations to sell their services to riparian governments and joint commissions has contributed to a technocratic approach to institutional strengthening that fails to meaningfully acknowledge or address the influences of power and interest asymmetries in the basin's management of resources.

This approach causes donor organisations to diagnose the lack of basin-wide planning and allocation as a function of informational uncertainty and the youth of the joint commission as opposed to the zero-sum mentality underpinning South Africa's efforts to maintain the status quo. Consequently, donor organisations have focused heavily on efforts to reduce informational uncertainty among riparian states but have failed to meaningfully address some of the other important barriers (e.g., perceived commitment requirements, the limited scope of benefit analysis, the intangibility of alternatives, and the construction of facts and limitations) to cooperation.

Taken together, the analysis of expert networks active in the Orange-Senqu basin cannot fully corroborate the hypothesis that expert networks will bolster the implementation of water governance arrangements. Overall, the situation in the basin clearly demonstrates the potential for expert networks to motivate and contribute to significant change. It also shows, however, that expert networks are also influenced by power and interest asymmetries and are capable of reinforcing the status quo when challenging it doesn't directly benefit their aims.

#### ***9.1.6 Political Context***

*SQ6: How does political context influence the formation, implementation, and effects of transboundary water governance arrangements in the Orange-Senqu basin?*

The Orange-Senqu water regime's formation, implementation, and effects cannot be fully understood without considering the significant transitions from colonisation to independence, apartheid to democracy, and the related shifts in the economic and

political integration of the riparian states. Attention to the political context in which the water regimes were formed and implemented provides important insight. However, the empirical evidence from the basin does not fully corroborate the hypothesis that higher levels of integration between states facilitate the formation and implementation of transboundary water governance arrangements.

On one hand, much of the experience in the basin resonates strongly with the expectation that strong political relationships can enable agreement establishment, although wider tensions can stall the process of institutional formation. In the lower basin, South Africa's occupation of South West Africa led to high levels of political integration that ultimately facilitated the formation of the 1987 JTC. Upstream, strong political and economic ties between Lesotho and South Africa contributed to early convergence around the construction of the LHWP, but shifts in the political relationships repeatedly stalled research and negotiation processes (section 5.1.1).

Taking a step back from the fits and starts of the feasibility study in the Lesotho Highlands, however, this study showed that it was, in fact, low levels of regional integration that motivated the formation of early water agreements. During apartheid, South Africa used water agreements as a tool to influence regional integration (section 5.1.3). Recognising that collaboration over water resources can be used for such a purpose reminds us that it is embedded in a much wider sphere of interstate relations and that it may be influenced by a range of other motives and goals. As chapter 5 showed, water governance was not always the prime motivation for water agreements in the Orange-Senqu basin.

The shift in politics following South Africa's transition from apartheid to democracy contributed significantly to the levels of openness between riparian states and their opportunities and willingness to exchange information. This has increased adaptive capacity in the basin by allowing states to construct a more complete picture of basin resources and changing circumstances (section 6.2). The shift did not, however, significantly increase the willingness of South Africa to engage in planning or water resources allocation at the basin level, which limits the extent to which adaptive capacity can be achieved.

#### ***9.1.7 Comparative Analysis of Core Determinants***

*SQ7: Which determinants are most significant for explaining the formation, implementation, and effects of the Orange-Senqu transboundary water governance regime?*

Analysing the variance in determinants over time and comparing their impact on the international water management institutions comprising the Orange-Senqu water regime demonstrated the influential role that power asymmetry, problem structure, expert networks, and political contexts all played in the transboundary water governance arrangements' formations and implementations. Considering the interaction between each category of determinants confirmed the hypothesis that power asymmetry and problem structure are essential for understanding their emergences and effects.

Political context and power asymmetry proved mutually influential. Power asymmetry was shown to shape the political context in the early stages of water regime formation, when South Africa applied coercive tactics to influence the selection of political leadership in neighbouring states and territories. More commonly, the opposite occurred: political context influenced power asymmetries in the basin. Namibia's independence, for example, decreased South Africa's ability to set the agenda downstream. With the transition to democracy, however, South Africa regained external support. Emphasis on water's role in redressing past inequalities domestically also bolstered the bargaining and ideational power of the hegemon. Knowing whether or not riparian states had strong economic and political relationships is, taken alone, insufficient for understanding the transboundary water regime's emergence and effects. But the analysis of political context provided important insights when coupled with an understanding of the states' interest in different aspects of joint water management and their capabilities of leveraging power endowments to achieve specific aims.

Expert networks and power asymmetry were also shown to be closely intertwined. Expert networks influenced power asymmetries: in the case of the LHWP, external consultants and the coalition of local and international NGOs bolstered the power of weaker parties at the national and subnational scale. Power asymmetries' influence over expert networks was seen in the quasi-internal networks that conducted studies and designed programmes that reflected the priorities of powerful parties in the basin. The low-risk, technocratic approach taken by donor organisations also reflected their sensitivity to the power asymmetries and the need to sell their services to the basin

hegemon. Like political context, expert networks constitute an important supporting determinant in understanding the emergence and effects of transboundary water governance regimes.

Problem structure and power asymmetry were also closely interconnected. It was through understanding the combinations of power endowments and riparian states' interests that the effects of transboundary water governance were better understood. As this analysis has shown, the core attributes of problem structure—commitment requirements, interest asymmetry, and uncertainty—were adjusted through interaction, negotiation, and bargaining, all processes heavily influenced by the multiple dimensions of power asymmetry. Low interest asymmetry, uncertainty, and commitment requirement alone did not lead to institutions' establishments unless one or more parties had a strong interest in pursuing them and were willing to use their power and resources to make it happen.

## **9.2 Analytical Implications and Areas for Future Research**

The primary aim of this thesis was to serve as a building block study through which the understanding of effects and causal mechanisms in the Orange-Senqu basin will have implications for understanding effects and causal mechanisms in other cases.

The research framework developed for this study proved useful for gaining a deeper understanding of the formation, implementation and effects of the water regime and provided the tools for a systematic analysis of causal factors. Efforts to refine the framework used in this study and broaden its application will further deepen our

understanding of existing transboundary water resource governance arrangements and their effects and may help illuminate opportunities for challenging the status quo.

### ***9.2.1 Geographical Scope***

This study has focused on the formation, implementation, and effects of the four international water management institutions comprising the Orange-Senqu water regime. This research approach was adopted to enable in-depth analysis of riparian states' interactions and a deeper understanding of the relationships between the bilateral and multilateral institutions operating simultaneously in the basin. The focus on a singular basin allowed for extended periods of field research in each riparian country and the development of strong relationships that facilitated access to important meetings, information, and insights.

This research may be refined in the future by including the analysis of other transboundary water governance regimes in the SADC region. A comparative analysis of the experience of water cooperation in the Orange-Senqu and Incomati-Maputo basins, for example, could provide valuable insight into the different strategies and tactics used by the regional hegemon, South Africa, in different basins. Such a comparison would also illuminate the mechanisms and strategies used by the nonhegemonic states in the Incomati-Maputo basin, Mozambique and Swaziland, to shape the transboundary water governance arrangements there. Significantly, the Incomati-Maputo is the first basin in the SADC region where a basin-wide flow regime with current and future allocations specified for all three riparian countries and an ecological requirement for in-stream flows has been established. A deeper look at

the formation of the tripartite allocation agreement and the performance, determinants, and effects of their international water management institutions may also provide useful information for policymakers in the Orange-Senqu basin interested in clarifying water allocations at the basin level.

Comparative analyses with basins beyond the SADC region will also be valuable for examining the hypotheses explored in this study and developing a deeper understanding of international water management institutions' formations, performances, effects, and determinants worldwide.

### ***9.2.2 Interscalar Analysis***

This study has focused heavily on interstate interactions and formal water treaties and organisations. The analysis has also provided important insight into the role of bilateral and multilateral organisations operating in the basin and the power and interest asymmetries underpinning their largely technocratic approach to institutional strengthening. Attention was also paid to subnational actors influencing and affected by the transboundary water governance regime. More work, however, is needed to understand the layers of governance arrangements and the multiplicity of actors operating at the global, national, and local levels and how these layers interact to shape the patterns of riparian states' interactions.

At the national level, this study would benefit greatly from a more intensive analysis into the power and interest asymmetries affecting decision making and priority setting within each riparian government. A deeper understanding of the linkages and

interactions between the multiple departments and ministries charged with different aspects of water governance would be ideal. Each of the riparian states in the Orange-Senqu basin is in the midst of revising or implementing recently revised national water policies. Continued investigation into the factors shaping domestic policy reform and the impact of these policy changes on water resources and riparian states' interactions is critical for understanding the wider dimensions of the Orange-Senqu basin's water resources governance.

This study also exposed the influential role of private consultants contracted by riparian governments and joint commissions to conduct studies and propose management strategies. The private sector component of Orange-Senqu basin water governance is often overlooked. Building on the preliminary insights generated by this work, a more in-depth investigation into the relationships amongst consulting firms and between the consultants and government ministries in each of the riparian states could help deepen the understanding of knowledge production and utilisation in the basin.

### ***9.2.3. Putting Power and Interests into Practice***

Another key area for future research is the investigation of how a deeper understanding of power and interest asymmetries can be integrated into the strategies and tactics deployed by international donors. For example, deconstructing South Africa's zero-sum mentality highlighted at least four significant barriers hindering basin-wide planning and allocation in the Orange-Senqu basin: perceived commitment requirements, the limited analysis of potential benefits, the intangibility

of alternatives, and the construction of facts and limitations designed to maintain the status quo. Recognition and deconstruction of these barriers draws attention to a range of potential tactics for envisioning alternatives and enacting change, from the creation of informal discussion space to benefit-sharing frameworks and participatory modelling. Such deconstruction has the potential to assist riparian states in envisioning mutually beneficial alternatives that challenge the status quo. Additional work is required to understand how such tactics have been applied in other transboundary basins and the nature of their impacts on power asymmetries, the decision-making process, and transboundary water resources.

### **9.3 Conclusion**

This study has provided critical analysis of the institutional developments in the Orange-Senqu basin and of the performance, effects, and determinants of the wider water regime. In doing so, it has demonstrated that not all water cooperation has positive effects, an outcome often taken for granted.

More importantly, the analysis has illuminated the influences of power asymmetry, problem structure, expert networks, and political context in shaping the wide range of water governance structures and outcomes in the basin. It has shown that asymmetries in power and interests, in particular, are critical factors for understanding the emergence and effects of international water management institutions. Recognising that none of these determinants are static phenomena provides important insights into possibilities for generating resistance to the status quo, envisioning alternatives, and enacting change.

## APPENDIX 1: LIST OF INTERVIEWEES

<b>Name</b>	<b>Position/Affiliation</b>	<b>Date</b>	<b>Place of Interview</b>
Amakali, Maria	Deputy Director, Department of Water Affairs	11/9/2007	Windhoek, Namibia
Ashton, Peter	Aquatic Ecologist and Principal Researcher, CSIR-Pretoria	21/9/07	Pretoria, South Africa
Ashton, Peter	Aquatic Ecologist and Principal Researcher, CSIR-Pretoria	28/4/07	Pretoria, South Africa
Basson, Tertius	Engineer, MAAF	14/9/2007	Windhoek, Namibia
Biggs, Dudley	Former Deputy Director of Planning, MAWF, Former Member of the ORASECOM Technical Task Team	11/9/2007	Windhoek, Namibia
Brown, Chris	Executive Director, Namibian Nature Foundation	24/10/2007	Benoni, South Africa
Chamberlain, Linda	Programme Officer, European Commission	11/1/2008	Pretoria, South Africa
Claasens, Johann	Director of Investment and Management, TCTA	27/3/2007	Centurion, South Africa
Claassen, Marius	Research Group Leader for Water Resources Governance, CSIR-Pretoria	16/8/2009	Stockholm, Sweden
de Wet, Stefan	Deputy Director of Water Environment, Namibian Department of Water Affairs	25/10/2007	Benoni, South Africa
Dlamini, Zodwa	South African Delegate to the LHWC	17/4/2007	Maseru, Lesotho
Earle, Anton	Director, African Centre for Water Research	5/4/2007	Cape Town, South Africa
Engel, Albert	Sector Coordinator for Natural Resources and Rural Development, GTZ	17/09/07	Windhoek, Namibia
Farrington, Tom	Programme Management Advisor, SADC Secretariat	20/11/2007	Gaborone, Botswana
Grieb, Alexander	Senior Technical Advisor, KFW Development Bank	6/3/2007	Johannesburg, South Africa

Heyns, Piet	Former Under Secretary, Department of Water Affairs; Former Namibian delegate to ORASECOM and OKACOM	12/3/2007	Windhoek, Namibia
Heyns, Piet	Former Under Secretary, Department of Water Affairs; Former Namibian delegate to the ORASECOM and OKACOM	10/9/2007	Windhoek, Namibia
Hidemma, Ugo	Legal Counsel, TCTA	27/3/2007	Centurion, South Africa
Katai, Othusitse	Director, International Water Division, Department of Water Affairs	27/11/2007	Gaborone, Botswana
Katai, Othusitse	Director, International Water Division, Department of Water Affairs and Member of the ORASECOM Technical Task Team	16/08/2007	Stockholm, Sweden
Keevy, Chris	CEO, KOBWA	6/3/2007	Johannesburg, South Africa
Khathibe, Benedict	Lesotho Delegate to the LHWC	5/3/2007	Johannesburg, South Africa
Klintonberg, Patrick	Research and Training Coordinator, Desert Research Foundation of Namibia	18/9/2007	Windhoek, Namibia
Langford, John	Senior Manager, NamPower	12/3/2007	Windhoek, Namibia
Lesoma, Manuel	Water Commissioner	17/04/07	Maseru, Lesotho
Liebenberg, Piet	Engineer, MAWF; Delegate to the PWC and JIA	14/9/2007	Windhoek, Namibia
Makhoalibe, Sechoocha	Regional Project Manager, FFEM	29/11/2007	Gaborone, Botswana
Malephane, Malieketso	Chief Economic Planner, Water Commission	21/02/08	Maseru, Lesotho
Malzbender, Daniel	Director, African Centre for Water Research	5/3/2007	Johannesburg, South Africa
McCornick, Scott	Chief of Party, USAID	26/11/2007	Gaborone, Botswana
McKenzie, Ronnie	Director, WRP Consulting	12/11/2007	Pretoria, South Africa
McKenzie, Ronnie	Director, WRP Consulting	16/01/2008	Pretoria, South Africa

Melin, Mikael	Programme Manager, European Commission	28/11/2007	Gaborone, Botswana
Mendelsohn, John	Raison Consulting	12/7/2007	Windhoek, Namibia
Mochebelele, Reatile	Water Director, NEPAD; Former Lesotho Delegate to the LHWC	22/2/2007	Midrand, South Africa
Mojakisane, Mokake	Director, Department of Water Affairs	16/4/2007	Maseru, Lesotho
Mokorosi, Palesa Raliile	Department of Water Affairs	12/4/2007	Maseru, Lesotho
Mokorosi, Palesa Raliile	Department of Water Affairs	25/1/2008	Email Correspondence
Molapo, Letlafuoa	Delegate to the LHWC	12/4/2007	Maseru, Lesotho
Molapo, Lira	Principle Environment Officer, Water Commission	21/02/08	Maseru, Lesotho
Monggae, Feliz	CEO, Kalahari Conservation Society	21/11/2007	Gaborone, Botswana
Monyake, Vuyani	Senior Environmental Officer, Water Commission	11/4/2007	Maseru, Lesotho
Mumbuna, Njekwa	Division Manager, LHDA Strategic and Corporate Services	20/20/2008	Maseru, Lesotho
Mwakalumbwa, Charles	Chief Delegate, LHWC	12/4/2007	Maseru, Lesotho
Nthathakane, Peter	Chief Technical Officer, Water Commission	19/2/2008	Maseru, Lesotho
Nthathakane, Peter	Chief Technical Officer, Water Commission	26/2/2007	Maseru, Lesotho
Pashkin, Jenny	Associate, South African DWAF	15/2/2007	Pretoria, South Africa
Phillips, David	Director, Phillips Robinson and Associates	15/8/2009	Stockholm, Sweden
Phoofolofo, Matheka	Senior Systems Analyst, Water Commission	21/02/08	Maseru, Lesotho
Pyke, Peter	Chief Engineer. South African DWAF; Member of the technical task team to ORASECOM	20/2/2007	Pretoria, South Africa

Pyke, Peter	Chief Engineer, South African DWAf; Member of the technical task team to ORASECOM	16/01/08	Pretoria, South Africa
Ramoeletsi, Richard	Manager, Mohale Dam Development and Operations Division	20/2/2008	Maseru, Lesotho
Ramoeli, Phera	Senior Water Program Manager, SADC	27/11/2007	Gaborone, Botswana
Ramoseu, Lawrence	Coordinator, SADC Water Sector	25/10/2007	Benoni, South Africa
Reeve, Charles	Attaché to the Delegation, European Commission	11/1/2008	Pretoria, South Africa
Ridout, Malcolm	Senior Livelihoods Advisor, DFID-Southern Africa	1/2/2008	Pretoria, South Africa
Roberts, Carole	Project Manager, Desert Research Foundation of Namibia	18/9/2007	Windhoek, Namibia
Roberts, Paul	Former Deputy Director General, South African DWAf	26/4/2007	Pretoria, South Africa
Ruston, Ian	National Coordinator, GWC Consulting Engineers	20/2/2008	Maseru, Lesotho
Schreiner, Barbara	Deputy Director General, South African DWAf	5/3/2007	Johannesburg, South Africa
Seago, Caryn	Analyst, WRP Consulting	12/11/2007	Pretoria, South Africa
Seeger, Cathleen	Programme Manager, GTZ	5/3/2007	Johannesburg, South Africa
Seely, Mary	Associate, Desert Research Foundation of Namibia	18/9/2007	Windhoek, Namibia
Sekhran, Nik	Programme Manager, UNDP/GEF	23/4/2007	Pretoria, South Africa
Sepamo, Tsepo	Senior Engineer, Water Commission	21/02/08	Maseru, Lesotho
Seqhee, Mothusi	Programme Director, TRC	27/02/07	Maseru, Lesotho
Setloboko, Thato	Principle Hydrologist for Botswana's Department of Water Affairs and Member of the ORASECOM Technical Task Team	20/11/2007	Gaborone, Botswana

Sibanda, Gibson	Legal Counsel for the Department of Water Affairs	20/11/2007	Gaborone, Botswana
Tanner, Andrew	Director, Ninham Shand Consultants	15/9/2009	Phone Conversation
Tarr, Peter	Executive Director, Southern African Institute for Environmental Assessment	24/10/2007	Benoni, South Africa
Tau, Khomoatsana	Director of Energy, Ministry of Natural Resources	13/4/2007	Maseru, Lesotho
Tau, Khomoatsana	Director of Energy, Ministry of Natural Resources	3/5/2007	Johannesburg, South Africa
Taylor, Paul	Director, Cap-Net	27/3/2007	Pretoria, South Africa
Taylor, Paul	Director, Cap-Net	5/3/2007	Pretoria, South Africa
Tekateka, Reggie	Specialist Advisor on International Relations, South African DWAF; Delegate to ORASECOM and the LHWC	15/11/2007	Pretoria, South Africa
Tekateka, Reggie	Specialist Advisor on International Relations, South African DWAF; Delegate to ORASECOM and the LHWC	31/10/2007	Pretoria, South Africa
Thamae, Lenka	Executive Secretary, ORASECOM	16/1/2008	Pretoria, South Africa
Tlhomola, Fred	Technical Specialist in Integrated Planning for the LHDA	20/2/2008	Maseru, Lesotho
Tlhomola, Fred	Technical Specialist in Integrated Planning for the LHDA	16/2/2009	Email Correspondence
Turner, Tim	Chief Technical Advisor, UNDP/GEF	25/10/2007	Benoni, South Africa
Turton, Anthony	Principal Researcher, CSIR-Pretoria	6/2/2007	Pretoria, South Africa
Turton, Anthony	Principal Researcher, CSIR-Pretoria	13/12/2007	Pretoria, South Africa
Van den Berg, Leo	Program Director, South African DWAF	24/10/2007	Benoni, South Africa

van Niekerk, Peter	Chief Director of Integrated Water Resources Planning, South African DWAF; Delegate to ORASECOM and PWC	20/3/2007	Pretoria, South Africa
van Rensburg, Martie Janse	CEO, TCTA	27/3/2007	Centurion, South Africa
van Wyk, Neil	Chief Engineer, South African DWAF	15/2/2007	Pretoria, South Africa
Vogel, Horst	Programme Manager, GTZ/SADC Water Programme	28/11/2008	Gaborone, Botswana
Vogel, Horst	Programme Manager, GTZ/SADC Water Programme	16/8/2009	Stockholm, Sweden
Von Tonder, Ben	Executive Coordinator, Environmental Justice and Advocacy Centre; Former Director, Highland Church Action Group	17/4/2007	Maseru, Lesotho
Yamamoto, Akiko	Programme Manager, UNDP/GEF	8/10/2007	Pretoria, South Africa
Yamamoto, Akiko	Programme Manager, UNDP/GEF	23/4/2007	Pretoria, South Africa

*Note:* CEO = Chief Executive Officer, CSIR = Council for Scientific and Industrial Research, DFID = Department for International Development, DWAF = Department of Water Affairs and Forestry, FFEM = French Global Environmental Facility, GTZ = German Technical Cooperation Agency, JIA, Joint Irrigation Authority, KFW = German Reconstruction Credit Institute, KOBWA = Komati Basin Water Authority, LHDA = Lesotho Highlands Development Authority, LHWC = Lesotho Highlands Water Commission, MWAFF = Ministry of Water and Agricultural Affairs, NEPAD = New Partnership for African Development, OKACOM = Okavango River Basin Water Commission, ORASECOM = Orange-Senqu River Commission, PWC = Permanent Water Commission, SADC = Southern African Development Community, TCTA = Trans-Caledon Tunnel Authority, UNDP/GEF = United Nations Development Programme/Global Environmental Facility, USAID = United States Agency for International Development, WRP = Water Resources Partnership Ltd.

## APPENDIX 2: ARTICLES, PAPERS, AND PRESENTATIONS RELATED TO THE STUDY

### Published Articles

- Kistin, E. J., J. Fogarty, R. Shaening-Pokrasso, and M. McCally. 2010. Water, climate change, and child health. *Archives of Disease in Childhood* 95:545-549.
- Kistin, E. J., and P. J. Ashton. 2008. Adapting to change in trans-boundary rivers: An analysis of treaty flexibility on the Orange-Senqu River basin. *International Journal of Water Resources Development* 24: 385–400.
- Kistin, E. J., P. J. Ashton, A. Earle, D. Malzbender, M. J. Patrick, and A. R. Turton. 2009. An overview of the content and historical context of the international freshwater agreements that South Africa has entered into with neighboring countries. *Journal of International Environmental Agreements: Politics, Law and Economics* 9 (1): 1–21.

### Papers and Presentations

- The dynamic effects of transboundary water interaction on adaptive capacity in the Orange-Senqu basin. 19 August 2009. Paper presented at the World Water Week, Stockholm.
- Transboundary water and climate change. 6 March 2009. Lecture presented at Colwell Center for Global Understanding, St. Johnsbury, VT.
- Harmony and discord: An analysis of donor cooperation in the Orange-Senqu River basin. 22–24 July 2008. Paper presented at Universities Council on Water Resources Annual Conference, Durham, NC.
- Beyond water conflict: Evaluating the effects of trans-boundary water cooperation. 26–29 March 2008. Paper presented at the 49th ISA Annual Convention, San Francisco.
- Trans-boundary water cooperation in the SADC: From concept to implementation. 30 October–3 November 2007. Paper presented at the 8th WaterNet/WARFSA/GWP-SA Symposium, Lusaka, Zambia.
- Critiquing current cooperative arrangements on transboundary waters. 13 May 2007. Paper presented at the Third International Workshop on Hydro-Hegemony, London.
- Putting power into practice: Challenging the hegemony of the global water community. 13 May 2007. Panel participant, Third International Workshop on Hydro-Hegemony, London.
- Evaluating the effectiveness of transboundary cooperation. 7 February 2007. Lecture presented at the Council for Scientific and Industrial Research, Pretoria, South Africa.
- Qualifying cooperation over transboundary waters. 1 December 2006. Paper presented at the Water Governance for Africa, Bradford Centre for International Development, Bradford, UK.
- Reflections on the UNDP 2006 Human Development Report. 15 November 2006. Paper presented at the Oxford University Centre for the Environment, Oxford, UK.
- Conflict and cooperation over transboundary waters. 6 November 2006. Lecture presented at St. John's College Lecture Supper, Oxford University, Oxford, UK.
- The refractive nature of cooperation over transboundary water resources. 7 May 2006. Paper presented at the Second International Conference on Hydro-hegemony, Kings College, London.

### Reports

- Hosterman, H. R., P. G., McCornick, E. J., Kistin, A. Pant, B. Sharma, and L. Bharati, L. 2009. Water, climate change and adaptation: Focus on the Ganges. Nicholas Institute Working Paper. <http://nicholasinstitute.duke.edu>
- Phillips, D. J. H., J. A. Allan, M. Claassen, J. Granit, A. Jägerskog, E. Kistin, M. Patrick, and A. Turton. 2008. The Transcend-TB3 Project: A methodology for the trans-boundary waters opportunity analysis. Report Number 23, Stockholm: SIWI.
- Roux, D., K. Murray, L. Hill, H. Biggs, C. Breen, A. Driver, E. J. Kistin, M. Levendal, K. Rogers, and H. Roux. Implementing cross-sector policy objectives for conserving freshwater ecosystems: A reflective assessment tool for achieving multi-agency cooperation. South African Water Research Commission, Project K5/1710.

## **APPENDIX 3: ANALYSIS OF SOUTHERN AFRICAN WATER AGREEMENTS**

### **Introduction**

Transboundary river basins, which extend across national boundaries and are shared by two or more states, in the SADC region are vital for human health, economic vitality, and environmental processes (Pallett 1997). They contain sixty-eight percent of the SADC region's area, 74% of the people, and 91% of the available surface water resources are contained within such basins (Ashton and Turton, 2008). There are twenty-one shared rivers in the SADC region<sup>48</sup> and twenty-two aquifers that extend across national boundaries and are shared by two or more states (Turton et al. 2006).

The riparian states depend on these shared systems to meet the needs of urban and rural communities, industry, mining, power generation, irrigated agriculture, and environmental flows (Basson, Van Niekerk, and Van Rooyen 1997). As each country strives to generate economic growth, provide water for urban and rural residents, and protect the ecological health of the river, pressures on these shared systems are increasing (Ashton, Hardwick, and Breen 2008). Five of these shared river systems—the Incomati, Limpopo, Maputo, Orange-Senqu, and Okavango—are approaching “closure,” signifying that insufficient water is available for new developments if current water use patterns continue unchanged (Turton and Ashton, 2008). Several of the other shared basins, including the Zambezi and the Cunene, are also heavily developed but have not yet reached the levels of water stress experienced in the other four basins (Ashton, Hardwick, and Breen 2008).

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<sup>48</sup> This includes the Chiloango, Congo, Pagani, Umba, Rovuma, Zambezi, Pungwe, Buzi, Save-Runde, Cunene, Cuvelai, Okavango, Limpopo, Incomati, Orange-Senqu, Umbeluzi, Maputo, Thukela, and Nile rivers and the drainage basins of the endorheic lakes Natron and Chilway (Kistin et al. 2009).

This appendix analyses thirty-seven agreements pertaining specifically to river systems shared between southern African states. Unlike many content analyses of transboundary water treaties that merely analyse the mention of key categories in treaty texts, this appendix delves deeper and looks at how important management issues like water allocation and information sharing are actually addressed in the agreements. This method provides additional insight into the range of strategies and approaches employed by riparian states.

This portion of the study contributes to the empirical literature on international water management institutions by compiling a comprehensive collection of all the international freshwater agreements entered into between southern African states beginning in the twentieth century. It presents an in-depth analysis of the rules, procedures, and organisations adopted overtime.<sup>49</sup> This analysis provides insight into the shifting priorities in basin states as well as a deeper understanding of the legal and institutional landscapes that guide present water use and decision making. A better understanding of the coverage and content of existing agreements in southern Africa is a first step towards understanding the formation and effects of institutional arrangements for transboundary water management in the region. Reflection on the current institutional arrangements for transboundary water management may also assist in the creation of new agreements and the enhancement of existing institutions.

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<sup>49</sup> The term *southern African states* refers to the fourteen member states of the SADC. They are Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe.

### **A3.1 Information Sources on International Freshwater Agreements**

Multiple collections of international water agreements are available to support the study of water governance and institutional design. This study drew on four particular databases to gain information about existing international freshwater agreements in southern Africa. First, the FAOLEX database, administered by the UN's Food and Agricultural Organisation, includes over 3600 water-related treaties formed between 805 and 1984 (FAOLEX 2004). Second, the Transboundary Freshwater Dispute Database (2004), housed at Oregon State University in the US, includes a Web-based, searchable collection of roughly 506 international agreements formed between 1820 and 2002. That database is updated periodically with new agreements. Third, the Database of South African Water Agreements, created by the Council for Scientific and Industrial Research and housed at the Water Research Commission, compiles the full text of sixty-one international, water-related treaties and agreements that South Africa has entered into since 1910, including protocols and conventions entered into with countries worldwide (e.g., the Convention on the Protection of Wetlands; Ashton et al. 2006). Finally, the African Transboundary Water Law Page, created by Mark Lautze at Tufts University and Mark Giordano at the International Water Management Institute, includes over 150 international water agreements signed between 1862 and 2005 pertaining to water issues on the African continent (Lautze and Giordano, 2005). Further communication with the departments of water affairs in riparian countries facilitated the review of the full text of both current and historical agreements (see chapter 3).

Using these four databases and a review of existing literature, a list of thirty-seven treaties pertaining specifically to river systems shared between southern African states was compiled (table A3.1). Agreements that focused primarily on boundary demarcation or general bilateral cooperation and only mentioned water were omitted from the present analysis. Additionally, amendments and protocols to existing treaties were not regarded as separate agreements. For convenience, each treaty used in this appendix is cited by its CSIR database number and year of signature (e.g., 43, 1971: 18, 1964) when it is referred to in the text. Agreements not included in the original CSIR database have been assigned database numbers A1–A15. Readers can locate the title of the relevant document from the list of treaties and agreements in table A3.1. A full copy of the particular treaty or agreement can then be viewed on the publically available database (Ashton et al., 2006). Copies of these added agreements can be obtained from the author and will eventually be included in an updated CSIR database.

**Table A3.1** Chronological list of international freshwater agreements pertaining to basins shared between southern African states

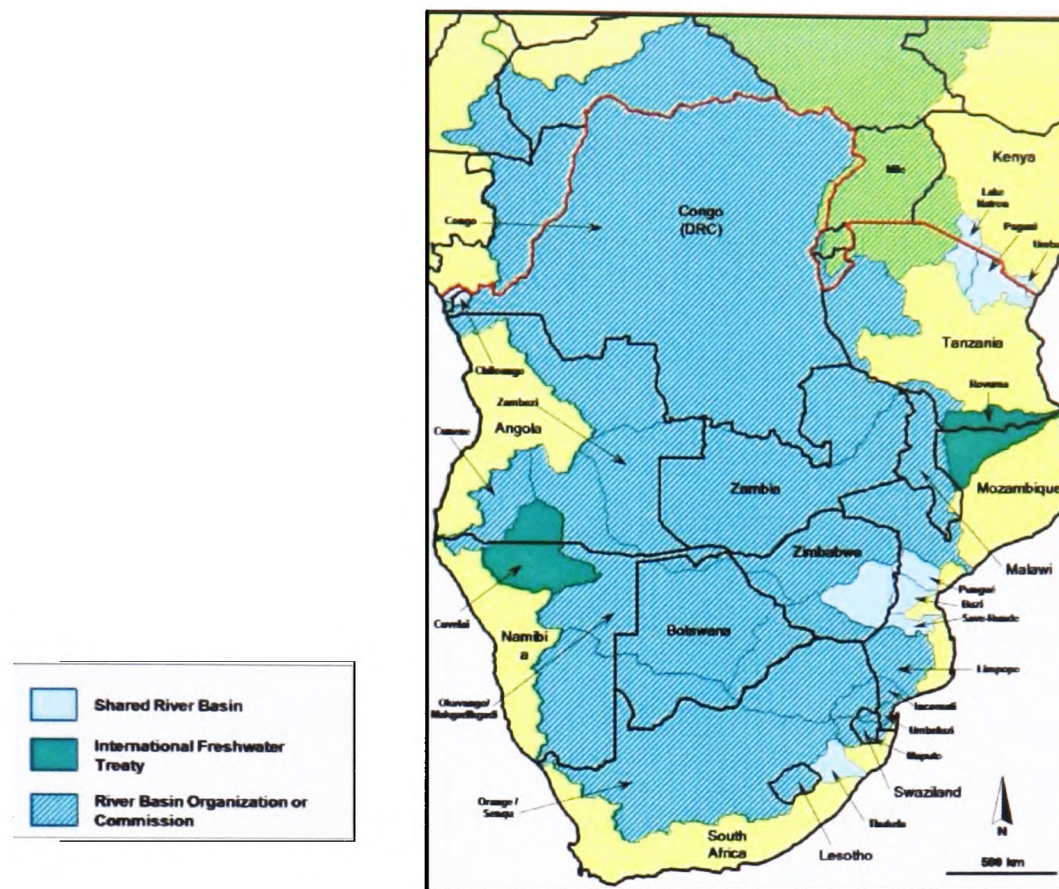
DB#	Year	Agreement
63	1926	Agreement between the government of the Union of South Africa and the Government of the Republic of Portugal regulating the use of Waters of the Kunene River for the Purposes of Generating Hydraulic Power and of Inundation and Irrigation in the Mandated Territory of South West Africa
18	1964	Agreement between the Union of South Africa and Portugal in Regard to Rivers of Mutual Interest and the Cunene River Scheme
50	1969	Agreement between the Government of the Republic of South Africa and the Government of Portugal in regard to the first phase of development of the water resources of the Cunene River Basin
43	1971	Agreement between the Government of the Republic of South Africa and the Government of the Republic of Portugal in Regard to Rivers of Mutual Interest 1964—Massingir Dam
A15	1978	Memorandum of Understanding between the Government of South Africa and the Government of Lesotho for the Establishment of a Joint Technical Committee
59	1980	Agreement in Respect of a Servitude to be granted by Swaziland to South Africa for the Inundation of 3800 Acres (1540 Hectares) in Swaziland by the Pongolapoort Dam and the Instruments of Ratification Thereto
4	1983	Agreement between the Governments of the Republic of South Africa, The Kingdom of Swaziland and The Republic of Mozambique Relative to the Establishment of a Tripartite Permanent Technical Committee

A1	1983	Agreement between the Government of the Republic of South Africa and the Government of the Republic of Botswana establishing the Joint Permanent Technical Committee
58	1984	Agreement between the Governments of the Republic of South Africa, the People's Republic of Mozambique and the Republic of Portugal Relative to the Cahora Bassa Project
13	1986	Treaty on the Lesotho Highlands Water Project between the Government of the Republic of South Africa and the Government of the Kingdom of Lesotho
47	1986	Agreement between the Government of the Republic of Botswana, the Government of the People's Republic of Mozambique, the Government of the Republic of South Africa and the Government of the Republic of Zimbabwe Relative to the Establishment of the Limpopo Basin Permanent Technical Committee
A3	1987	Agreement between the Republic of Zimbabwe and the Republic of Zambia concerning the utilization of the Zambezi River (July)
A5	1987	Agreement on the Action plan for the environmentally sound management of the Common Zambezi River System (May)
76	1987	Samewerkingsooreenkoms tussen die Regering van die Republiek van Suid-Afrika en die Oorgangsregering van Nasionale eenheid van Suidwes-Afrika/Namibië Betreffende die beheer, ontwikkeling en Benutting van die Water van die Oranjerivier
38	1988	Agreement Relating to the supply of water from the Molatedi Dam on the Marico River
A2	1989	Memorandum by the Joint Permanent Technical Commission on the Utilization of Water from the Limpopo River and Its Tributaries Where these Rivers Constitute the International border between the Republic of Botswana and the Republic of South Africa
A6	1990	Agreement between the Government of Botswana and the Republic of Namibia on the Establishment of a Joint Water Commission
A7	1990	Agreement between the Peoples' Republic of Angola and the Government of the Republic of Namibia on General Cooperation and the Creation of the Angolan-Namibian Joint Commission of Cooperation
80	1991	Tripartite Ministerial Meeting of Ministers Responsible for Water Affairs held on the 15th of February 1991 in Swaziland (Piggs Peak Agreement)
8	1992	Treaty on the Development and Utilization of the Water Resources of the Komati River Basin between the Government of the Republic of South Africa and the Government of the Kingdom of Swaziland
9	1992	Treaty on the Establishment and Functioning of the Joint Water Commission between the Government of the Republic of South Africa and the Government of the Kingdom of Swaziland
20	1992	Agreement on the Violsdrift and Noordoewer Joint Irrigation Scheme between the Government of the Republic of Namibia and the Government of the Republic of South Africa
84	1992	Agreement between the Government of the Republic of South Africa and the Government of the Republic of Namibia on the Establishment of a Permanent Water Commission
A8	1994	Agreement between the Governments of the Republic of Angola, the Republic of Botswana and the Republic of Namibia on the Establishment of a Permanent Okavango River Basin Water Commission
57	1995	Protocol on Shared Watercourse Systems in the Southern African Development (SADC) Region
1	1996	Agreement between the Government of the Republic of South Africa and the Government of the Republic of Mozambique on the Establishment and Functioning of the Joint Water Commission
89	1997	Memorandum of Understanding between the Government of the Republic of Mozambique and the Government of the Republic of South Africa Concerning Mepanda Uncua
3	2000	Agreement between the Government of the Republic of Botswana, the Kingdom of Lesotho, the Republic of Namibia and the Republic of South Africa on the Establishment of the Orange-Senqu River Commission
A9	2000	Memorandum of Understanding between the Government of the Republic of Mozambique and the Republic of Zimbabwe on the Development of the Pungue River Basin Joint Integrated Water Resources Management Strategy
6	2000	Revised Protocol on Shared Watercourses in the Southern African Development Community
36	2002	The Tripartite Interim Agreement between the Republic of Mozambique and the Republic of South Africa and the Kingdom of Swaziland for Cooperation on the Protection and Sustainable Utilisation of the Incomati and Maputo Watercourses
A10	2002	Agreement between the Government of the Republic of Mozambique and the Republic of Zambia on the establishment of the Joint Water Commission
A11	2004	Agreement between the Republic of Botswana, the Republic of Mozambique, the Republic of South Africa and the Republic of Zimbabwe on the establishment of the Limpopo Watercourse Commission
A12	2004	Agreement between the Republic of Angola, the Republic of Botswana, the Republic of Malawi,

		the Republic of Mozambique, the Republic of Namibia, the United Republic of Tanzania, and the Republic of Zimbabwe on the Establishment of the Zambezi Watercourse Commission
44	2004	Agreement between the Government of the Kingdom of Swaziland and the Government of the Republic of South Africa on the Operation of the Lavumisa Government Water Supply
A13	2007	Agreement between the United Republic of Tanzania and the Government of the Republic of Mozambique on the Establishment of a Joint Water Commission
A14	2008	Agreement between the United Republic of Tanzania and the Government of the Republic of Mozambique on the Establishment of the Rovuma Basin Committee

### **A3.2 Coverage of Freshwater Agreements**

The coverage of freshwater agreements and organisations in southern Africa is substantial, forming approximately one-third of all the freshwater agreements signed on African river basins (Lautze and Giordano 2005). Of the twenty-one international river basins in the SADC region, thirteen are subject to at least one freshwater treaty, and eleven are governed by some form of international basin organisation (Turton et al., 2006; Malzbender and Earle, 2008) (figure A3.1). The SADC river basins that are governed by one or more freshwater agreements and possess a formal international river basin organisation account for approximately 90% of the shared surface water resources in the region (Ashton and Turton, 2008). For some of the river basins not covered by basin-specific, international, freshwater agreements, like the Buzi and Save-Runde, efforts to develop transboundary water institutions are in the advanced stages (Earle and Malzbender 2008). However, no formal international agreements have yet been made regarding the groundwater resources shared between southern African states (Turton et al. 2006).



**Figure A3.1** Map showing the coverage of international water agreements and joint organisations in southern Africa. *Source:* Figure drawn by Dr. Pete Ashton and reproduced with permission.

The extensive coverage of international water agreements in southern Africa has inspired cautious optimism about the future of water management in the SADC region (Turton 2005; Ashton et al. 2006). The number of agreements suggests a prolonged history of interaction over common waters in the region. Yet, as section 1.2 stressed, a numerical account of water treaties, taken in isolation, reveals little about the context in which the agreements were negotiated, the nature of rules and regulations adopted, or the influence of the agreements in addressing problems or enhancing joint governance (Kistin et al. 2009).

### **A3.3 International Agreements' Content**

The thirty-seven freshwater agreements considered in this analysis vary by party, scope, and content, with multiple agreements and institutions contributing simultaneously to the structures of governance of the international river basins in the

region. While many of these agreements consider a broad range of issues, particular focus is given to five key issues of institutional design: information sharing, water allocation, water quality, side payments/issue linkages, monitoring, evaluation, and dispute resolution.

The categories for analysis were chosen because, based on a review of literature, they constitute some of the most common issues dealt with by states and negotiators seeking to create new agreements or modify existing arrangements. An evaluation of the thirty-seven freshwater agreement's content provides important insight into the shifting priorities of the riparian parties and a deeper understanding of the rules, regulations, and institutional landscape that now guide current patterns of water utilisation and decision making.

### ***A3.3.1 Information Sharing***

Nearly all of the freshwater agreements regarding rivers shared between members of the SADC explicitly require parties to exchange data and information. In fact, the earliest agreements for freshwater management, signed in 1926 and 1964 between South Africa and Portugal, focussed the parties' collaboration around the exchange of "hydrological and other relevant data" and the realisation of joint studies regarding water availability and demand (63, 1926; 18, 1964).

The types of data shared have expanded over time and reflect an increasing concern for environmental health and the ecological integrity of shared basins (see section 4.3.2). Early agreements focussed primarily on the exchange of information about

plans for the development and use of shared waters and hydrological data pertaining to the system. Yet by the late 1980s, as environmental protection gained recognition worldwide, obligations to share information about the water quality and ecological conditions of the shared systems were incorporated into agreements alongside requirements to share information about the hydrological, hydrogeological, and meteorological conditions (e.g., A5, 1987; 57, 1995; 3, 2000; 36, 2002). The 1987 agreement between Botswana, Mozambique, Tanzania, Zambia, and Zimbabwe is one of the first agreements in the region to deal comprehensively with environmental concerns. The agreement draws heavily on the principles established at the Mar del Plata Conference and the African Ministerial Conference on the Environment to outline a strategy for the environmentally sound management of the shared basin (A5, 1987).

Where an exchange of information about the development and use of a water resource is required, parties are obligated to notify any potentially affected states before proceeding with development plans. Additional information (e.g., the hydrological characteristics of the basin) is to be made available upon request from any other riparian state. The methods for data collection and exchange articulated in these freshwater agreements have also evolved to reflect changing levels of technology. One of the most recent agreements, for the tripartite management of the Incomati and Maputo basins, reflects technological advancements in mandating the exchange of data and information between riparian parties using a common website (36, 2002).

The importance of comparable and compatible data is acknowledged in agreements pertaining to the Orange-Senqu, Incomati, Maputo, and Zambezi Rivers (3, 2000; 36, 2002; A12, 2004). Data incompatibility may stem from a lack of consensus regarding the preferred approach to investigations, a lack of agreement on data collection protocols, variability in laboratory analytical methodologies, poor database management and reporting systems, and/or a lack of agreement on interpretation methods (Kistin and Phillips, 2007). Within the treaty frameworks, parties aim to increase data compatibility through joint studies, and in one case, the development of data protocols to standardise data collection and processing. The development of a basin-wide data protocol is further mentioned in the 2004 agreement establishing the Zambezi Watercourse Commission. According to Phera Ramoeli, director of the SADC Water Sector, preliminary efforts are also under way to develop basin-wide data protocols in the Orange, Incomati, Limpopo, and Maputo basins (personal communication, 2008).

### ***A3.3.2 Allocation***

Only a small portion of southern Africa's freshwater agreements specify water allocations. This is not dissimilar from global trends. In their study of 506 freshwater treaties, Wolf (2003) noted that only twenty-seven include water quantity as a principle issue-area.

Of the thirty-seven freshwater agreements reviewed in this analysis, only eleven specify any type of water allocation. The majority of the allocation agreements deal with bilateral projects established in the early 1990s or before. However, the 2002

Tripartite Interim Agreement provides a notable exception (36, 2002). The agreement outlines a comprehensive flow regime for the Incomati and Maputo Rivers. Most of southern Africa's freshwater allocation agreements are bilateral and project-related and were established before South Africa's transition to democracy in 1994 (table A3.2).

**Table A3.2** Allocation agreements between southern African states and their specifications by basin.

Basin	DB#	Year	Water Allocation specifications
Incomati	80	1991	<b>South Africa</b> is required to release 2 m <sup>3</sup> /s averaged over a cycle of three days
	8	1992	<b>Swaziland:</b> 15.1 hm <sup>3</sup> at high assurance; 260.2 hm <sup>3</sup> at low assurance; 46 hm <sup>3</sup> for afforestation <b>South Africa:</b> 157.8 cubic hectometres at high assurance; 381.0 cubic hectometres at low assurance; 99 hm <sup>3</sup> for afforestation
	36	2002	<b>South Africa:</b> 336.6 Mm <sup>3</sup> /year (first priority supplies); 786 Mm <sup>3</sup> /year (irrigation supplies); 475 Mm <sup>3</sup> /year (afforestation) <b>Swaziland:</b> 22 Mm <sup>3</sup> /year (first priority supplies); 261 Mm <sup>3</sup> /year (irrigation supplies); 46 Mm <sup>3</sup> /year (afforestation) <b>Mozambique:</b> 19 Mm <sup>3</sup> /year, with up to 87.6 Mm <sup>3</sup> /year reserved (first priority supplies); 280 Mm <sup>3</sup> /year (irrigation supplies); 25 Mm <sup>3</sup> /year (afforestation)
Maputo	59	1980	South Africa is required to supply 5 cusecs of water to Swaziland in addition to the construction of a 280 acre-feet storage reservoir near Lavumisa
	36	2002	<b>South Africa:</b> 242 Mm <sup>3</sup> /year (first priority supplies); 532 Mm <sup>3</sup> /year (irrigation supplies); 198 million Mm <sup>3</sup> /year (afforestation) <b>Swaziland:</b> 44 Mm <sup>3</sup> /year (first priority supplies); 413 Mm <sup>3</sup> /year (class 1), 114 (class 2; irrigation supplies); 82 Mm <sup>3</sup> /year (afforestation) <b>Mozambique:</b> 6.0 Mm <sup>3</sup> /year, with up to 87.6 Mm <sup>3</sup> /year reserved (first priority supplies); 60 Mm <sup>3</sup> /year (irrigation supplies); 0 Mm <sup>3</sup> /year (afforestation)
Orange-Senqu	13	1986	Annex 2 specifies the amount of water to be delivered annually from Lesotho to South Africa between 1995 and 2020
	20	1992	20 Mm <sup>3</sup> /year is allocated for the joint scheme, with 11 Mm <sup>3</sup> /year designated for farmers on the South African side and 9 Mm <sup>3</sup> /year for those in Namibia
Cunene	x	1969	<b>Portugal:</b> Granted the right to abstract 50%, or 80 m <sup>3</sup> /s <b>South Africa:</b> Granted 6 m <sup>3</sup> /s for irrigation, household use, and stock watering in the Ovamboland area of South West Africa/Namibia
Limpopo	38	1988	<b>Department of Water Affairs (Republic of Bophuthatswana):</b> 5.0 Mm <sup>3</sup> /year (primary purposes); 20.6 Mm <sup>3</sup> /year <b>Water Utilities Corporation (Botswana):</b> 7.3 Mm <sup>3</sup> /year (primary purposes) <b>Department of Water Affairs and Forestry (South Africa):</b> 10.6 Mm <sup>3</sup> /year (irrigation)
	A2	1989	Flows in the Ngotwane, Marico, and Limpopo rivers where they constitute the border shall be shared equally between states with an estimated quantity of roughly 116.67 Mm <sup>3</sup> /year for Botswana and South Africa.

The principle of "equitable and reasonable utilisation," which is enshrined in global and regional water agreements (e.g., UN, 1997; SADC, 2000) has been adopted in many of the bilateral and basin-wide agreements as a goal and/or guide for the

management of shared waters. Besides the Joint Permanent Technical Committee governing the Incomati and Maputo basins, however, no other joint organisation has yet attempted to specify a basin-wide flow regime. While the factors that states may consider when defining what might be equitable and reasonable for a particular basin are quite broad, the flow regimes established for the Incomati and Maputo rivers are underpinned by a consideration of

- a) the geographic, hydrological, climatic, and other natural characteristics of each watercourse;
- b) the need to ensure water of sufficient quantity with acceptable quality to sustain the watercourses and their associated ecosystems;
- c) any present and reasonably foreseeable water requirements, including afforestation;
- d) existing infrastructure that has the capacity to regulate the streamflow of the watercourses; and
- e) agreements in force among the parties.

The majority of allocations enshrined in these agreements are specified in volumetric terms. Two of the agreements divide the water resources using a basin percentages split. The 1969 agreement regarding water resources development in the Cunene basin granted Portugal an entitlement to 50% of the basin flow, an estimated 80 m<sup>3</sup>/s (50, 1969). The 1989 Memorandum of Understanding signed between South Africa and Botswana (A2, 1989) committed parties to a 50/50 division of water (estimated at roughly 116.67 Mm<sup>3</sup> per state, per year) from the portion of the Limpopo River that constitutes the common boundary.

As climatic, demographic, and socioeconomic changes take place in the region, management strategies and allocations may require adjustment. Four of the allocation agreements recognise the potential need for adjusting allotments in response to changes in water availability, demand, or technology (e.g., 13, 1986; 38, 1988; 8, 1992; 36, 2002).

Some of the agreements include specific provisions to adjust allocation or assurance levels in the event of such changes (see section 4.3.2). For example, parties in the Incomati basin assigned water allocation using high and low assurance levels. This method guides parties in the curtailment of funds in the event of a drought (Komati Basin Water Authority [KOBWA], 2006). Additionally, the agreement establishing the LHWP (13, 1986) includes a delivery schedule designed to increase gradually in synchrony with successive phases of the project and subject to modification based on South Africa's level of demand. Alternatively, the agreement establishing the VNJIS (20, 1992) provides water managers with no specific guidelines for adjusting the specified allocations to each country over time. Instead, it leaves the issue to the two bilateral institutions—the JIA and the PWC—for investigation, negotiation, and recommendation to parties (Kistin and Ashton, 2008).

### ***A3.3.3 Water Quality and Environmental Protection***

Though often given less attention than quantity issues, the issue of water quality has been consistently recognized in agreements dating from the early 1990s. In the late 1980s, the impacts of poor water quality on allocation, economic development and

ecosystem health were acknowledged in select agreements. The project agreement for water delivery from South Africa to Gaborone, Botswana (38, 1988), for example, specified that the delivery of poor quality water would be treated as the delivery of no water at all (*e.g.*, Article 12.13). The 1987 agreement specifying an environmentally sound management plan for the Zambezi River, further sought to balance human, economic and ecological uses of the shared waters (A5, 1987). Parties supplemented the 2002 Tripartite Interim Agreement on the Incomati and Maputo rivers with a detailed resolution on the exchange of information and water quality (24, 2002). The resolution specifies short and long term targets for water quality in both basins.

As concerns about water quality and ecological health continue to grow, several states in the region have started to investigate and adopt legislation to mandate in-stream flow requirements at the national level (Tharme, 2000; Mazvimavi et al. 2007). To date, however, the Tripartite Interim Agreement (36, 2002) is the only international treaty that formalizes a specific environmental water allocation at the basin level.

#### ***A3.3.4 Side Payments/Issue-Linkage***

In line with the global trends identified by Dombrowsky (2007), the analysis of the 37 southern African agreements reveals that explicit side-payments and non-water issue linkages are not overtly common in the southern African region. Issue-linkage in the region has been restricted primarily to the development of hydropower schemes with payments made between parties for the construction of joint infrastructure (see 50, 1969; 8, 1984). In the establishment of the Komati Basin Authority, South Africa

agreed to compensate Swaziland for the portion of its land inundated by the construction of the Driekoppies Dam (8, 1992). Perhaps the best example of side-payments and issue-linkage is the Lesotho Highlands Water Project. The project stores water in the Lesotho Highlands and diverts it to the Vaal dam, servicing South Africa's prime industrial province. In return for this service, Lesotho receives hydropower generated through the scheme and royalty payments for the water delivery.

#### ***A3.3.5 Monitoring, Enforcement, and Dispute Resolution***

Of the 37 treaties listed in Table A3.1, 16 outline specific procedures for dispute resolution. In general, disputes arising between parties are initially referred back to the parties or to the joint organization for resolution. If point disputes remain unresolved, the agreements specify a range of procedures for referring the dispute to a third party. In the case of the Zambezi Watercourse Commission disputes not resolved among the states or by the Council can be referred to the executive secretary and on to an external tribunal if necessary (A12, 2004). If an external tribunal is required to settle disputes in the Incomati or Maputo basins, the 2002 treaty outlines procedures through which the party requesting arbitration appoints one arbiter, the other parties together appoint the second arbiter and the two arbiters appoint a third (36, 2002). Requirements for monitoring and enforcing the agreements are less explicit in the treaties than dispute resolutions. However, the implied expectation in most cases is that that joint organizations will perform both monitoring and enforcement functions.

#### **A3.4 Structure and Mandate of Existing Organisations**

The following section analyses existing international river basin organisations' structures and mandates. Southern African states have established twenty-four international water management organisations over the last two and a half decades (table A3.3). Of these, fourteen are bilateral, two are multilateral, and five are basin-wide.<sup>50</sup>

The structures and mandates of international water management organisations in southern Africa vary. Six of them are project-oriented authorities. Of the six still in operation today, each has a significant degree of authority to make management decisions regarding their respective projects. These organisations are expected to liaise with bilateral Commissions but are largely responsible for the day to day management and financing of their respective projects.

Aside from these project-oriented organisations, there are 15 other joint water management organisations operating in the region: ten are bilateral and five are basin-wide bodies.<sup>51</sup> Unlike the project-oriented authorities, these organisations do not have decision-making power. Rather, their role is to make recommendations to the parties regarding water management strategies.

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<sup>50</sup> This number does not include three organisations established in the region and subsequently replaced by new or modified organisations: 1) the Joint Permanent Technical Committee between Lesotho and South Africa, replaced by the Lesotho Highlands Water Commission; 2) the Joint Technical Committee between South West Africa/Namibia and South Africa, replaced by the Permanent Water Commission between Namibia and South Africa; and 3) the Limpopo Basin Permanent Technical Committee, replaced by the Limpopo Commission.

<sup>51</sup> Note that the Rovuma Basin Committee is a bilateral, basin-wide commission. It has been included here in the group of basin-wide organisations, while the more general Joint Water Commission established between Mozambique and Tanzania is considered bilateral.

An examination of the mandates granted to these advisory bodies provides some insight into both the priorities of the parties at the time of negotiation and the scope of their current work. A majority of the organisations are tasked with advising on measures to alleviate short-term problems resulting from water shortages during periods of drought as well as the allocation of water resources (and, in some cases, benefits), the operation and maintenance of joint schemes, and the investigation of shared waters. Additionally, all of the organisations created in or after 1992 include mandates to advise on pollution control. This was not an explicit role conferred to organisations created before 1992, and it reflects the global trend towards environmental protection. Agreements signed after the early 1990s also include a catch-all clause that grants the various bodies authority to advise the parties on “any other matter that may arise.” The agreements establishing the ORASECOM, the Limpopo Basin Commission (LIMCOM), the Zambezi Basin Commission (ZAMCOM), and Rovuma Basin Commission also notably include a mandate to advise the parties on methods for facilitating public participation in the basin.

The compositions of the organisations vary, but most of the advisory bodies include a council comprised of three representatives per party. Given the number of riparians in the basin, the Zambezi Watercourse Commission only includes one representative from each party on the council. These councils are all supported by technical task teams. In addition, basin-wide commissions in the region have increasingly begun to fold secretariats into their structures. Marty (2001) argued secretariats were important for organizations’ effectiveness, a hypothesis explored in more detail in chapter 6. The secretariat position was specified in the treaty establishing ZAMCOM but was

not included in the original provisions for the Okavango Basin Commission (OKACOM), ORASECOM, and LIMCOM, where riparian states have subsequently implemented this structure. The secretariats are intended to serve an administrative and coordinating role. Before operating with a secretariat, the delegations hosting the meeting were in charge of securing a venue, preparing the agenda, and taking and distributing minutes from each meeting (van Niekerk, personal communication, 2007). In general, the agreements specify that each delegation is responsible for their own travel costs. The party hosting a meeting is responsible for the cost of securing a venue and providing additional necessary resources.

**Table A3.3** Composition and mandate of joint water management organisations between southern African states

DB#	Year	Organisation	Parties	Composition	Mandate
A15	1978	Joint Technical Committee	South Africa: Lesotho	2 consulting teams. 1 hired by each party	To assess the feasibility of the Lesotho Highlands Water Project (LHWP)
4	1983	Tripartite Permanent Technical Committee	Mozambique: Swaziland: South Africa	3 representatives from each party	To serve as an advisory body to the three parties
A1		Joint Permanent Technical Committee (JPTC)	Botswana: South Africa	3 representative from each party	To serve as an advisory body to the parties
13	1986	JPTC. replaced in 1999 by the Lesotho Highlands Water Commission (LHWC)	Lesotho: South Africa	3 representatives from each party	To monitor the planning and execution of the LHWP and advise the Lesotho Highlands Development Authority (LHDA) and the Trans-Caledon Tunnel Authority (TCTA)
47		Limpopo Basin Permanent Technical Commission. replaced in 2004 by the Limpopo Basin Commission	Botswana: Mozambique: Zimbabwe: South Africa	3 representative from each party	To serve as an advisory body to the parties
76	1987	Joint Technical Committee. replaced in 1992 by the Permanent Water Commission (PWC)	Namibia: South Africa	3 representatives from each party	To serve as an advisory body to the parties
A3	1987	Zambezi River Authority	Zambia: Zimbabwe	2 members from each party	To operate and maintain Kariba Dam
A4	1987	Zambezi Intergovernmental Monitoring and	Botswana: Mozambique: Tanzania: Zimbabwe:	Representatives from each state	To advise parties on the environmentally sound management of the

		Coordinating Committee	Zambia		Zambezi system
		Zambezi River Basin Coordinating Unity		3-4 members	To coordinate national efforts
38	1988	Twasa Operating Control Committee	Department of Water Affairs (Bophuthatswana); Water Utility Commission (Botswana); Department of Water Affairs and Forestry (South Africa)	2 members from each party	To operate and maintain the transfer project
A6	1990	Joint Water Commission	Botswana, Namibia	3 members from each party	To advise parties on waters of mutual interest
A7		Permanent Joint Technical Commission	Angola, Namibia	3 members from each party	To advise parties on the management of waters of mutual interest
		Joint Operating Authority		Board of directors with equal representatives from each party	To operate and maintain the dams at Gove, Calueque, and Ruacana
8	1992	Komati Basin Water Authority	Swaziland; South Africa	Board of directors with equal representation from each party	To design, construct, maintain, and manage the project
9		Joint Water Commission	Swaziland; South Africa	3 representatives from each party	To serve as an advisory body to the parties
20		Joint Irrigation Authority (JIA)	Namibia; South Africa	4 delegates from each party, at least 3 of whom must be landowners in the district. The 4th place in each delegation is currently filled by a representative from the respective Departments of Water and Agriculture who also serve as liaisons to the PWC	To operate and maintain the Irrigation Scheme and Control abstraction of water from the Orange River
84		PWC	Namibia; South Africa	3 representatives from each party	To serve as a technical advisor to the parties and monitor and advise the JIA
A8		1994	Okavango River Basin Water Commission	Angola; Botswana; Namibia	3 representatives from each party
1	1996	Joint Water Commission (JWC)	Mozambique; South Africa	3 representatives from each party	To serve as an advisory body to the parties
16	1999	LHWC, replaced 1986 JPTC	Lesotho; South Africa	3 representative from each party	To be responsible and accountable for the project and monitor, advise, and audit the LHDA and the TCTA
3	2000	Orange-Senqu River Commission	Botswana; Lesotho; Namibia; South Africa	Council of 3 representatives from each party supported by a Technical Task Team comprising specialists drawn from each country. A permanent secretariat for the Commission was established in October 2007.	To serve as an advisory body to the parties

A10	2002	JWC	Zimbabwe; Mozambique		To serve as an advisory body
A11	2004	Limpopo Watercourse Commission	Botswana; Mozambique; South Africa; Zimbabwe	3 representatives from each party	
A12	2004	Zambezi Watercourse Commission	Angola; Botswana; Malawi; Mozambique; Namibia, Tanzania; (Zambia) Zimbabwe	1 delegate from each party  Executive secretary	
A13	2007	JWC	Mozambique; Tanzania	3 representatives from each party	To serve as an advisory body
A14	2008	Rovuma Basin Committee	Mozambique; Tanzania	3 representatives from each party	To serve as an advisory body

### A3.5 Summary and Research Implications

This analysis shows that countries in southern Africa have a long history of cooperation over transboundary water resources. The coverage of international water management institutions is substantial in the region, but not universal. A few river basins still lack agreements and groundwater still remains uncovered by the international, institutional frameworks.

Information sharing has long been a cornerstone of transboundary cooperation in the region. Over time, the type of information that is shared and the methods for sharing information have changed, signalling both technological advances and an increasing focus on water quality and environmental concerns. States have also become increasingly concerned with issues of data compatibility in addition to data exchange.

Few agreements in the basin specify water allocation between riparian states. Thus far, the 2002 Tripartite Interim Agreement on the Incomati and Maputo basins is the only treaty to establish a basin-wide flow regime. Most of the joint organisations identify the specification of “equitable and reasonable utilisation of water resources”

as a top priority, but none of them have yet to engage in serious deliberations about the allocation of water resources.

Attention to issues of water quality and environmental concerns has increased in international agreements since the late 1980s. This trend is attributable in part to the increased global awareness of environmental issues. In addition to pollution control in shared basins, riparian states are now considering in-stream flow requirements for various basins as a means for maintaining the ecological health of the river system.

Riparian states have used side payments and issue-linkages in the establishment of joint projects for water storage, delivery, and hydropower production. However, given the small number of joint projects in the region, neither side payments nor issue-linkages are a common feature of international water agreements in the region.

There are twenty-one international organisations currently operating in southern Africa to manage shared water resources: six are project authorities, ten are bilateral advisory bodies, and five are basin-wide commissions. Each varies in their structure and mandate, with multiple organisations operating in a single basin at a time. The mandates of the advisory organisations are broad, and they are expected to guide riparian states in formulating strategies for equitable and reasonable water resources use and the adaptation to changing circumstances over time.

Analysing the design of existing international water management institutions provides important insight into the rules and regulations that guide riparian behaviour.

However, understanding the provisions that are in place for transboundary water management is not enough. To better understand the outcomes of transboundary water management and opportunities for enhancing its effectiveness, we must look both forwards and backwards to the processes of establishing and implementing these transboundary water agreements as this study did.

## REFERENCES

- African Water Issues Resource Unit. 2008. African transboundary water law. The African Transboundary Water Law Website. <http://www.africanwaterlaw.org/>
- Allan, J.A. 1996. The political economy of water [in the Jordan Basin]: reasons for optimism but long term caution. In *Water, peace and the Middle East, negotiating resources in the Jordan Basin*, eds. J.A. Allan, J. A. and J.H.O. Court, 75-94. London: Tauris Academic Studies.
- Allan, J.A. 1999. The Nile basin: Evolving approaches to Nile waters management. *SOAS Occasional Paper 20*. London: SOAS Water Issues Group, University of London.
- Allan, J.A. 2001. *The Middle East water question: Hydropolitics and the global economy*. London: I. B. Tauris.
- Allan, J.A. 2002. Water resources in semi-arid regions: Real deficits and economically invisible and politically silent solutions. In *Hydropolitics in the developing world: A southern African perspective*, eds. A. R. Turton and R. Henwood, 23–36. Pretoria: African Water Issues Research Unit.
- Allan, J. A. 2004. Foregrounding and backgrounding risk: Consequences for water policy making in the MENA Region. *Bulletin of the Royal Institute for Inter-Faith Studies* 6 (1): 63–78.
- Allan, J. A. 2005. Water in the environment/Socio-economic development discourse: Sustainability, changing management paradigms and policy responses in a global system. *Government and Opposition* 40 (2): 181–99.
- Allan, J. A. 2006. IWRM/IWRAM: A new sanctioned discourse? In *Integrated water resource management in South Asia: Global theory, emerging practice and local needs*, eds. P. P. Mollinga, A. Dixit, and K. Athukorala, ##–##. Hyderabad, India: Sage Publications.
- Annan, K. 2002. World Water Day press release SG/SM/8139, OBV/262. <http://www.un.org/News/Press/docs/2002/sgsm8139.doc.htm>
- Appelgryn, M. S. 1984. *Johannesburg 1886–1889: Origins and early management*. Pretoria: University of South Africa.
- Apthorpe, R. 1996. Reading development policy and policy analysis: On framing, naming, numbering and coding. In *Arguing development policy: Frames and discourses*, eds. R. Apthorpe and D. Gasper. London: Frank Cass.
- Archer, M. 1985. Structuration versus morphogenesis. In *Macro-sociological theory: Perspectives on sociological theory*, eds. S.N. Eisenstadt and H.J. Helle, 58-88. Newbury Park, CA: Sage.
- Arskey, H. and P. Knight. 1999. *Interviewing for social scientists: An introductory resource with examples*. London: Sage.
- Arts, B. 2000. Regimes, non-state actors and the state system: A “structural” regime model. *European Journal of International Relations* 6 (4): 513–42.
- Ashton, P.J. 2000. Southern African water conflicts: Are they inevitable or preventable? *Water for peace in the Middle East and Southern Africa*. Geneva: Green Cross International.
- Ashton, P.J., A. Earle, D. Malzbender, M. B. H. Moloi, M. J. Patrick, and A. R. Turton. 2006. A compilation of all the international freshwater agreements entered

- into by South Africa with other states. Report No. 1515/1/06. Pretoria: Water Research Commission.
- Ashton, P.J., D. Hardwick, and C. M. Breen. 2008. Changes in water availability and demand within South Africa's shared river basins as determinants of regional social and ecological resilience. In *Sustainability Science*, eds. M. Burns and A. V. B. Weaver, 279–310. Stellenbosch: SUN Press.
- Ashton, P. J. and V. Ramasar. 2002. Water and HIV/AIDS: Some strategic considerations for southern Africa. In *Hydropolitics in the developing world: A southern African perspective*, eds. A. R. Turton and R. Henwood, 217–35. Pretoria: African Water Issues Research Unit.
- Ashton, P. J. and A. R. Turton. 2008. Water and security in sub-Saharan Africa: Emerging concepts and their implications for effective water resource management in the southern African region. In *Facing global environmental change: Environmental, human, energy, food, health and water security concepts*, Vol. 4, eds. H. G. Brauch, J. Grin, C. Mesjasz, H. Krummenacher, N. C. Behera, B. Chourou, U. O. Spring, P. H. Liotta, and P. Kameri-Mbote, 665–78. Berlin: Springer-Verlag.
- Axelrod, R. 1984. *The evolution of cooperation*. New York: Basic Books.
- Axelrod, R. and R. O. Keohane. 1986. Achieving cooperation under anarchy: Strategies and institutions. In *Cooperation under anarchy*, ed. K. A. Oye, 226–254. Princeton: Princeton University Press.
- Barber, J. and J. Barratt. 1990. *South Africa's foreign policy: The search for status and security, 1945–1988*. Cambridge: Cambridge University Press.
- Barlow, M. 2008. *Blue covenant: The global water crisis and the coming battle for the right to water*. New York: The New Press.
- Basson, M. S., P. H. Van Niekerk, and J. N. Van Rooyen. 1997. Overview of water resources availability and utilization in South Africa. Report No. P RSA/00/0197. Pretoria: Department of Water Affairs and Forestry.
- Beinart, W. 2001. *Twentieth century South Africa*. Oxford: Oxford University Press.
- Berg, B. L. 2004. *Qualitative research methods for the social sciences*. Boston: Pearson.
- Bernard, H. R. 1995. *Research methods in anthropology: Qualitative and quantitative approaches*. Walnut Creek, CA: Altamira.
- Bernauer, T. 1995. The effect of international environmental institutions: How we might learn more. *International Organization* 49 (2): 351–77.
- Bernauer, T. 2002. Explaining success and failure in international river management, *Aquatic Sciences*, 64 (1), 1–19.
- Bhaskar, R. 1979. *Possibility of naturalism: A philosophical critique of the contemporary human sciences*. Brighton, UK: Harvester Press.
- Biswas, A. K. 2008. Current directions: integrated water resources management—a second look. *Water International* 33 (3): 274–78.
- Boge, V. 2006. Water governance in southern Africa: Cooperation and conflict prevention in transboundary river basins. *BICC Brief* 33. Bonn: Bonn International Center for Conversion.
- Bonner, P. And L. Segal. 1998. *Soweto: A History*. Cape Town: Maskew Miller Longman.

- Braun, Y.A. Large dams as development: Restructuring access to natural resources in Lesotho. In *Globalization and the environment*, eds. A. K. Jorgenson and E. L. Kick, 151–71. Leiden, NL: Brill.
- Browder, G. and L. Ortolano. 2000. The evolution of an international water resources management regime in the Mekong River basin. *Natural Resources Journal* 40 (3): 499–531.
- Brugnach, M., A. Dewulf, C. Pahl-Wostl, and T. Taillieu. 2008. Toward a relational concept of uncertainty: About knowing too little, knowing too differently, and accepting not to know. *Ecology and Society* 13 (2): 30–6.
- Bruns, B. R. and R. Meinzen-Dick, eds. 2000. *Negotiating water rights*. London: International Food Policy Research Institute.
- Bryman, A. 2001. *Social research methods*. Oxford: Oxford University Press.
- Bullock, J. and A. Darwish, eds. 1993. *Water wars: Coming conflicts in the Middle East*. London: Gollancz.
- Carlsnaes, W. 1992. The agency–structure problem in foreign policy analysis. *International Studies Quarterly* 36 (3): 245–70.
- Cascao, A. 2008. Ethiopia: Challenges to Egyptian hegemony in the Nile basin. *Water Policy* 10 (S2): 13–28.
- Cascao, A. 2009. Changing power relation in the Nile River basin: Unilateralism vs. cooperation? *Water Alternatives* 2 (2): 245–68.
- Central Intelligence Agency. 2007. The World Factbook: Country listing. <http://www.cia.gov/library/publications/the-world-factbook/geos/>
- Central Intelligence Agency. 2009. The World Factbook: Country listing. <http://www.cia.gov/library/publications/the-world-factbook/geos/>
- Cernea M. 1990. Involuntary risks from population resettlement in water resources development. Development Discussion Paper, No. 355. Cambridge: Harvard Institute for International Development.
- Checkel, J. 1998. The constructivist turn in international relations theory. *World Politics* 50 (2): 324–48.
- Cleaver, Frances, and Tom Franks. 2005. How institutions elude design: River basin management and sustainable livelihoods. BCID Research Paper No. 12. Bradford: Bradford Center for International Development.
- Commission of Enquiry. 1970. Report of the Commission of Enquiry into water matters in South Africa. Report RP 34/1979. Pretoria: Government of South Africa.
- Conca, K. 2006. *Governing water: Contentious transnational politics and global institution building*. Cambridge, MA: MIT Press.
- Conely, A. and M. A. Moote. 2003. Evaluating collaborative natural resource management. *Society and Natural Resources* 16:371–86.
- Conley, A.H. and P. H. van Niekerk. 2000. Sustainable management of international waters: The Orange River case. *Water Policy* 2:131–49.
- Cooley, J. 1984. The war over water. *Foreign Policy* 54:3–26.
- Cornelius, W. 1982. Interviewing undocumented immigrants: Methodological reflections based on fieldwork in Mexico and the United States. *International Migration Review* 16:378–411.
- Cortell, A. P. and J. W. Davis. 2000. Understanding the domestic impact of international norms: A research agenda. *International Studies Review* 2(1): 65–87.

- Cox, R. 1981. Social forces, states and world orders: beyond international relations theory. *Millennium: Journal of International Studies*, 10(2): 126-55.
- Cox, R. 1985. Realism, positivism and historicism. In *Approaches to world order*, eds. R. Cox and T. Sinclair, 49–59, Cambridge: Cambridge University Press.
- Daily News, The*. 1983. Gates of discord threaten flow of Lesotho's massive water plans. 16 March.
- Daoudy, M. 2005. Turkey and the region: Testing the links between power asymmetry and hydro-hegemony. Paper presented at the First Workshop on Hydro-Hegemony, London.
- Daoudy, M. 2009. Asymmetric power: Negotiating water in the Euphrates and Tigris. *International Negotiations* 14:359–89.
- Daoudy, M. and E. J. Kistin. 2008. Beyond water conflict: Evaluating the effects of international water cooperation. Paper presented at the International Studies Association annual meeting, San Francisco.
- Davidson-Harden, A., A. Naidoo and A. Arden. 2007. The geopolitics of the water justice movement. *Peace, Conflict and Development* 11: 1-34.
- Davies, R. and D. O'Meara. 1985. Total strategy in southern Africa: An analysis of South African regional policy since 1978. *Journal of Southern African Studies* 11 (2): 183–211.
- Department of Water Affairs and Forestry. 2003a. Upper Vaal water management area: Overview of water resources availability and utilisation. Report No. P WMA 08/000/00/0203. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2003b. Middle Vaal water management area: Overview of water resources availability and utilisation. Report No. P WMA 09/000/00/0203. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2003c. Lower Vaal water management area: Overview of water resources availability and utilisation. Report No. P WMA 10/000/00/0203. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2003d. Upper Orange water management area: Overview of water resources availability and utilisation. Report No. P WMA 13/000/00//0203. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2003e. Lower Orange water management area: Overview of water resources availability and utilisation. Report No. P WMA 14/000/00/0203. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2004a. National Water Resources Strategy. 1st ed. Pretoria: Department of Water Affairs and Forestry.
- Department of Water Affairs and Forestry. 2004b. Orange River System: Overarching internal strategic perspective. Report No. P RSA D000/00/0104. Pretoria: Department of Water Affairs and Forestry.
- Dessler, D. 1989. What's at stake in the agent–structure debate? *International Organization* 43 (3): 441–73.
- de Wit, M. and J. Stankiewicz. 2006. Changes in surface water supply across Africa with predicted climate change. *Science Express* 10:1126–36.
- Die Vaderland 1983, see Turton, A. 2004.
- Dinar, A. 1998. Water policy reforms: Information needs and implementation obstacles. *Water Policy* 1:367–82.

- Dinar, A., Dinar, S., McCaffrey, S. and McKinney, D. 2007. *Bridges over water*. London: World Scientific Publishing Company.
- Dinar, S. 2000. Negotiations and international relations: A framework for Hydropolitics. *International Negotiation* 5:375–407.
- Dombrowsky, I. 2007. *Conflict, cooperation, and institutions in international water management: An economic analysis*. Cheltenham, UK: Edward Elgar.
- Dombrowsky, I. 2008. Institutional design and regime effectiveness in transboundary river management—The Elbe water quality regime. *Hydrology and Earth System Sciences* 12 (1): 223–38.
- Dombrowsky, I. 2010. The role of intra-water sector issue linkage in the resolution of transboundary water conflicts. *Water International* 35 (2): 132–49.
- Dreyer, R. 1993. *Namibia and southern Africa: Regional dynamics of decolonization 1945–90*. London: Kegan Paul International
- Duc, L. and N. Carrasco. 2007. Success and failure in international river management: the case of the Lesotho Highlands Water Project. In *The science and politics of large dam projects*, eds. T. Bernauer, B. Wehrli, A. Wüest, and N. Pasche. Zurich: ETH.
- Durth, R., 1996. *Grenzüberschreitende umweltprobleme und regionale integration: Zur politischen ökonomie von Oberlauf-Unterlauf-Problemen an internationalen Flüssen*. Baden Baden: Nomos.
- Earle, A. and D. Malzbender. 2008. Water and the peaceful, sustainable development of the SADC region. Paper produced for the Safer Africa project.
- Earle, A., D. Malzbender, A. R. Turton, and E. Manzungu. 2005. A preliminary basin profile of the Orange-Senqu River. *Integrated water resources management in shared river basins in the SADC region*. Pretoria: AWIRU and Green Cross International.
- Elhance, A. 2000. Hydropolitics: Grounds for despair, reasons for hope. *International Negotiation* 5:201–22.
- European Union. 2005. African transboundary river basin support programme: Case of the basin of the Orange-Senqu river in Botswana, Lesotho, Namibia and South Africa. Financing Agreement 9ACPRPR53. Brussels: European Union.
- FAOLEX. Food and Agriculture Organisation of the United Nations legal database, <http://faolex.fao.org/faolex/> [accessed 10 April 2008].
- Feitelson, E. 2001. The upcoming challenge: Transboundary management of the hydraulic cycle. *Water, Air and Soil Pollution* 123:533–49.
- Feitelson, E. and M. Haddad. 1999. Identification of joint management structures for shared aquifers: A comparative Palestinian-Israeli effort. World Bank Technical Paper, No. 415. Washington DC: World Bank.
- Ferguson, J. 1990. *The anti-politics machine: "Development" depoliticisation and bureaucratic power in Lesotho*. Cambridge: Cambridge University Press.
- Finnemore, M. 1996. *National interests in international society*. Ithaca, NY: Cornell University Press.
- Fischhendler, I. 2004. Legal and institutional adaptation to climate uncertainty: A study of international rivers. *Water Policy* 6:281–302.
- Fischhendler, I. and E. Feitelson. 2003. Spatial adjustment as a mechanism for resolving river basin conflicts. *Political Geography* 22 (5): 557–83.

- Foucault, M. 1980. *Power-knowledge: Selected interviews and other writings 1972–1977*. Harlow, UK: Longman.
- Franks, T. 2006. Water governance: A solution to all problems. Paper presented at the ESRC Seminar Series on Water Governance, Bradford, UK.
- Franks, T., and F. Cleaver. 2007. Water governance and poverty: A framework for analysis. *Progress in Development Studies* 7 (4): 291–306.
- French Global Environment Facility. 2009. ORASECOM: Capacity Building Program. Pretoria: Orange-Senqu River Commission.
- Funke, N., K. Nortje, K. Findlater, M. Burns, A. R. Turton, A. Waever, and H. Hattingh. 2007. Redressing inequality: South Africa's new water policy. *Environment, Science and Policy for Sustainable Development* 3:11–25.
- Furlong, K. 2006. Hidden theories, troubled water: International relations, the “territorial trap,” and the Southern African Development Community's transboundary waters. *Political Geography* 25:38–45.
- Furlong, K. 2008. Hidden theories, troubled waters: Response to critics. *Political Geography* 27:811–14.
- Geertz, C. 1973. *The interpretation of cultures*. New York: Basic Books.
- Geldenuys, D. 1984. *The diplomacy of isolation: South African foreign policy making*. New York: St. Martin's Press.
- Geldenuys, D. and T. Venter. 1979. Regional cooperation in southern Africa: A constellation of states. *International Affairs Bulletin* 3 (3): 36–72.
- Giddens, Anthony. 1984. *The constitution of society: Outline of the theory of structuration*. Cambridge: Polity Press.
- Giddens, A. and C. Pierson. 1998. *Conversations with Anthony Giddens*. Cambridge: Polity Press.
- Gill-Wason, D. 2004. *Evolving livelihood strategies of rural Basotho: 1993 to 2002*. LRAP Discussion Paper No. 5. Maseru: CARE Lesotho-South Africa.
- Gleick, P. 1993. Water and conflict, freshwater resources and international security. *International Security* 18 (1): 79–112.
- Global Water Partnership. 2000. *Towards water security: A framework for action*. Stockholm: Global Water Partnership.
- Goldstein, J. and R. O. Keohane. 1993. *Ideas and foreign policy: Beliefs, institutions, and political change*. Ithaca, NY: Cornell University Press.
- Gooch, G. D., P. Hoglund, G. Roll, E. Lopman, and N. Aliakseyeva. 2000. Review of existing structure models and practices for transboundary water management. Paper presented at the Second International Conference on Sustainable Management of Transboundary Waters in Europe, Miedzyzdroje, Poland.
- Good Neighbor Environmental Board. 2005. *Fourth report of the Good Neighbor Environmental Board*. Washington, DC: Good Neighbor Environmental Board.
- Gordon, F.D. 2009. *Freshwater resources and interstate cooperation: Strategies to mitigate an environmental risk*. New York: SUNY Press.
- Goulden, M., D. Conway, and A. Persechino. 2008. Adaptation to climate change in international river basins in Africa: A review. Tyndall Working Paper, No. 127. Norwich, UK: University of East Anglia.
- Government of Lesotho. 2004. The Lesotho Lowlands Water Supply Scheme. Report available at: [http://www.lesotho.gov.ls/articles/2004/LLW\\_Supply\\_Scheme.htm](http://www.lesotho.gov.ls/articles/2004/LLW_Supply_Scheme.htm)

- Government of South Africa. 2008. Speech by Mrs LB Hendricks, Minister of Water Affairs and Forestry National Council of Provinces, Parliament, Cape Town, Western Cape. *Policy Review Debate on Budget Vote 34 of 2008/09*. Cape Town: Government of South Africa.
- Granit, J. 2000. Management of shared water resources in southern Africa and the role of external assistance. Paper presented at the First WARFSA/WaterNet Symposium, November 1-2, Maputo, Mozambique.
- Green Cross International, 2000. *National sovereignty and international watercourses*. Renens, Switzerland: Green Cross International.
- Greco, F. 2005. The securitization of the Disi aquifer: A silent conflict between Jordan and Saudi Arabia. Paper presented at the First Workshop on Hydro-Hegemony, London.
- Grieco, J. M. 1990. *Cooperation among nations: Europe, America, and non-tariff barriers to trade*. Ithaca, NY: Cornell University Press.
- Grover, V. I., ed. 2008. *Water: A source of conflict or cooperation?* Enfield, NH: Science Publishers.
- Gutteridge, W. 1983. South Africa's National Strategy: Implications for regional security. *Conflict Studies* 148:3–9.
- Gutteridge W., ed. 1995. *South Africa: From apartheid to national unity: 1981–1994*. Brookfield, VT: Dartmouth.
- Gyawali, D. 2002. Nepal-India water resource relations. In *Power and negotiation*, eds. W. I. Zartman and J. Z. Rubin, 129–54. Ann Arbor, MI: University of Michigan Press.
- Hall, R.B. and T.J. Biersteker, ed. 2002. *The Emergence of Private Authority in the International System*. Cambridge: Cambridge University Press.
- Haftendorn, H. 2000. Water and international conflict. *Third World Quarterly* 21 (1): 51–68.
- Haggard, S. and B. A. Simmons. 1987. Theories of international regimes. *International Organization* 41:491–517.
- Hajer, M. A. 1997. *The politics of environmental discourse: Ecological modernization and the policy process*. Oxford: Oxford University Press.
- Hall, D., and G. Jennings. 2007. Demographic and economic activity in the four Orange Basin states. In *Orange River Integrated Water Resources Management Plan*, ed. Orange-Senqu River Commission. Johannesburg: Orange-Senqu River Commission.
- Hamner, J. and A. Wolf. 1998. Patterns in international water resource treaties: The Transboundary Freshwater Dispute database. *Colorado Journal of International Environmental Law and Policy*: 157–77.
- Hanlon, J. 1986. *Beggar your neighbours: Apartheid power in southern Africa*. London: James Currey.
- Hasenclever, A., P. Mayer, and V. Rittberger. 1997, *Theories of international regimes*. Cambridge: Cambridge University Press.
- Hasenclever, A., P. Mayer, and V. Rittberger. 2000. Integrating theories of international regimes. *Review of International Studies* 26:3–33.
- Haas, P.M. 1989. Do regimes matter? Epistemic communities and Mediterranean pollution control. *International Organization* 43:377–403.

- Haas, P.M. 1992. Introduction: Epistemic communities and international policy coordination. *International Organization* 46 (1): 1–35.
- Hass, P.M. 1993. Epistemic communities and the dynamics of international environmental cooperation. In *Regime theory and international relations*, ed. V. Rittberger, 170-191. Oxford: Clarendon Press.
- Hatfield Consultants. 2009. Orange-Senqu River Awareness Kit. <http://www.orangesenqurak.org/> [accessed 20 November 2010].
- Hepworth, N. D. 2009. A progressive critique of IWRM in sub-Saharan Africa: Beyond capacity towards self-determined regulatory personality. PhD diss., University of East Anglia.
- Heyns, P. S. v. H. 2003. Water-resources management in Southern Africa. In *International waters in southern Africa*, ed. M. Nakayama. Paris: United Nations University Press.
- Heyns, P. S. v. H. 2004. Achievements of the Orange-Senqu River Commission in integrated transboundary water resource management. Paper presented at the General Assembly of the International Network of Basin Organizations, Martinique.
- Homer-Dixon, T. F. 1994. Environmental Scarcities and Violent Conflict: Evidence from Cases. *International Security* 19(1): 5-40.
- Homer-Dixon, T. F. 1999. *Environment, scarcity, and violence*. Princeton: Princeton University Press.
- Hoover R. 2001. *Pipe dreams: The World Bank's failed efforts to resolve lives and livelihoods of dam-affected people in Lesotho*. Maseru: Transformation Resources Centre.
- Hope, R., M. Edmunds, R. McDonnell, M. Rouse, D. Johnstone, E. Kistin, and L. Vincent. 2007. Review of UNDP Human Development Report 2006, Beyond scarcity: power, poverty and the global water crisis. *Development Policy Review* 25 (4): 517–28.
- Horta, K. 1995. The mountain kingdom's white oil: The Lesotho Highlands Water Project. *The Ecologist* 25 (6): 227–31.
- Horta, K. and L. Pottinger 2006. The role of the World Bank: the perspective of international NGOs. In *The Wrong Side of Development: Lessons learnt from the Lesotho*, eds. M.L. Thamae and L. Pottinger, 23-38. Maseru: Transformation Resource Centre.
- International Conference on Freshwater. 2001. Ministerial declaration: Ministerial session of the International Conference on Freshwater. Bonn.
- International Conference on Water and the Environment. 1992. Dublin Principles, Dublin.
- International Law Association. 1966. *Helsinki Rules on the uses of waters of international rivers*. The Hague: International Law Association.
- International Law Association. 1986. The Seoul Rules on international groundwater adopted by the International Law Association at the sixty-second conference, Seoul.
- International Water Management Institute. 2000. World water supply and demand in 2025. In *World water scenario analyses*, ed. F. R. Rijsberman. Marseille: World Water Council.
- Irani, R. 1991. Water wars. *New Statesman and Society* 4 (149): 24–5.

- Jacobs, I. 2009. Norms and transboundary cooperation in Africa: The cases of the Orange-Senqu and Nile rivers. PhD diss., St. Andrew's University.
- Jägerskog, A. 2002. The sanctioned discourse: A crucial factor for understanding water policy in the Jordan basin. *SOAS Occasional Paper 41*. London: SOAS Water Issues Group, University of London.
- Jägerskog, A. 2003. *Why states cooperate over shared water: The water negotiations in the Jordan River basin*. PhD thesis, Department of Water and Environmental Studies, Linköping University, Sweden.
- Jairath, J. 2006. Water discourse as an ideological mechanism of misgovernance. Paper presented at the ESRC Seminar Series, Bradford, UK.
- Jaster, R. S. 1988. *The defence of white power: South African foreign policy under pressure*. Basingstoke, UK: Macmillan Press in association with the International Institute for Strategic Studies.
- Jeleni, A., and H. Mare H. 2007. Review of existing infrastructure in the Orange River catchment. In *Orange River Integrated Water Resources Management Plan*, ed. Orange-Senqu River Commission. Johannesburg: Orange-Senqu River Commission.
- Jorgens, H. 2004. Governance by diffusion: Implementing global norms through cross-national imitation and learning. In *Governance for sustainable development: The challenge of adapting form to function*, ed. W. M. Lafferty, 246-283. Cheltenham, UK: Edward Elgar.
- Karshenas, M. and J. A. Allan. 1996. Managing environmental capital. In *Water, peace and the Middle East: Negotiating resources in the Jordan basin*, ed. J. A. Allan, 121-35. London: Tauris Academic.
- Keohane, R. O. 1984. *After hegemony: Cooperation and discord in the world political economy*. Princeton: Princeton University Press.
- Keohane, R. O. and J. Nye. 1989. *Power and independence*. Princeton: Princeton University Press.
- Keohane, R. O. and E. Ostrom, eds. 1995. *Local commons and global interdependence: Heterogeneity and cooperation in two domains*. London: Sage.
- Kibaroglu, A. 2008. The role of epistemic communities in offering new cooperation frameworks. *Journal of International Affairs* 61 (2): 183-98.
- Kibaroglu, A. and I. H. Unver. 2000. An institutional framework for facilitating cooperation in the Euphrates-Tigris River basin. *International Negotiation* 5:311-30.
- Ki-Moon, B. 2007. What I saw in Darfur. *The Washington Post*, September 14, A13.
- King, G. R. Keohane, and S. Verba. 1994. *Designing social inquiry*. Princeton, NJ: Princeton University Press.
- Kistin, E. J. 2006. Critiquing cooperation: A case study of the Rio Grande-Rio Bravo water regime. MID thesis, Oxford University.
- Kistin, E. J. 2007. Transboundary cooperation in the SADC: From concept to implementation. Paper presented at the 8th WaterNet/WARFSA/GWP-SA Symposium, Lusaka, Zambia.
- Kistin, E. J. and P. J. Ashton. 2008. Adapting to change in transboundary rivers: An analysis of treaty flexibility on the Orange-Senqu River basin. *International Journal of Water Resources Development* 24 (3): 385-400.

- Kistin, E. J., P. J. Ashton, A. Earle, D. Malzbender, M. J. Patrick, and A. R. Turton. 2009. An overview of the content and historical context of the international freshwater agreements that South Africa has entered into with neighboring countries. *Journal of International Environmental Agreements: Politics, Law and Economics* 9 (1): 1–21.
- Kistin, E. J. and D. J. H. Phillips. 2007. A critique of existing agreements on transboundary waters and proposals for creating effective cooperation between copriarians. Paper presented at the Third International Workshop on Hydro-Hegemony, London.
- Kotelo-Molaoa, M. N. 2007. The socio-economic impact of the Lesotho Highlands Water Resettlement Programme at Makhoahoeng. PhD diss., University of the Free State.
- Kranz, N., E. Interwies, and R. Vidaurre. 2005. Transboundary regimes in the Orange-Senqu basin. *New Approaches to Adaptive Water Management under Uncertainty*. Berlin: NeWater.
- Kranz, N., E. Interwies, A. Vorwerk, and A. von Raggamby. 2005. Governance institutions and participation in the Orange-Senqu basin. Report to the NeWater Project. Berlin: NeWater.
- Kranz, N. and R. Vidaurre. 2008. Institution-based water regime analysis, Orange-Senqu basin: Emerging river basin organisation for adaptive water management. Report of the NeWater project: New approaches to adaptive water management under uncertainty. Berlin: Ecologic–Institute for International and European Environmental Policy.
- Krasner, S. D., ed. 1983. *International regimes*. Ithaca, NY: Cornell University Press.
- Kratochwil, F. V. 1989. *Rules, norms, and decisions*. Cambridge: Cambridge University Press.
- Lange, G., E. Mungatana, and R. Hassan. 2007. *Water accounting for the Orange River basin: An economic perspective on managing a transboundary resource*. Pretoria: University of Pretoria.
- Lankford, B. A., B. van Koppen, T. Franks, and H. Mahoo. 2004. Entrenched views or insufficient science? Contested causes and solutions of water allocation: insights from the Great Ruaha River basin, Tanzania. *Agricultural Water Management* 69 (2): 135–53.
- Lautze, J. and M. Giordano. 2005. Transboundary water law in Africa: Development, nature, and geography. *Natural Resources Journal* 45:1053–87.
- Lautze, J. and M. Giordano. 2007. Demanding supply management and supplying demand management: Transboundary waters in sub-Saharan Africa. *The Journal of Environment and Development* 16:290–306.
- Lawless, A. 2008. *Numbers and Needs in Local Government*. Midrand, South Africa: SAICE.
- Lawrence, P. 1998. Pretoria has its way in Lesotho. *African Report*, March–April: 50–51.
- Laws, S., C. Harper, and R. Marcus. 2003. *Research for development: A practical guide*. London: Sage.

- Lee, M. 2003. *The political economy of regionalism in southern Africa*. Cape Town: UCT Press.
- Le Marquand D. 1977. *International rivers: The politics of cooperation*. Vancouver: University of British Columbia.
- Lesotho Highlands Development Authority. 1986a. Lesotho Highlands Water Project Feasibility Study. Maseru: Ministry of Water, Energy, and Mining.
- Lesotho Highlands Development Authority. 1990. Phase 1A compensation policy. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 1997. Revised compensation policy. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2000. *Annual Report 1999/2000*. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2002a. Compensation procedure. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2002b. Analysis of the minimum degradation, treaty, design limitations, and fourth scenarios for Phase 1 development. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2003. *Annual report 2002/2003*. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2004. Impact of the Lesotho Highlands Water Project. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2005. *Annual report 2004/2005*. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2006. *Annual report 2005/2006*. Maseru: Lesotho Highlands Development Authority.
- Lesotho Highlands Development Authority. 2008. *Annual report 2007/2008*. Maseru: Lesotho Highlands Development Authority.
- Levy, M. A., O. R. Young, and M. Zurn. 1995. The study of international regimes. *European Journal of International Relations* 1:267–330.
- Lieberman, E. 1997. Organizational cloaking in southern Africa: South Africa and SADC after apartheid. *Transformation* 34:86-110.
- Lifitin, K. (1994) *Ozone discourses: Science and politics in global environmental cooperation*. (New York: Columbia University Press.
- Lindemann, S. 2008. Understanding water regime formation: A research framework with lessons from Europe. *Global Environmental Politics* 8 (4): 117–40.
- Lowi, M. 1993. *Water and power: The politics of a scarce resource in the Jordan River basin*. Cambridge: Cambridge University Press.
- Lukes, S. 1974/2005. *Power: A radical view*. New York: Palgrave Macmillan.
- Lundahl, M., C. McCarthy, and L. Petersson. 2003. *In the shadow of South Africa: Lesotho's economic future*. London: Ashgate.
- Lundahl, M., and L. Petersson. 1991. *The dependent economy: Lesotho and the southern African trade union*. Boulder: Westview.
- Lustick, I. S. (2002) Hegemony and the riddle of nationalism: The dialectics of nationalism and religion in the Middle East. *Logos* 1 (3): 18–44.
- Mafisa, S. S. 2003. Special report in the matter of complaints by the resettled people against the Lesotho Highlands Development Authority. Maseru: Government of Lesotho.

- Malzbender, D., and A. Earle. 2008. The impact of and implications of the adoption of the 1997 UN Watercourse Convention for countries in southern Africa. Study commissioned by WWF International, Global Freshwater Programme.
- Malzbender, D. and A. Earle. 2009. Water Resources of SADC: Demands, dependencies, and governance responses. In *Rethinking natural resources in southern Africa*, eds. M. Pressend and T. Othieno. Midrand, South Africa: Institute for Global Dialogue.
- Mandela, N. 1998. Speech at the opening of the Lesotho Highlands Water Project, 22 January. [http://www.info.gov.za/speeches/1998/98123\\_0w2359810106.htm](http://www.info.gov.za/speeches/1998/98123_0w2359810106.htm)
- March, J. and J. Olsen. 1989. *Rediscovering institutions: The institutional basis of politics*. New York: Free Press.
- Mare, H. G. 2007. Summary of water requirements from the Orange River. In *Orange River Integrated Water Resources Management Plan*, ed. Orange-Senqu River Commission. Pretoria: Orange-Senqu River Commission.
- Marty, F. 2001. *The management of international rivers: Problems, politics, and institutions*. Frankfurt: Peter Lang.
- Mashuari, J. and S. Makhoalibe. 2005. Project progress review: Organization development support to the Limpopo and Orange-Senqu River Basin Commissions. Eschborn, Germany: German Technical Cooperation Agency.
- Mason, J. 2002. *Qualitative Researching*. London: Sage Publications.
- Matlosa, K. 1998. Changing socio-economic setting of the Highlands Regions as a result of the Lesotho Highlands Water Project. *Transformation* 37:28–45.
- Matlosa, K. 2000. The Lesotho Highlands Water Project: Socio-economic impacts. In *Environmental security in southern Africa*, eds. D. Tevera and S. Moyo, 175–86. Harare: SAPES Books.
- Mazvimavi, D., E. Madamombe, and H. Makurira. 2007. Assessment of environmental flow requirements for river basin planning in Zimbabwe. *Journal of Physics and Chemistry of the Earth*, 32 (15): 995–1006.
- McCaffrey, S. 2001. *The law of international watercourses*. Oxford: Oxford University Press.
- McCaffrey, S. 2003. The need for flexibility in freshwater treaty regimes, *Natural Resources Forum* 27:156–62.
- McKeowan, T. 2004. Case studies and the limits of the quantitative worldview. In *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, eds. H. Bradey and D. Collier, 139-167. Lanham, Maryland: Rowman and Littlefield.
- Mehta, L. 2000. Water for the twenty-first century: Challenges and misconceptions. IDS Working Paper, No. 11. Sussex: Institute for Development Studies.
- Meissner, R. 2000. The case of the Orange River. *Conflict Trends* 2:24–7.
- Meissner, R. 2005. The transnational role of and involvement of interest groups in water politics: A comparative analysis of selected southern African case studies. PhD diss., University of Pretoria.
- Middle East Quarterly*. 1997. Boutros Boutros-Ghali: I support the Algerian government 6(3): 59-66.
- Miles, E. L., A. Underal, S. Andresen, J. Wettstad, J. B. Skaereth, and E. M. Carlin. 2002. *Environmental regime effectiveness: Confronting theory with evidence*. London: MIT Press.

- Milner, H. V. 1992. International theories of cooperation among nations: Strengths and weaknesses. *World Politics* 44(3): 466–96.
- Mirumachi, N. 2004. Incentives for cooperative water management in international rivers: The case of the Lesotho Highlands Water Project. *The 2nd Asian Pacific Association of Hydrology and Water Resources Proceedings*. Kyoto: Asian Pacific Association of Hydrology and Water Resources.
- Mirumachi, N. 2006. Benefit sharing and interdependency in developing international river basins: A comparative study. Paper presented at World Water Week in Stockholm, Sweden.
- Mirumachi, N. 2007. Fluxing relations in water history: Conceptualizing the range of relations in transboundary river basin. Paper presented at the 5th International Water History Association Conference, Tampere, Finland.
- Mirumachi, N. and Allan, J. A. 2007. Revisiting transboundary water governance: Power, conflict cooperation and the political economy. Paper presented at the CAIWA International Conference on Adaptive and Integrated Water Management, Basel, Switzerland.
- Mitchell, R. B. 2006. Problem structure, institutional design and the relative effectiveness of international environmental agreements. *Global Environmental Politics* 6 (3): 72–89.
- Mokhehle, S. 1997. Opening speech at the Workshop on Social and Environmental Impacts of the LHWP, Maseru.
- Montoya, Jennifer. 2005. Interview on binational water governance by World Wildlife Fund, Las Cruces, New Mexico.
- Mostert, E. 2005. How can international donors promote transboundary water management? Discussion Paper. Bonn: Deutsches Institut für Entwicklungspolitik.
- Mullings, B. 1999. Insider or outsider, both or neither: Some dilemmas of interviewing in a cross-cultural setting. *Geoforum* 30 (4): 337–50.
- Murombedzi, J. 2003. Pre-colonial conservation practices in southern Africa and their legacy today. Harare, Zimbabwe: IUCN.
- Newig, J., C. Pahl-Wostl, and K. Sigel. 2005. The role of public participation in managing uncertainty in the implementation of the Water Framework Directive. *The Journal of European Environmental Policy* 15 (6): 333–43.
- Nicol A., F. van Steenbergen, H. Sunman, T. Turton, T. Slaymaker, T. Allan, M. de Graaf, and M. van Harten. 2000. *Transboundary water management as an international public good*. Report prepared for the Ministry of Foreign Affairs, Sweden.
- Nishat, A. and I. M. Faisal. 2000. An assessment of the institutional mechanisms for water negotiations in the Ganges-Brahmaputra-Meghna system. *International Negotiation* 5:289–310.
- Ohlsson, L. 1998. Water and social resource scarcity. FAO Issue Paper. Rome: Food and Agricultural Organisation.
- Ohlsson, L. 1999. *Environment scarcity and conflict: A study of Malthusian concerns*. Goteborg, Sweden: University of Goteborg.
- Ohlsson, L. and A. R. Turton. 1999. The turning of a screw: Social resource scarcity as a bottle-neck in adaptation to water scarcity. *SOAS Occasional Paper* 19. London: SOAS Water Issues Group.

- O'Meara, D. 1996. *Forty lost years: The apartheid state and the politics of the National Party, 1948–1994*. Randburg, South Africa: Raven Press.
- O'Neill, K., J. Balsiger, and S. VanDeveer. 2004. Actors, norms and impact: Recent international cooperation theory and the influence of the agent–structure debate. *Annual Review of Political Science* 4:149–75.
- Orange-Senqu River Commission. 2000. Historic background to the establishment of the proposed Orange-Senqu River Commission' Press Release 7/2/12/1
- Orange-Senqu River Commission. 2007. *Roadmap towards stakeholder participation*. Pretoria: Orange-Senqu River Commission.
- Orange-Senqu River Commission. 2009. ORASECOM programme implementation plan – Q4 2007 to Q4 2012. Report shared by ORASECOM Secretariat.
- Overseas Development Institute. 2002. Financing transboundary water management. Water Policy Brief No. 2. London: Overseas Development Institute.
- Pallett, J. 1997. *Sharing water in southern Africa*. Windhoek: Desert Research Foundation of Namibia.
- Panel of Experts. 1989. Report prepared for the Lesotho Highlands Development Authority. Maseru: Lesotho Highlands Development Authority.
- Panel of Experts. 1990. Report prepared for the Lesotho Highlands Development Authority. Maseru: Lesotho Highlands Development Authority.
- Panel of Experts. 1995. Report prepared for the Lesotho Highlands Development Authority. Maseru: Lesotho Highlands Development Authority.
- Panel of Experts. 1996. Report prepared for the Lesotho Highlands Development Authority. Maseru: Lesotho Highlands Development Authority.
- Panel of Experts. 2002. Report prepared for the Lesotho Highlands Development Authority. Maseru: Lesotho Highlands Development Authority
- Parker, John. 2002. *Structuration*. Buckingham, UK: Open University Press.
- Pearce, R. 2007. *When the rivers run dry: Water, the defining crisis of the twenty-first century*. Boston, MA: Beacon.
- Permanent Water Commission. 2005. Pre-feasibility study into measures to improve the management of the lower Orange River and to provide for future developments along the border between Namibia and South Africa. DWA Namibia Report No: 400/8/1/P-13. Windhoek: Department of Water Affairs.
- Phillips, D. J. H., J. A. Allan, M. Claassen, J. Granit, A. Jägerskog, E. Kistin, M. J. Patrick, and A. Turton. 2008. *The TWO analysis: Introducing a methodology for the transboundary water opportunity analysis*. Stockholm: SIWI.
- Phillips, D. J. H., M. Daoudy, J. Öjendal, A. Turton, and S. McCaffrey. 2006. *Transboundary water cooperation as a tool for conflict prevention and for broader benefit-sharing*. Stockholm: Ministry for Foreign Affairs.
- Piet, B. 2010. Botswana: Fourteen turn down WUC job offers. Article available at <http://allafrica.com/stories/201003080386.html>
- Pimbert, M. 2004. *Institutionalising participation and people-centered processes in natural resource management: Research and publications highlights*. London: International Institute for Environment and Development and Institute of Development Studies.
- Pinheiro, I., G. Gabaake, and P. Heyns. 2003. Cooperation in the Okavango River basin: The OKACOM perspective. In *Transboundary rivers, sovereignty and development: Hydropolitical drivers in the Okavango River basin*, eds. A. R. Turton, P. Ashton, and E. Cloete, 105-118. Pretoria: University of Pretoria.

- Postel, S. and A. Wolf. 2001. Dehydrating conflict. *Foreign Policy* 126:60–7.
- Powell, R. 1991. Absolute and relative gains in international relations theory. *American Political Science Review* 85:1303–20.
- Raadgever, G. T., E. Mostert, N. Kranz, E. Interwies, and J. G. Timmerman. 2008. Assessing management regimes in transboundary river basins: Do they support adaptive management? *Ecology and Society* 13 (1): 14–23.
- Rameoli, P. 2002. SADC Protocol on Shared Watercourses: its history and current status. In *Hydropolitics in the Developing World: A Southern African Perspective*, eds. A. Turton and R. Henwood, 105-111. Pretoria, South Africa: AWIRU.
- Ratashobya, D.G. and J. Wellens-Mensah. 2002. SADC-HYCOS evaluation mission report. Gaborone: SADC.
- Reid, John. 2006. Water wars: Climate change may spark conflict. *Independent*. 28 February.
- Reisner, M. 1986. *Cadillac desert: The American West and its disappearing water*. New York: Viking Press.
- Rijsberman, F. R. 2005. Water scarcity: Fact or fiction? *Agricultural Water Management* 80: 5–22.
- Risse, T. 2002. Transnational actors and world politics. In *Handbook of international relations*, eds. W. Carlsnaes, T. Risse, and B. A. Simmons, 255-274 London: Sage.
- Rosenau, J. N. 1992. Governance, order and change in world politics. In *Governance without government: Order and change in world politics*, eds. J. N. Rosenau and E. Czempiel, 1-29. Cambridge: Cambridge University Press.
- Ross, R. 1997. *A Concise History of South Africa*. Cambridge: Cambridge University Press.
- Rubin, H. and I. Rubin. 1995. *Qualitative interviewing: The art of hearing data*. Thousand Oaks, CA: Sage.
- Sadoff, C. and D. Grey 2002. Beyond the river: The benefits of cooperation on international rivers. *Water Policy* 4:389–403.
- Sadoff, C. and D. Grey 2005. Cooperation on international rivers: A continuum for securing and sharing benefits. *Water International*, 30 (4): 1–8.
- Schaffer, B. 1984. Organisational decisions and policy outcomes. IDS Discussion Paper No. 22. Brighton: Institute of Development Studies at the University of Sussex.
- Schuermans, A. M., J. Helbing, and R. Fedosseev. 2004. *Evaluation of success and failure in international water management: Orange River basin, South Africa*. Zurich: ETH.
- Scudder, T. 2005. *The future of large dams: Dealing with social, environmental, institutional and political costs*. London: Earthscan.
- Sechaba Consultants. 2000. *Poverty mapping exercise for Lesotho*. Maseru: Sechaba Consultants.
- Selby, J. 2003. Dressing up domination as “cooperation”: The case of Israeli-Palestinian water relations. *Review of International Studies* 29 (1): 121–38.
- Selby, J. 2007. Beyond hydrohegemon: Gramsci, the national and the transnational. *SOAS Occasional Paper 94*. London: SOAS Water Issues Group.
- Serageldin, I. 1995. Water. In [www.serageldin.com/Water.htm](http://www.serageldin.com/Water.htm)

- Shiva, V. 2002. *Water wars: Privatization, pollution and profit*. Cambridge, MA: South End.
- Sidaway, J. and D. Simon. 1993. Geopolitical transition and state formation: The changing political geographies of Angola, Mozambique and Namibia. *Journal of Southern African Studies* 19 (1): 6–28.
- Smakhtin V., P. J. Ashton, A. Batchelor, R. Meyer, J. P. Maree, R. Murray, B. Barta, N. Bauer, D. Terblanche, and J. Olivier. 2001. Unconventional water supply options in South Africa: Possible solutions or intractable problems? *Water International* 26 (3): 314–34.
- Smit, B. and J. Wandel. 2006. Adaptation, adaptive capacity and vulnerability. *Global Environmental Change* 16 (3): 282–92.
- Smith, S., D. G. Willems, and N. A. Johnson. 1997. *Nurtured by knowledge: Learning to do participatory action research*. Canada: IDRC.
- Sneddon, C. and C. Fox. 2006. Rethinking transboundary waters: A critical hydro-politics of the Mekong basin. *Political Geography* 25 (2): 181–202.
- Snidal, D. 1985. The limits of hegemonic stability theory. *International Organization* 39 (4): 579–614.
- South African Department of Defence. 1977. White paper on defense. Pretoria: Government of South Africa.
- Southern African Development Community. 1995. *Protocol on shared watercourses*. Windhoek: Southern African Development Community.
- Southern African Development Community. 2000. *Protocol on shared watercourses in the Southern African Development Community region*. Windhoek: Southern African Development Community.
- Southern African Development Community. 2008. *Activities of international cooperating partners (ICPs) in transboundary water cooperation in the SADC region: Results of a 2008 survey*. Gaborone: Southern African Development Community Water Sector.
- Southern African Development Coordination Conference. 1980. Southern Africa: Towards economic liberation—A declaration by the governments of independent states of southern Africa made in Lusaka on April 1st.
- Sprinz, D. F. and C. Helm. 1999. The effect of global environmental regimes: A measurement concept. *International Political Science Review* 20:359–369.
- Stanley, L. and S. Wise. 1993. Method, methodology, and epistemology in feminist research processes. In *Feminist praxis: Research theory and epistemology*, ed. L. Stanley. London: Routledge Kegan Paul.
- Starr, R. 1991. Water wars. *Foreign Policy* 82:17–36.
- Statistics South Africa. 2007. South African population statistics: Census 2001. <http://statssa.gov.za/census01/html>.
- Stott N., K. Sack, and L. Greeff, eds. 2000. Once there was a community. Report on Southern African hearings for communities affected by large dams. Cape Town, South Africa: Environmental Monitoring Group.
- Strange, S. 1994. Who governs? Networks of power in world society. In *Authority and markets: Susan Strange's writings on international political economy*, eds. R. Tooze and C. May. Basingstoke, UK: Palgrave Macmillan.

- Struckmeier, W. F., W. H. Gilbrich, J. v. D. Gun, T. Maurer, S. Puri, A. Richts, P. Winter, and M. Zaepke. 2006. *WHYMAP and the world map of transboundary aquifer systems at the scale of 1:50,000,000*. Paris: UNESCO.
- Suhardiman, D. and M. Giordano. 2009. Virtual hegemony: donors' preeminent role and their limited influence in transboundary water governance of the Mekong. Challenge Programme on Water and Food Working Paper.
- Sullivan, J. 1989. Southern Africa in conflict: Problems enough to share. In *South Africa in southern Africa: Domestic change and international conflict*, eds. E. J. Keller and L. A. Picard, 221-54. Boulder: Lynne Rienner.
- Sullivan, C.A., J.R. Meigh and A.M. Giancomello. 2003. The water poverty index: development and application at the community scale. *Natural Resources Forum* 27(3): 189-199.
- Susskind, L. E. 1994. *Environmental diplomacy: Negotiating more effective global agreements*. Oxford: Oxford University Press.
- Swain, A. 2001. Water wars: Fact or fiction? *Futures*, 33:769–81.
- Tanner, A., S. Tohlang, and P. van Niekerk. 2009. Lesotho Highlands Water Project: An overview of the engineering components. *Civil Engineering* 17 (5): 28–35.
- Teskey, G. 2005. Capacity development and state building: issues, evidence and implications for DFID. Report available at [http://www.jica.go.jp/cdstudy/library/pdf/20071101\\_30.pdf](http://www.jica.go.jp/cdstudy/library/pdf/20071101_30.pdf)
- Thabane, M. 2000. Shifts from old to new social and ecological environments in Lesotho Highlands Water Scheme: Relocating residents of the Mohale Dam area. *Journal of Southern African Studies* 26 (4): 633–54.
- Thamae, M. L. and L. Pottinger 2006. *On the wrong side of development: Lessons learned from the Lesotho Highlands Water Projects*. Maseru: Transformation Resource Centre.
- Tharme, R. 2000. An overview of environmental flow methodologies with particular reference to South Africa. In *Environmental flow assessments for rivers: Manual for building block methodology*, eds. J. King, R. Tharme, and M. DeVilliers. Pretoria: Water Research Commission.
- Thompson, L. and H. Lamar. 1981. Comparative frontier history. In *The frontier in history: North America and southern Africa compared*, eds. H. Lamar and L. Thompson. New Haven and London: Yale University Press.
- Tibbets-Abbott-McCarthy-Stratton Consortium. 1996. Water resources management: Policy and strategies, final report. Maseru: Ministry of Natural Resources.
- Tilt, B., Y. Braun, D. He. 2009. Social impacts of large dam projects: A comparison of international case studies and implications for best practices. *Journal of Environmental Management* 90:S249–57.
- Timmerman, J. G. and S. Langaas. 2005. Water information: What is it good for? The use of information in transboundary water management. *Regional Environmental Change* 5 (4): 177-87.
- Tompkins, R. 2007. Institutional structures in the four Orange Basin states. In *Orange River Integrated Water Resources Management Plan*, ed. Orange-Senqu River Commission. Pretoria: Orange-Senqu River Commission.
- Transboundary Freshwater Dispute Database. 2004. Database of Oregon State University, Department of Geosciences. <http://www.transboundarywaters.orst.edu/projects/internationalDB.html>

- Trans-Caledon Tunnel Authority–Lesotho Highlands Development Authority. 2003. *Sustainable development: Lesotho Highlands Water Project*. Pretoria: Trans-Caledon Tunnel Authority–Lesotho Highlands Development Authority.
- Transformation Resource Centre. 2006. *On the wrong side of development: Lessons learned from the Lesotho Highlands Water Project*. Maseru: Transformation Resource Centre.
- Tshabalala, M. and W. Kisubi. 2003. Socioeconomic monitoring of households affected by Phase 1A of the LHWP: a synthesis of 2000/1 results. Maseru: Lesotho.
- Turton, A. R. 2000. Water wars in southern Africa: Challenging conventional wisdom. In *Water wars: Enduring myth of impending reality*, African dialogue lecture series, Monograph Series No. 2, eds. H. Solomon, and A. R. Turton. Durban, South Africa: Accord.
- Turton, A. R. 2003. The political aspects of institutional developments in the water sector: South Africa and its international river basins. PhD diss., Department of Political Science. Pretoria: University of Pretoria.
- Turton, A. R. 2004. The evolution of water management institutions in select southern African international river basins. In *Water as a focus for regional development*, eds. A. K. Biswas, O. Unver, and C. Tortajada, 251-189. London: Oxford University Press.
- Turton, A. R. 2005. A critical assessment of the river basins at risk in the southern African hydropolitical complex. Paper presented at the Workshop on the Management of International Rivers and Lakes, Helsinki, Finland.
- Turton, A. R. and P. J. Ashton. 2008. Basin closure and issues of scale: The southern African hydropolitical complex. *International Journal of Water Resources Development* 24:305–18.
- Turton, A. R., A. Earle, D. Malzbender, and P. J. Ashton. 2006. Hydropolitical vulnerability and resilience along Africa’s international waters. In *Hydropolitical resilience and vulnerability along international waters*, ed. A. T. Wolf, 19–67. Nairobi: United Nations Environment Program.
- Turton, A. R. and N. Funke. 2008. Hydro-hegemony in the context of the Orange River. *Water Policy* 10 (S2): 51–69.
- Turton, A. R., R. Meissner, P. Mampane, and O. Seremo. 2004. *A hydropolitical history of South Africa’s international river basins*. Pretoria: Water Research Commission.
- Turton A. R. and L. Ohlsson. 2000. Water scarcity and social stability: Towards a deeper understanding of the key concepts needed to manage water scarcity in developing countries. *SOAS Occasional Paper 17*. London: SOAS Water Issues Group.
- Underdal, A. 1992. The concept of regime “effectiveness.” *Cooperation and Conflict* 27 (3): 227–40.
- Underdal, A. and O. Young. 2005. *Regime consequences*. Dordrecht, The Netherlands: Kluwer Academic.
- United Nations. 1997. Convention on the Law of Non-Navigational Uses of International Watercourses. United Nations General Assembly Document A/51/869. New York: United Nations.

- United Nations. 2001. Secretary-general asks United States geographers to work with him to tackle climate change problems, environmental degradation and sustainable development. United Nations Press Release SG/SM/7732. New York: United Nations.
- United Nations. 2002. *Report on the World Summit on Sustainable Development. Johannesburg, South Africa, 26 August - 4 September 2002. A/CONF.199/20\**. New York: United Nations.
- United Nations Conference on Environment and Development. 1992. *Agenda 21*. New York: United Nations.  
[http://www.sidsnet.org/docshare/other/Agenda21\\_UNCED.pdf](http://www.sidsnet.org/docshare/other/Agenda21_UNCED.pdf)
- United Nations Development Program. 2006. *Beyond scarcity: Power, poverty, and the global water crisis*. New York: United Nations Development Program.
- United Nations Development Program/Global Environment Facility. 2005. Development and implementation of the Strategic Action Programme for the Orange-Senqu basin: Project development facility, request for pipeline entry and PDF Block B approval. Pretoria: United Nations Development Program/Global Environment Facility.
- United Nations Education, Scientific, and Cultural Organisation- Internationally Shared Aquifer Resources Management. 2004. *Managing shared aquifer resources in Africa*. Paris: United Nations Education, Scientific, and Cultural Organisation.
- United Nations Environment Programme. 2002. *Atlas of international freshwater agreements*. Nairobi: United Nations Environment Programme.
- Van der Zaag, P. and A. C. Vaz. 2003. Sharing the Incomati waters: Cooperation and competition in the balance. *Water Policy* 5:349–68.
- Van der Zaag, P., I. M. Seyam, and H. H. G. Savenije. 2000. Towards objective criteria for the equitable sharing of international water resources. *Water Policy* 4: 19–32.
- Van Robbroeck, T. 1986. *The Lesotho Highlands Water Project: An authoritative overview*. Pretoria: Department of Water Affairs.
- Vaz, A. C. 1999. Problems in the management of international river basins: The case of the Incomati. In *River basin management: Proceedings of the International Workshop*, ed. E. Mostert, 57–68. Paris: United Nations Environmental, Scientific, and Cultural Organisation.
- Verwoed 1965, see Turton et al. 2004.
- Victor, D. G., K. Raustiala, and E. B. Skolnikoff, eds. 1998. *The implementation and effectiveness of international environmental commitments: Theory and practice*. London: MIT Press.
- Wallis, S. 2000. *Lesotho Highlands Water Project, Vol. 5*. Surrey: Laserline.
- Waltz, K. N. 1979. *Theory of international politics*. New York: McGraw-Hill.
- Warner, J. 2003. Images of water security: A more integrated perspective. Paper presented at the Flood Hazard Research Centre, Middlesex University.
- Warner, J. 2004. Mind the GAP? Working with Buzan: The Ilisu dam as a security issue. *SOAS Occasional Paper 67*. London: SOAS Water Issues Group, University of London.

- Warner, J. 2005. Hydro-hegemony as a layered cake: Hydro-hegemonic strategies in the case of Turkey. Paper presented at the First Workshop on Hydro-Hegemony, King's College, London.
- Warner, J. 2008. Contested hydrohegemony: hydraulic control and security in Turkey. *Water Alternatives* 1(2): 271-288.
- Warner, J. forthcoming. Hydrohegemonic politics: a crossroads on the Euphrates-Tigris.
- Warner, J. and M. Zeitoun. 2008. International relations theory and water do mix: A response to Furlong's troubled waters, hydro-hegemony and international water relations. *Political Geography* 27:802–10.
- Waterbury, J. 1997. Between unilateralism and comprehensive accords: Modest steps towards cooperation in international river basins. *Water Resources Development* 13 (3): 279–89.
- Weinthal, E. 2002. *State making and environmental cooperation: Linking domestic and international politics in central Asia*. Cambridge, MA: MIT Press.
- Weiss, E. B. and H. K. Jacobson, eds. 1998. *Engaging countries: Strengthening compliance with international environmental accords*. Cambridge, MA: MIT Press.
- Wendt, A. 1987. The agent–structure problem in international relations theory. *International Organization* 41 (3): 335–70.
- Wendt, A. 1992. Anarchy is what states make of it: The social construction of power politics. *International Organization* 46 (2): 391–425.
- Wester, P. and J. Warner. 2002. River basin management reconsidered. In *Hydropolitics in the developing world: A southern African perspective*, eds. A. Turton and R. Henwood, 61-72. Pretoria: African Water Issues Research Unit.
- Willemse, N. 2007. Actual versus predicted transboundary impact: A case study of Phase IB of the Lesotho Highlands Water Project. *International Journal of Water Resources Development* 23 (3): 457–72.
- Wilcox, A. R. 1986. *Great river: The story of the Orange River*. Winterton, South Africa: Drakensberg.
- Wolf, A.T. 1997. International water conflict resolution: lessons from comparative analysis. *International Journal of Water Resources Development* 13(3): 333-67.
- Wolf, A.T. 1999. Criteria for equitable allocations: the heart of international water conflict. *Natural Resources Forum* 23: 3-30.
- Wolf, A. T., S. B. Yoffe, and M. Giordano. 2003. International waters: Identifying basins at risk. *Water Policy* 5:29–60.
- World Bank. 2007. Lesotho Highlands Water Project Phase B implementation completion and results report. Washington DC: World Bank.
- World Bank. 2009. Development data and statistics. <http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS.html> [accessed 4 December 2009].
- World Commission on Dams. 2000. *Dams and development: A new framework for decision-making: World Commission on Dams*. London: Earthscan.
- World Health Organisation. 2003. *The right to water*. Geneva: World Health Organization.
- World Water Assessment Programme. 2009. *Water in a changing world*. Paris: United Nations Economic, Scientific, and Cultural Organisation.

- World Water Council. 2000. *Second World Water Forum & Ministerial Conference, 17-22 March 2000, The Hague, Final Report*. Marseille: World Water Council. [www.worldwaterforum.net/Ministerial/declaration.html](http://www.worldwaterforum.net/Ministerial/declaration.html)
- World Water Council. 2003. *World water actions: Making water flow for all*. Marseille: World Water Council.
- Worth, O., and C. Kuhling. 2004. Counter-hegemony anti-globalisation and culture in international political economy. *Capital and Class* 84:31–42.
- Wouters, P. K., S. Vinogradov, A. Allan, P. Jones, and A. Rieu-Clarke. 2005. Sharing transboundary waters: An integrated assessment of equitable entitlement. *Technical Documents in Hydrology* 74. Paris: United Nations Economic, Scientific, and Cultural Organisation.
- Yin, R. K. 2003. *Case study research: Design and methods*. Thousand Oaks, CA: Sage.
- Yoffee, S. and K. Larson. 2001. *Basins at risk: Water event database methodology (Basins at risk research project, chapter 2)*. Corvallis, OR: Oregon State University.
- Yohe, G. and R. S. J. Tol. 2002. Indicators for social and economic coping capacity: Moving toward a working definition of adaptive capacity. *Global Environmental Change* 12 (1): 25–40.
- Young, O. R. 1999. *The effectiveness of international environmental regimes*. London: MIT Press.
- Young, O. R. 2002. *The institutional dimensions of environmental change: Fit, interplay, and scale*. Cambridge, MA: MIT Press.
- Young, O. R. and M. A. Levy. 1999. The effectiveness of international environmental regimes. In *The effectiveness of international environmental regimes: Causal connections and behavioural mechanisms*, ed. O. R. Young, 1-32. London: MIT Press.
- Zawahari, N. 2008. Capturing the nature of cooperation, unstable cooperation, and conflict over international rivers: The story of the Indus, Yarmouk, Euphrates, and Tigris rivers. *International Journal of Global Environmental Issues* 8 (3): 286–310.
- Zeitoun, M. 2006. Power and the Palestinian-Israeli water conflict: Towards an analytical framework of hydro-hegemony. PhD diss., Kings College, London.
- Zeitoun, M. and A. Jägerskog. 2009. Confronting power: Strategies to support less powerful states. In *Getting transboundary water right: Theory and practice for effective Cooperation*, eds. A. Jägerskog and M. Zeitoun. Stockholm: Stockholm International Water Institute.
- Zeitoun, M. and N. Mirumachi. 2008. Transboundary water interaction I: Reconsidering conflict and cooperation. *International Environmental Agreements* 8:297–316.
- Zeitoun, M., N. Mirumachi, and J. Warner. 2009. Transboundary water interaction II: The influence of “soft” power. *International Environmental Agreements* published online 8 September.
- Zeitoun, M. and J. Warner. 2006. Hydro-hegemony: A framework for analysis of trans-boundary water conflicts. *Water Policy* 8:435–60.