NeWater

TRANSBOUNDARY REGIMES IN THE ORANGE SENQU BASIN

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Preamble

The project has assembled a group of enthusiastic people with different scientific and practical background. In and of itself, the project presents a major challenge and a practical lesson in social learning in order to promote and guide the research process to profit from the diversity of knowledge and experiences. We welcome feedback and suggestions from anyone reading this report since it defines the basic structure of what we intend to do in the project.

All teams involved are grateful for the support of the European Commission in providing funds for this research and to the national organisations contributing to the project.

Claudia Pahl-Wostl

Coordinator of WB1
NeWater project
August 2005

Executive Summary

Overview of Project

This report is part of the NeWater project, and provides a review on the water resources governance regime in the Orange-Senqu River basin in southern Africa. This transboundary basin, shared between four countries, is one of six international river basins that serve as case studies for NeWater. The project aims to provide new knowledge on managing the transition from currently prevailing regimes of water resources management to more adaptive regimes, which will be more suitable for operation under uncertainty.

The project has started in January 2005 and will run until December 2008.

Report Summary

This report provides an overview of the water management regime(s) of the Orange River basin. The approx. 1 million sq. km. large basin is characterised by strongly varying hydrometeorological conditions, which produce an extremely uneven distribution of the water resources within the basin. Of the four countries within which the basin lies, only Lesotho can be said not to face water stress; the other three face different problems related to water resources scarcity (Chapter 1). Due to this situation large-scale water infrastructure (including inter basin transfers (IBTs)) has been built, and more projects, particularly IBTs, are currently under review.

In view of this situation, and in line with the growing importance given internationally to integrated approaches to river basin management, the four countries initiated co-operation on transboundary water management, resulting in the creation of the Orange-Senqu River Commission (ORASECOM) in the year 2000. This river basin organisation was created in a highly favourable political climate, in the aftermath of a process of political union (which had as result the creation of the Southern African Development Community) and of widely-praised international policy- and law-making. Due in large part to its post-apartheid political process, South Africa has seen wide-sweeping reforms of the national water legislation, which as well as being based on different principles (e.g. equitable access), incorporates best-practice knowledge regarding resource management. The basin's other countries have also undergone or are currently undergoing processes of modernisation of their water legislation (Chapter 2). Both the national and international evolution in the region present a highly favourable scenario for designing and implementing governance systems with an integrated water resources management approach.

The changes responsible for the positive outlooks for the river basin organisation are, paradoxically, also hampering its effective implementation. The basin's countries are still in the midst of restructuring their water sectors, and progress in the development of the ORASECOM has accordingly been slow. The window of opportunity for the development of this river basin organisation has been recognised by the international donor community, and a large variety of efforts have been realised or are currently being initiated. These target subjects as diverse as the structure of the organisation, the development of a strategic action programme for it, capacity building, generation of hydrometeorological information, etc. (Chapter 2).

Information production and communication is central for the management of transboundary resources. The current production of information relevant to water resources management has serious shortfalls, but this area is also showing considerable development. The generation of more hydrometeorological data, for instance, has been the focus of various efforts. A commitment to information exchange between the countries can be found in both international and national legislations, and the ORASECOM agreement commits member countries to information exchange of relevant information (Chapter 3). Although still in its early stages, the governance system that is emerging in the basin also shows promise in this subject.

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1 Introduction

This report intends to provide an overview of transboundary issues in the Orange River basin in Southern Africa, with the aim of delivering an evaluation of the adaptive capacity of the water management regime in this basin. This report forms part of work package 1.3 on 'transboundary water regimes' of the NeWater project.

NeWater research is aimed at identifying new approaches to more adaptive strategies in water resource management. In the inception phase, current water management regimes in a number of selected case study basins are described as a basis for the development of further research agendas on the transition towards adaptive water management schemes.

The Orange basin has been selected as a one of the river basins for further analysis in the context of the NeWater project. While studies prepared by WP 1.2 on the issue of governance, institutions and participation mainly analysed the structure of water management regimes in some of the riparian states of the river basin (South Africa and Lesotho), WP 1.3 specifically examines the interplay of different policies, institutions and countries in international river basins, the existing problems and challenges in such basins as well as current and possible future strategies for possibly improving the situation.

Water management in the Orange basin is determined by the increasing scarcity of the resource in the region and the struggle of all riparian countries to secure access and availability to the resource for their future economic development and the welfare of their nations. Availability of water resources is a crucial pre-condition for agriculture and industry in all riparian states of the Orange basin. Among these countries South Africa is assuming a dominant role in comparison with Namibia, Botswana and Lesotho with the effect that water management in the past very often was tailored to meet the demands of the Republic of South Africa.

While bilateral agreements have tradition in the region and have been used to clarify the relations of individual states in the context of water management, a multi-lateral institution (the Orange-Senqu River Commission, ORASECOM) has only been established very recently. This young organisation aims to provide a platform for negotiations on water quality and quantity issues as well as the sharing of knowledge and experiences. The establishment of this joint body marks a step in the right direction. Whether it will contribute to more transparency in decision-making, better stakeholder involvement at the national and international level and the sustainable management of the water resources in the region in an equitable manner will only emerge in the years to come.

This process towards more co-operation in the region in the area of water management is directly linked to two overarching policy developments over the past years: the increasing collaboration of Southern African countries to advance economic development more uniformly throughout the region and the trend towards a more integrated management of water resources, as for example promoted by the recent South African water law.

This report aims to provide an introductory description of these factors as well as a brief assessment of the adaptiveness of the regime in the Orange basin as a basis for the further work in NeWater. This will entail the development of a research agenda for investigating and addressing some of the most pressing issues from a governance perspective in close collaboration of the NeWater partners active in the case study area with the goal of contributing to the process to more adaptive water management in the basin. In the context of this report, all countries in the basin will be considered, while the focus will be on South Africa and Lesotho.

The following text is guided by a reporting template designed to address the main aspects of a transboundary basin regime: the set-up of institutions and the interplay of different actors

as well as all issues related to the generation, dissemination and use of information for river basin management.

1.1 Basin description

The river basin of the Orange is the largest watershed in South Africa, and the Orange is the largest river in Africa south of the Zambezi. Approx. 60% of the around one million square kilometres that form the catchment area lie in the country of South Africa. The remainder falls within Botswana (11%), Namibia (25%) and Lesotho (4%), the latter country lying totally within the basin [40].

The river originates in the Drakensberg range in Lesotho and stretches over 2.200 km westwards to the South Atlantic. The Orange basin is characterised by extremely variable rainfalls, ranging from around 2.000 mm per year in the Lesotho Highlands to 50 mm per year - and thus extremely arid climatic conditions - near its mouth, with an average annual potential evaporation of approx. 1.100 mm in the Lesotho Highlands to over 3.000 mm in lower areas of the basin [40].

Main tributaries of the Orange are the Caledon, Senqu, Kraal and Vaal rivers; further downstream the Orange receives water from the Hartbees, Molopo and Fish rivers. These rivers usually run dry during several months of the year, and the same has happened to the Lower Orange during severe droughts. The Orange does not have extensive floodplains or a significant delta.

The climatic variability within the Orange Basin produces large differences in the distribution of water resources within it. Botswana, for instance, whilst having a large area of the country within the basin, does not actually contribute runoff to the Orange: within living memory the Molopo tributary has not contributed any surface runoff to the main river [40]. Meanwhile Lesotho, constituting only 4% of the basin area, contributes approx. 45% of its runoff. South Africa dominates the basin in terms of land area and runoff contribution. Namibia contributes about 4% to total surface runoff, and, in part due to its being a downstream riparian country, faces a relative scarcity of water resources.

In terms of water use, the situation in the basin can be described as follows: irrigation dominates water use with 54%, contrasting with the 10% that goes towards environmental demands and the 2% provided to urban and industrial use. The remaining 34% is accounted for by evaporation and run-off to the ocean through the mouth and canals.

Figure 1: Orange River Basin and riparian states

1.2 Main (transboundary) issues

Water availability, and hence water allocation, is probably the main transboundary issue in the region. Of the four riparian states of the Orange River Basin, three belong to the driest countries in the Southern African Development Community (more detail on the SADC in Chapter 2) [40]. South Africa, for example, faces a water deficit in 11 of its 19 Water Management Areas (a deficit being defined as water requirements exceeding water availability). In the northern parts of the country, both surface and groundwater resources are nearly fully developed and utilised. Growing industrialisation and urbanisation, as well as population growth, will place further demands on water resources unless corrective measures are taken [16].

Namibia has an extremely arid hydroclimate, a high level of water stress and absolute water scarcity. In spite of wastewater recycling measures and the development of desalinisation technology, the water situation makes it likely that Namibia will look to international water resources to meet internal demand [16]. In the arid southern parts of the country, the main development potential lies in irrigation, which would also most probably create the highest demand for water; Namibia has been having successful experiences with the irrigated cultivation of cash crops (utilising water from the Orange), and is interested in an expansion of the irrigated surface, which is subject to water availability. As well as agriculture, industrial uses, mines, and a proposed gasfield power station are activities Namibia would like to support through a new water reservoir on the lower Orange River, which would give the country increased assurance of supply [40; 18]. Being the downstream riparian country, Namibia depends on South Africa in these matters; South Africa's policy insures that agreed allocations for downstream countries should be respected, but this raises the issue equitable sharing. According to Turton [40], "the indisputable facts are that South Africa has most control over the Orange River, and that Namibia is the hardest hit".

With an aridity comparable to Namibia's and a water demand which is expected to double in the next 15-20 years, Botswana faces a situation of water resources under high level of stress. The country realises that augmentation of its internal water resources through the utilisation of internationally shared supplies (border-rivers and perhaps transboundary

aquifers) will become extremely important over the next decade [16]. In spite of not contributing surface run-off, it is a legal riparian country, a situation which could produce coalition-building in return for concessions in other areas of strategic interest for Botswana [40].

Lesotho, in spite of not facing water stress, does face distribution problems: the concentration of population and industry is not coincident with the availability of large quantities of water [16]. The main transboundary issue for Lesotho, though, and one that is also very important for the other riparian countries, is water transfer, which can be both within the Orange Basin as well as with other river basins. The Orange is considered the most developed river system in Africa [40]; South Africa also plays a dominating role in these developments, which include a series of complex inter-basin transfer schemes (ITBs), mainly due to thermal power generation in the Gauteng area, as a result of which almost every major river basin in the country, including the four international basins, are linked [40]. The most well-known of these projects is the Lesotho Highlands Water Project, which transfers water within the Orange basin between Lesotho and South Africa. Currently, the extension of this project, as well as a wide array of other possible water transfers (e.g. water transfers from Lesotho to Botswana and from Botswana to South Africa) are being considered, and the importance of water transfers in the region looks set to grow in the future [18; 53].

Droughts are an important issue for all countries within the basin. South Africa, as the country most dependent on the water of the Orange River [40], is especially affected, but has some reaction capacity thanks to extensive damming and the existence of water transfer infrastructure, both within South African river basins as well as with Lesotho [40]. In spite of the relatively high amount of rainfall, droughts and desertification are also an issue for Lesotho, especially in the southern districts of the country [1]. Botswana and Namibia are, due to their water resources stress, clearly very vulnerable to droughts; Namibia, due to its downstream riparian status, is especially vulnerable.

In the basin, water and various sectors of the economy are linked in complex ways. One of these is the energy sector. The water requirements for thermal power generation in the South African Gauteng area have already been mentioned; the water is used for the cooling of coal-fired power plants. (It is thus linked to the technology currently in use; changes in the power generation in the area could strongly affect this water consumption. [12]) The water linking of water basins carried out by South Africa is part of a complex strategic plan designed to safeguard the energy needs of South Africa with a system flexible enough to guarantee assurance of supply in times of localised drought [40]. More than 80% of South Africa's electricity requirements are met through the resources of the Vaal (principal tributary of the Orange), and water is also supplied from the Vaal to some of the largest gold and platinum mines in the world, as well as to production activities in some of the world's largest coal reserves [16].

2 Water management regime in the Orange Basin

This chapter will focus on describing the water management regime currently operating in the area, as well as the ongoing processes currently changing this regime. Both on the national and international level, the last decade has seen great changes of water policy and water law in the area although the implementation of these changes on the ground is still not complete, and in some cases only in the early stages. The analysis will accordingly split the international from the national elements of the water regime.

2.1 Water policy

2.1.1 International context

The most far-reaching and general policy statement in the region that specifically refers to water resources is the New Partnership for Africa's Development (NEPAD). It is a pledge by African leaders, signed in October 2001, focusing on the eradication of poverty, sustainable growth and development as well as the active participation of African countries in the world economy and political bodies [42]. Its strategy for achieving sustainable development in the 21st Century establishes sectoral priorities. One of these sectors is "Water and Sanitation", and its objectives include:

- To plan and manage water resources to become a basis for national and regional co-operation and development
- To co-operate on shared rivers among member states
- To effectively address the threat of climate change

The SADC Protocol (the SADC founding protocol of 1994) and the Revised Protocol on Shared Watercourses in the SADC are agreements which strictly speaking correspond to international law. Nevertheless, both legislations include objectives and statements of intent not found in other policy statements, and that can be seen as policy in their own right. Due to this, they will be discussed in this water policy chapter, and only be referred to briefly in the water law section.

The piece of legislation that provides the overall legal framework within which international water initiatives (as well as various other areas) operate in the region is the Southern African Development Community Protocol (SADC Protocol). Fourteen countries are members of this community, including the four countries in which the Orange Basin lies. The goal of the SADC is "the attainment of an integrated regional economy on the basis of balance, equity and mutual benefit of all States" [18]. Regional integration and poverty alleviation are central elements of its agenda [49], and the protocol declares political, economic and ecological co-operation as a form of promoting this integration. Article 22 (1) of the Treaty "provides for member states to conclude a series of protocols that elaborate the objectives, scope and institutional mechanisms for co-operation and integration in the region. These protocols are to be developed, negotiated and agreed upon with the focus on various areas of co-operation", and "after approval and signature by the Summit, become integral parts of the Treaty" [53]. In the context of an assessment of the water policy process in South Africa, de Coning & Sherwill concluded that the SADC Protocol's framework provided a good vehicle for engaging government representations throughout the region, and that it has been active in promoting regional co-operation on shared water courses [3].

The SADC Protocol is of importance for transboundary river management because, apart from delivering the legal framework for more specific co-operation initiatives, it is a tangible result of what is seen as a process of growing involvement of the countries in the region, and it expresses a degree of political unity and goodwill not necessarily found in other regions with transboundary management issues. A wide range of co-operation programmes have been established between SADC countries, including programmes that address transboundary management of other resources (e.g. national parks, wildlife, tourism).

There are, though, differing versions on the amount of unity and goodwill to be found in the SADC. Turton, for example, says that South Africa not having a front-line role in an Orange River basin organisation would be a positive development, "given the inherent mistrust of South Africa within the SADC region" [40].

In 1995 the SADC signed the SADC Protocol on Water Resources, which was later modified in view of the UN Convention on the Law of the Non-Navigational Uses of Shared Watercourses, of 1997 [18]. The Revised SADC Protocol on Shared Water Resources was signed by the SADC countries in August 2000. (It entered into force during 2003, when 2/3 of the countries ratified it). Relevant to transboundary river basin management is that it seeks to promote and facilitate the establishment of shared watercourse agreements and shared watercourse institutions, as well as enshrining the principles of reasonable use and environmentally sound development of the resource. It also recognises the principles of unity and coherence of each shared watercourse. Signatory states "shall exchange available information and data", concerning hydrological, environmental, etc. parameters of the watercourse [49].

The protocol provides objectives, general principles and specific provisions that reflect best-practice concerning shared watercourse legislation. The provisions expressly address conflict-resolution between member states, detailing in a reasonably specific way the procedures to be followed when problems arise. The protocol provides the framework for specific shared watercourse agreements in the region, and several river basin organisations have been formed after the signing of this protocol and specifically refer to it in the corresponding agreements (e.g. Orange-Senqu River Commission (ORASECOM), Zambezi Watercourse Commission, Limpopo Watercourse Commission). The protocol also establishes a framework of general co-operation that includes elements required for successful transboundary river basin management: e.g. the exchange of resource-relevant information between member states and the recognition of the principles of unity and coherence of each shared watercourse. These agreements undertake to manage the water resources according to Integrated Water Resource Management (IWRM) [58], and the SADC's regional strategic action plan also follows these principles: it is called the Regional Strategic Action Plan for Integrated Water Resources Development and Management (RSAP-IWRM). This plan was developed by the SADC Water Sector between 1997 and 1998, and approved in 1998 by all member countries; it defined projects addressing the problems considered most pressing. Because of its intimate relationship of these projects with the organisations executing them, the RSAP-IWRM will be discussed in more detail in Section 2.3.

The SADC has, as well as developing the Revised SADC Protocol on Shared Water Resources and the RSAP-IWRM, established the SADC Water Division (described in Section 2.3.1.1). In this sense, the aim of collective development in the fields of politics, economy and ecology has already been operationalised in the water sector through several agreements and through institution-building.

2.1.2 National water resource policy

2.1.2.1 Lesotho

In 1998 Lesotho's National Environmental Policy was approved. Among the main environmental problems identified in the preamble are "periodic prolonged drought and scarcity of water for agriculture" and "pollution of land and water courses". The whole policy is based on the concepts of sustainable development/management of the environment as well as public participation [26].

Section 4.15 refers to water resources management. The first of its guiding principles addresses public participation, saying that "the involvement of stakeholders contributes to the efficiency, sustainability and success of water projects". Among the strategies identified for Water Resources Management, the need for joint co-operation in transboundary issues is addressed; one of the strategies is the "promotion of the research and conservation of shared water course systems and resources with neighbouring countries in the SADC region" [26]. Another relevant strategy refers to the "support of drought and other risk preparedness programmes".

Climate change is the only issue identified for which the need for an adaptive response is recognised and included in the policy. Section 4.11 refers to the prevention of climate change: one of the strategies envisioned is to "draw up contingency plans for the impact of climate change on water resources, agriculture and other economic development activities" [26].

2.1.2.2 South Africa

South Africa is the most economically developed state in the Orange basin with a high dependency on inter-basin water transfers for supporting their economy in large parts of the country. The construction of massive infrastructure of international dimension to secure the availability for industrial and agricultural uses has been dominating Southern African water policy over the past decades. Following the end of the apartheid regime in the early nineties, the water management strategy was adjusted in order to provide for a more equitable access to the resource for all South African people, but also to allow for a more sustainable approach to water resource management in general.

The process of change in the water-related laws and institutions of South Africa in the last decade has been guided by the National Water Policy White Paper of 1997. This document also made reference to transboundary issues of water management. It stipulates a benefits-sharing approach for international water resources, in accordance with the Helsinki rules. It advocates the regional level as preferable for water management, in order to enable all affected parties to participate and due to the requirements of IWRM, but the resource is seen as a national issue; the national government has a "central responsibility" for the water resources, implying a precedence of the national level over the regional one. Transboundary issues can have an even higher priority: the National Water Policy says that the government "will have the right to allocate water to downstream countries in preference to local water allocations", and regarding transboundary basins, "the whole shared catchment will be the basis for decision making, particularly where more than two countries are involved" [4].

The Department of Water Affairs and Forestry will be part of an institutional framework "which reflects the central responsibility of the national government as custodian of the nation's water resources" [4].

The National Water Resource Strategy is a strategy paper that "describes how the water resources of South Africa will be protected, used, developed, conserved, managed and controlled in accordance with the requirements of the policy and law [7]. It defines certain guidelines relevant to transboundary river basin management. The purposes of the NWRS, for instance, are established as follows:

- the national framework for managing water resources;
- the framework for the preparation of catchment management strategies;
- provision of water-related information; and
- identification of development opportunities and constraints.

2.1.2.3 Namibia

Namibia, after its independence in 1990, also initiated a transformation of its water sector. The Water and Sanitation Policy dates from 1993, and includes as broad sectoral objectives the following points:

- that essential water supply and sanitation services should become available to all Namibians, and should be accessible at a cost that is affordable to the country as a whole;
- that equitable improvement of services should be achieved by the combined efforts of the government and the beneficiaries, based on community involvement, community participation and the acceptance of mutual responsibility; and
- that communities should have the right, with due regard for environmental needs and the resources available, to determine which solutions and service levels are acceptable to them.

Beneficiaries should contribute toward the cost of services at increasing rates for standards of living exceeding the levels required for providing basic needs [16].

In 1997, an institutional reform process was initiated, called the Namibian Water Resources Management Review (NWRMR). An objective of NWRMR was to create a more effective and appropriate institutional structure for the Water Sector; it also reflects the decentralisation policy of the Government.

2.1.2.4 Botswana

Information regarding water policy in Botswana is limited. A document that includes activities related to water management is the Botswana National Water Master Plan Study, developed more than a decade ago, but revised and adjusted over this period. Due to the fact that approx. 80% of the population and the livestock rely on groundwater as their freshwater source, the document addresses groundwater issues explicitly. The activities emphasised include:

- close monitoring of groundwater wellfields to avoid excessive depletion. In cases where the rate of extraction is greater than the rate of replenishment, alternative water resources must be found;
- ensuring greater use of alternative technologies, such as desalination, to develop and conserve water resources;
- management and the development of water supplies by local communities;
- ensuring greater co-ordination between Government institutions in the planning and development of water resources;
- requiring environmental impact statements (EIS) as an integral part of all project feasibility and subsequent studies for water development projects; and
- building interconnecting water supply schemes as a measure to respond to drought [16].

There is a growing realisation that an increase in its internal water resources through the use of internationally shared supplies (border-rivers and perhaps transboundary aquifers) could

become extremely important over the next decade. Botswana has established an International Water Unit within the Ministry of Natural Resources to provide technical support for the management of shared river basins.

2.2 Water law

2.2.1 Multi-lateral agreements

The Southern African Development Community Protocol (SADC Protocol) is the piece of legislation that provides the overall legal framework within which the various international initiatives operate in the region, including water ones. In 1995 the SADC signed the SADC Protocol on Water Resources, which was later modified to the Revised SADC Protocol on Shared Water Resources. Because these pieces of legislation include objectives and statements of intent that are not included in other policy documents, they have been discussed in the policy chapter (see Section 2.1.1.).

Even though the UN Convention on the Law of the Non-Navigational Uses of Shared Watercourses, the successor of the 1966 "Helsinki Rules", is not yet in force, due to the slow progress in its ratification, it strongly influenced the revised version of the first SADC Protocol, and the agreements that formed the basin organisations mentioned above make explicit reference to it [58]. The UN Convention has so far been signed and ratified by South Africa and Namibia.

The establishment of the basin organisation Orange-Senqu River Basin Commission (ORASECOM) did not replace previous bilateral agreements, and does not exclude the possibility of further bilateral agreements either. The detailed structure of ORASECOM will be discussed in Section 2.3.1.2. At the present moment, the bilateral agreements in the region that are in force are all from the times before the ORASECOM Commission was formed.

2.2.2 Bilateral agreements

The bilateral agreements still in force are the LHWP Treaty, signed by Lesotho and South Africa, and the agreement that created the Permanent Water Commission (PWC), which was signed between South Africa and Namibia. The PWC will be discussed in Section 2.3., since the agreement's main consequence was the creation of this commission.

The Lesotho Highlands Water Project (LHWP) was launched with the signing of the Treaty in October 1986 (see Section 2.2). Under this treaty, the Kingdom of Lesotho agreed to divert water from the Senqu basin (part of the Orange basin) to the Gauteng region of South Africa (also partly within the Orange basin), through a complex system of water dams and tunnels, at the same time generating electricity. The logic behind this agreement is that the water would eventually have flown into South Africa and could have been pumped (incurring in high costs) to the Gauteng area; the "royalties" paid by South Africa to Lesotho were determined as a function of the "saved" pumping costs. The water transfers and the generated electricity should result in benefit for both countries. The first phase of the project was finished in 2004; currently 29 cubic metres per second are transferred. At the moment it is not clear if construction of phases 2 to 4 will take place: the original plans were based on an overestimation of the future water scarcity in the Gauteng area, and in the meantime water policy in South Africa has seen a shift towards demand management. This notwithstanding, it remains one of the biggest water civil-engineering projects of its kind in the world [58].

The Treaty is one of the most comprehensive and detailed water-related contracts in sub-Saharan Africa, according to Turton (in [40]). It contains very clear rules - of a binding nature - regarding the obligations and tasks of each party. In the meantime it has been complemented through six protocols that address issues that have arisen due to

implementation of the project, as well as new problems. Some of the protocols solely specify the treaty further, as for instance Protocol IV, which makes provision for several "supplementary matters" concerning cost allocation, financing, insurance, start date of fixed royalty payments, etc. Other protocols have had more profound effects on the way the project is managed, as Protocol VI for example, which significantly changed the project's governance system, revising the attributions and functions of the institutions related to the project.

2.2.3 National water legislation

2.2.3.1 Lesotho

The main legislation regarding water resources is the Water Resources Act of 1978 [24]. It establishes that any use other than domestic use requires a water permit, and that domestic use has priority over other uses. The assignment of a permit does not include any guarantee of current or future availability of the assigned water. There is no mention of catchment organisations or of organisations of another kind; "water inspectors" are responsible for the implementation of the law. This seems to imply that the resource is centrally managed by the ministry, currently the Ministry of Natural Resources (formerly the Ministry of Water, Energy and Mining). The minister can declare certain areas to be protected areas for the purpose of protection and development. Further legislation relevant to water resources is scattered in several orders and acts administered by different departments without any consistency or overall guidelines; for more detailed information refer to [28].

2.2.3.2 South Africa

Regarding water resources, the main legislation in South Africa is the National Water Act of 1998. It contains comprehensive provisions for the protection, use, development, conservation, management and control of South African water resources. The strategic objectives are stipulated in the National Water Resource Strategy (NWRS). The Minister of Water Affairs is responsible for managing and administering water resources as the public trustee of the nation's water resources; the minister's responsibilities include ensuring that all water resources in every part of the country are managed for the benefit of all persons, that water is allocated equitably and that environmental values are promoted. For more detailed information refer to [28].

The transformations the water resource sector has been seeing during the last 15 years include a change from a central management system to a de-centralised one. A total of 19 Water Management Areas, whose borders mostly correspond to hydrological catchment borders, have been established, and Catchment Management Agencies will be the main administrative bodies to be established in them. These will be referred to in more detail in Section 2.3.

The National Water Act also establishes provisions for international water management. Management of this kind will be executed by bodies created to implement international agreements; Chapter 10 of this act determines the rules by which these bodies may be established and operated. Existing bodies (the Trans-Caledon Tunnel Authority, the Komati Basin Water Authority and the Vioolsdrift Noordoewer Joint Irrigation Authority) are considered as being bodies in the sense of Chapter 10 [43].

2.2.3.3 Namibia

The body of law currently in force dates from several decades ago. The laws directly concerned with water resources are four, some of them subsequently modified.

The Water Act of 1968 is the base statute and contains the "common law" aspects of water: the status of public water; the inherent rights of individuals to the use of water; the recording, granting, variation, and termination of formal rights to use or impound water or to discharge

effluents into it; the obligations of those taking water to use it properly; conditions controlling pollution of public water, and so on. This act established the Water Apportionment Board (WAB) as the licensing authority and prescribed its constitution, powers and duties.

The Borehole Act of 1956 stipulates the records and samples which have to be kept and furnished to the Director of the Department of Geological Survey (DGS) by anyone sinking a borehole more than 15 m below the surface or deepening an existing borehole.

The Waterworks Act of 1962 (amended by the Waterworks Amendment Act, 1983) provides for the constitution of water authorities in townships and other areas designated by the "Minister" and confer powers and duties upon them. Included among these is the right to acquire existing waterworks; construct new works; and curtail supplies in time of drought and other emergencies.

The Water Utilities Corporation (WUC) Act was passed in 1970 (amended in 1978 through the WUC Amendment Act). It established the Water Utilities Corporation for the supply and distribution of water within the Shashe Development Area and elsewhere. It also conferred necessary powers to the WUC to develop water resources [16].

At the moment, a Draft Water Bill is being considered at Cabinet level and is in the final stages of legal review.

2.2.3.4 Botswana

Up to the moment, specific information regarding water sector laws in Botswana has not been found.

2.3 Main actors in water management in the Orange basin

2.3.1 International level

2.3.1.1 Overarching institutions

In the year 2002 the Organisation of African Unity (OAU) was succeeded by the African Union (AU). The African Union was established to, inter alia, accelerate the process of integration in the continent to enable it to play its rightful role in the global economy. This process of integration was considerably advanced by the Organisation of African Unity, whose initiatives included co-operation programmes, mechanisms for conflict prevention, management and resolution, as well as a treaty that establishes the African Economic Community, a six-stage process whose outcome would be the establishment of the economic community and an African Common Market, based on the Regional Economic Communities as building blocks.

According to Wirkus and Böge [58] the AU, through its Commissioner for Agriculture and Water, influences directly the Water Programme of NEPAD by determining the political framework and influencing the complete development agenda. Two of its organisations, the Peace and Security Council and the Court of Justice of the African Union, relate to conflict resolution within the Union. The Court of Justice also has strong ties with the institutions and mechanisms of conflict resolution of the various regional organisations.

Also on a continental scale, the African Ministerial Council on Water (AMCOW) was formed in 2002 and its self-defined aim is to be the highest political body in relation to water management in the continent [58]. Programmatically, AMCOW is closely linked to NEPAD (see Section 2.1.1). It should take up the function of a ministerial technical committee in the foreseeable future; it is already partner of the European Union Water Initiative (EUWI) and

other donor organisations. A recent evaluation suggests that it will still take considerable time for AMCOW to be institutionally capable of taking over the supra-regional co-ordination of water resource management it sets out to do. This notwithstanding, AMCOW can be considered as the political arena for water issues in Africa, and its role in the co-ordination and moderation of development processes, particularly between member states, should progressively grow [58].

A Technical Advisory Committee was founded in 2003, composed of 3 experts of the 5 sub-regions (north, south, east, west, and central Africa). AMCOW apparently has had a different reception in different regions, and the regional powers Nigeria and South Africa are in some cases seen as pursuing hegemonic interests.

Changing over to a regional scale, the Southern African Development Community (briefly discussed in Section 2.1) established the SADC Water Division (previously named SADC Water Sector; its executive agency the SADC Water Sector Co-ordinating Unit, [49]) as an area of co-operation in 1996, soon after signing the first Protocol on Shared Water Resources [53]. It was created as part of the institutional framework for the implementation of the Protocol [49], and its main tasks have been the monitoring of the implementation of the Protocol, and the creation and implementation of the SADC Regional Strategic Action Plan on Integrated Water Resources Development and Management (RSAP-IWRM). In their own words, “the SADC Water Division has been tasked with creating the enabling environment for the integrated management of shared watercourses on a regional rather than national level. The two pillars supporting this integrated approach are the Protocol on Shared Watercourses and the Regional Strategic Action Plan.” (from SADC website, http://www.sadc.int, downloaded on 20/07/2005).

The SADC Regional Strategic Action Plan on Integrated Water Resources Development and Management (RSAP-IWRM) is the framework programme for Integrated Water Resources Management of the SADC. It was developed by the SADC Water Sector between 1997 and 1998, and approved in 1998 by all member countries. 31 projects were defined to address the problems perceived as most pressing and were grouped within 7 general areas, one of them relating closely to river basin management [58; 48]; other relevant areas are public participation and information acquisition, management and dissemination. A number of these projects are of relevance for the transboundary basin under analysis, addressing capacity building and stakeholder participation, and one of them specifically addresses future developments and management options on the Lower Orange River, the area in which both Namibia and South Africa have conflicting interests [50].

The whole RSAP-IWRM is mainly financed through international donor organisations, which, according to [58], has been detrimental to its good operation, because it has produced the need to adjust to the changing agendas and priorities of the international donor community.

The structural reforms of the SADC (realised between 2001 and 2003), in which the 21 sectoral co-ordination units of the SADC Secretariat (located in member countries) were bundled into 4 directorates (located with the Secretariat in Gaborone, Botswana), and in which the Water Sector and its co-ordination unit ended up as Water Division within the Directorate of Infrastructure and Services, has also had a negative impact on the implementation of the Revised Protocol. The functioning institutions that were eliminated have been replaced by institutions that still have to reach a similar capacity [58].

The RSAP-IWRM is part of the Regional Strategic Indicative Development Plan (RISDP), the long term strategy for economy and development, and as thus is directly connected with the goals of economic development.

2.3.1.2 ORASECOM

One of the first river basin institutions in the region, and the first to be established with reference to the Revised Protocol on Shared Watercourse Systems, was the Orange-Senqu River Basin Commission (ORASECOM) [8], in the year 2000. (The Permanent Okavango River Basin Commission (OKACOM), in which Orange countries Botswana and Namibia - as well as Angola - are represented, predates both versions of the Protocol, having been established in 1994). The four countries in which the Orange basin lies are equal members of the Commission, in spite of the differences in catchment area and runoff contribution, and the fact that the Botswana tributary has in living memory never contributed runoff to the main river (see Section 1.1). (Botswana was included due to its strategic importance and because it is an economically significant SADC state [18]). The Commission is an international organisation with international and national legal personality, empowered to serve as the technical advisor of the parties on matters relating to the development, utilisation and conservation of the water resources of the Orange River Watercourse System. It "shall also perform such other functions pertaining to the development and utilisation of the water resources as the Parties may agree to assign to the Commission"; and "the allocation of water from the Orange to the Parties is also subject to negotiations between the riparian States according to the rules of mutually accepted instruments of international water law" [18]. In the agreement, the parties commit to regular data exchange and advance notification of any project, programme or activity that would influence the watercourse system and have significant detrimental effects on one or more of the parties. There is also a commitment to the joint protection of the watercourse system [58].

The Commission is seen by the parties as "an important forum to discuss water matters of mutual interest at a technical level", and "has a duty to advise the respective Governments accordingly about the perceived best technical solution and to what extent the Commission is in agreement about the way forward" [18]. The Commission may execute feasibility studies to enable it to recommend technical solutions based on hard facts. No agreement or a possible conflict of national interests places the issue back within the political level for further negotiations or final approval; this ensures the technical solutions proposed will be based on facts and not on political perception or influence. Conflicting situations which cannot be solved in this manner are to be taken up by the SADC Tribunal, whose decision on the matter will be recognised as "final and binding" [58].

According to Wirkus and Böge [58], up to early 2005 the organisational structure of the commission was limited to a council, consisting of delegations from each country with 3 permanent members. The council meets twice a year, usually for 3 days; decisions are taken consensually. The council is supported by a task team (conformed of advisors, donor agencies representatives, etc.). The establishment of a secretariat was planned for May 2005, to be located in Pretoria.

The lack of a more elaborate organisational structure could be the reason for the rather limited results achieved by the commission up to now, exacerbated by the complex restructuring processes occurring in the regions water sectors. According to [18], the actual achievements have been limited to obtaining financial support in the form of studies, from mainly European organisations. In this ORASECOM has been successful in showing the benefits of a river basin organisation, but other areas apparently do not show similar progress [40].

The ORASECOM Agreement refers to and recognises the Helsinki Rules, the 1997 UN Convention and the SADC Protocol. It does not replace previous bilateral agreements, nor does it exclude the possibility of further bilateral agreements, but future agreements have to comply with ORASECOM. Turton considers it "probably the most complex river basin organisation in Southern Africa, because it involves so many riparians, and existing, often

highly elaborate bilateral schemes, without necessarily having jurisdiction over these schemes" [55].

2.3.1.3 Institutions of the Lesotho Highlands Water Project

Originally, two independent organisations were created, one in each country, for the implementation of the treaty establishing the LHWP. The Lesothian organisation is the Lesotho Highlands Development Authority (LHDA) (see Section 2.3.2.1), in charge of construction and operation of dams and electricity generation, whereas the South African Trans-Caledon Tunnel Authority (see Section 2.3.2.2) was placed in charge of construction and operation of the tunnel system and of the credit and financing management. The Lesotho Highlands Water Commission (LHWC) (successor of the Joint Permanent Technical Commission (JPTC)) is the bi-national organisation co-ordinating and supervising both national institutions; it is "in charge of monitoring and advising the administrative, technical and financial activities of the project" [58].

Originally, the LHWP project did not consider stakeholder participation as necessary. Over the years, national and international NGO's related to the environment and human rights movement started mounting pressure on the project and its financiers, due to perceived problems regarding the environment and the relocation and compensation of people (practically all pressure and resistance to the project has been in Lesotho). Due to this pressure a "Memorandum of Understanding" was signed between the LHDA and interest groups (see Section 2.4) in Lesotho, agreeing to co-operation on supervision and evaluation, lobbying, and information, among other things [58]. This agreement, though, has not resulted in an end to the problems between interest groups and the LHDA; several issues, especially compensation of people, remain contentious.

2.3.1.4 Permanent Water Commission

The other relevant bilateral agreement in the Orange basin is the Permanent Water Commission (PWC), signed by Namibia and South Africa in 1992 (replacing the Joint Technical Committee created in 1987), and its mission is to advise both governments on the development possibilities of the Lower Orange (the section of the river that forms the border between both countries). This technical advice focuses on the development and use of water resources that represent common interests of the signatory countries, and is mainly delivered through reports. The organisational structure is weak: the meetings of the commission are sporadic, and subcommittees address irrigation and planning issues [58]. The Joint Irrigation Authority, in charge of the irrigation project on both sides of the border, was also created in 1992 and is related to the agreement that created the PWC.

In an analysis of regime creation in the area, Turton says that the growth of the Lesotho Highlands Water Project "from earlier more simple agreements", and the recognition of previous bilateral agreements by the ORASECOM agreement, reflect "just how dynamic the process of regime creation is and, more importantly, the role that regimes play in reaching agreements and facilitating the convergence of diverse riparian interests over time" [55].

2.3.1.5 International donors

The involvement of international institutions in the region's water affairs has been extremely significant. Infrastructure projects such as the LHWP would not have been possible without foreign involvement and investment. International involvement has also focused on policy and law development, institutional development, capacity building, research, monitoring networks, etc. The development of transboundary water management in the region has been very positively influenced by this involvement. This section will provide a brief overview of the main donor organisations in the area and their kind of involvement.

The World Bank was one of the main supporters of the LHWP project. It had a central role in organising the financing of the LHWP. The backing of the project in its conception phase

and the support of its development has not been without problems; particularly the World Bank's reaction to the corruption charges within the project (which resulted in convictions) was heavily criticised. Currently the World Bank is one of the main supporters and financiers of a number of SADC – Water Division's RSAP-IWRM projects (see Section 3.1.1), in practically every one of the 7 general areas [50]. Another institution currently providing support for these projects is the African Development Bank (AfDB). This is a financial development institution whose self-defined mission is "to promote economic and social development through loans, equity investments, and technical assistance" of its regional member countries (from AfDB website, http://www.afdb.org, downloaded on 23/09/2005). Its beneficiary countries are exclusively African; member countries include Asian, European, and North and South American countries.

The United Nations (UN), the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP) and the UNESCO have also been involved in the region, specifically in efforts relating to knowledge transfer and in projects of the SADC Water Division [50]. The UNDP, for instance, was behind the SADC/UNDP Water Sector Round Table Conference, in December 1998. Both the UNDP and the UNEP are mentioned as co-operating partners in many of the SADC – Water Division's RSAP-IWRM projects [50; see Section 3.1.1].

The Global Environment Facility (GEF) of the UNDP is also a frequent co-operating partner in these SADC projects. Of particular relevance to NeWater participation in the Orange Basin is a project that is currently in its starting phase, which plans to develop and implement a Strategic Action Programme for the Orange-Senqu river basin. The aim is to improve the management of the basin's transboundary water resources through Integrated Water Resource Management (IWRM) approaches, and create a transition towards adaptive management strategies. Some of the project's foreseen outcomes are to increase the institutional capacity for ORASECOM, to prepare a Strategic Action Programme (after elaborating a transboundary diagnostic analysis (TDA)), and to generate a basin-wide programme of stakeholder involvement [16].

The EU played an important role in the phase previous to the signing of the Revised SADC Protocol on Shared Water Resources, for example as co-organizer of the SADC/EU Conference on the Management of Shared River Basins (May 1997). Currently, as well as funding this NeWater project, the EU (through its Water Initiative) is composing a project for integrated water resources management (IWRM) in the Orange-Senqu Basin. The project forms part of the EU-Africa Partnership for Water Affairs. Its starting point is a perceived imbalance: plenty of studies are being elaborated in the basin, but no real infrastructure projects are yet foreseen, which is problematic considering the Millenium Development Goals regarding water and sanitation for the year 2015. This project aims to manage a transition period for ORASECOM, which will see a shift from studies to real investments. It addresses 6 "pillars" of IWRM through different activities, e.g. support to an ORASECOM secretariat; issues relating to data collection, access and project management; creation of two partial river basin organisations at the Leotho/South Africa and Namibia/South Africa borders, and pilot projects to investigate investment needs.

National co-operation institutions have also been active in the region's water sector developments. The German GTZ has been actively involved with the SADC Water Sector and national water institutions, in the development of strategic action programmes and policy reviews, for instance. It is presently initiating a 6-year programme which addresses transboundary water management in the SADC and which specifically focuses on two river basins –the Limpopo and the Orange-Senqu – to help in the development of their basin organisations and their secretariats. It will also tackle the problem of harmonising the water policies and laws in the region. Another GTZ project, with a total duration of 9 years, plans to help increase co-operation between the region's river basin organisations.

The FGEF (French GEF) has also co-operated widely in water resources management in the region, and is one of the main partners in the development of the Strategic Action Programme for the Orange-Senqu River Basin mentioned above. Other relevant international donor organisations are the Denmark International Development Organisation (DANIDA) and the Swedish International Development Agency (SIDA).

2.3.2 National context

2.3.2.1 Lesotho

Lesotho's situation within the Orange Basin is a special one when compared with the other countries, in the sense that water scarcity is not (normally[1]) a problem. Lesotho's interests, as analysed in [18], are related to better use and capitalisation of its water resources; apart from the LHWP, Lesotho is planning on building water infrastructure in the lowlands for domestic and industrial water supply [18; 52]. Due to this, the formal actors within Lesotho are involved in a different way in the issues that drive ORASECOM, and will be mentioned only briefly.

The Lesotho Highlands Development Authority (LHDA) is in charge of the construction and operation of dams and the electricity generation of the LHWP. The importance of environmental criteria in the operation of the project has progressively grown in the 2 decades of its existence: it was only in the late nineties, for instance, and apparently due to stakeholder pressure, that studies regarding the in-stream flow requirements (IFRs) of the waterways were undertaken [38]. The LHDA is the organisation that will have to deal directly with these and other kinds of pressures for changes in the operation of the watercourse system, to the extent that the LHDA can influence it. The Ministry of Natural Resources is also clearly an important formal actor. Apart from taking decisions that affect the water resources in the country, international co-operation usually occurs at this level. The responsible bodies for the 31 RSAP-IWRM projects, for example, are in practically every case the "national government ministries and departments of water" [50]. The formal actors that relate to the environment, and thus only with a distant connection to transboundary issues (for more information on these institutions see [28]), are the Ministry of Environment, Gender and Youth, the National Environmental Secretariat (NES), and the Lesotho Environment Authority (LEA) (planned). Because of its relationship with the LHWP project, the Lesotho Electricity Corporation (LEC) can also be included within the relevant formal organisations.

2.3.2.2 South Africa

The main formal actor in South Africa is the Department of Water Affairs and Forestry (DWAF). The importance of this department as liaison and as the national counterpart to co-operation projects with international partners has already been stated above. In the case of South Africa, the DWAF takes up a special importance regarding the whole Orange Basin because of its (water resources) authority over most of the basin area and South Africa's technical capacity for complex inter- and intra-basin transfer schemes (see Section 1.2). Because of water scarcity and because the Gauteng area - the industrial heartland of South Africa - straddles the watershed between four internationally shared river systems (the Limpopo, Incomati, Maputo and Orange), very significant water transfer capacity to and from the Orange Basin has been constructed [18], some of which has an influence on the availability of water in downstream reaches of the Orange River. The National Water Act (1998) defines water as a resource of national interest, that can be moved between different areas of the country if considered necessary.

[1] The problems tend to be of distribution: the capital, Maseru, has water supply problems, and the surrounding population does not have water provision.

The Water Research Commission (WRC) is a statutory body funded by a levy on water sales. It was founded in 1971, after a period of severe water shortage, to tackle the issues of knowledge generation and purposeful promotion of the country's water research. It co-ordinates water-related research and development in South Africa, and encourages the development of water-related knowledge and facilitates its dissemination and application through its funding and networking activities. The WRC maintains close ties with the DWAF [7]. Four water-centred key strategic areas for research and development (R&D) have been defined (Water Resource Management, Water-Linked Ecosystems, Water Use (Industrial and Domestic) and Waste Management, Sustainable Water Use for Agriculture), as well as cross-cutting key strategic areas, Water-Centred Knowledge as well as Environment. The WRC seems to be a very important actor in water-centred R&D of the region, and of R&D that is based on local water environments and requirements.

South African universities generate a large amount of relevant research. Institutions that are particularly relevant are University of Pretoria's Centre for International Political Studies (CIPS), the University of Kwazulu-Natal, the University of Cape Town, and the Institute for Water Research at Rhodes University. The country's Council for Scientific and Industrial Research (CSIR) also has a number of researchers on its staff who have produced a significant amount of research in this field.

The International Water Management Institute (IWMI) has a regional office in South Africa. It is a non-profit scientific research organisation that focuses on the sustainable use of water and land resources in agriculture, and on the water needs of developing countries. Of their 5 research areas, the two most relevant for the subject of this study are Integrated Water Resource Management for Agriculture and Water Resource Institutions and Policies. They have produced several reports related to the regions water management (e.g. [36], [37]).

The Trans-Caledon Tunnel Authority (TCTA) is the South African counterpart to the Lesotho Highlands Development Authority, and working under the supervision of the Lesotho Highlands Water Commission. It was placed in charge of construction and operation of the tunnel system and of the credit and financing management. Initially, the scope of the TCTA was limited to the implementation of the South African works related to the Lesotho Highlands Water Project and the liability management of the project. However, in March 2000 the TCTA received a wider scope of activity from the Government and is now also in charge of funding and implementing other projects within South Africa.

The regional institutions that will take over the responsibility and authority for water resources management from the DWAF, following the process of progressive decentralisation, are now reaching the implementation stage. The Catchment Management Agencies (CMAs) will manage the 19 Water Management Areas (WMAs), and will be responsible for the elaboration of the Catchment Management Strategies.

2.4 Informal actors

2.4.1 International level

An organisation that has been very active these last years in the region is the International Rivers Network (IRN). The implementation of the Lesotho Highlands Water Project has generated considerable environmental and social problems, and has thus met growing national (mainly in Lesotho) and international resistance. The IRN, a respected California-based NGO which combines work on changing global policies with campaigning on specific key projects, has taken up the LHWP as one of these key projects, and initiated its Lesotho Campaign. They have worked extensively with local organisations and published a number

of thoroughly-researched reports with huge amounts of information culled from the area; the conclusions are very critical of the management of the project [19; 21; 22]. They define their mission thus: "The IRN supports local communities working to protect their rivers and watersheds. We work to halt destructive river development projects, and to encourage equitable and sustainable methods of meeting needs for water, energy and flood management."

The IRN's focus regarding the LHWP has been predominantly on the social issues related to the project construction. The problems related directly to the resettlement of villagers and problems regarding the delivery of promised compensation, as well as the new social issues created through the reallocation and building projects, have been studied extensively by the organisation. (These studies have been in co-operation with the Lesotho NGO Transformation Resource Centre (more below).) At least one of its staff lived in the affected area for several years [21]. At least concerning this project, this area of knowledge (social issues, knowledge of grassroots organisations and contacts, local knowledge) seems to be the strongest, with the environmental or water management issues being evaluated based on previously existing information, like technical reports, environmental impact assessments, etc. It compares pre-existing technical information with independent evaluations such as the final report of the World Commission on Dams.

The World Commission on Dams (WCD) included representatives of diverse interests groups, was backed among others by the World Bank and the World Conservation Union – IUCN, and was established to help surpass the breakdown of dialogue on the construction of dams between NGOs, the private sector, governments and international organisations (such as the World Bank). The commission was formed by 12 members of diverse backgrounds, and worked between May 1998 and the year 2000; with the launching of its report in November 2000 the commission dissolved. The commission's secretariat was located in Cape Town, South Africa, and its chair was Professor Kader Asmal, then Minister of Water Affairs and Forestry of the Republic of South Africa.

In spite of the controversial nature of the subject and the diversity of backgrounds and interests of its members, the commission produced a report widely perceived as extremely relevant, providing a framework for the examination of both existing and planned dams. The report, titled "Dams and Development: A New Framework for Decision Making", generated positive reactions from NGOs, development banks, donor organisations, etc., as well as some negative evaluations, mainly from civil engineering associations. The guidelines for decision-making regarding dams published in this document represent an authoritative position, which future projects cannot afford to ignore.

The formerly mentioned World Conservation Union – IUCN, the "world's largest and most important conservation network", has a regional office for southern Africa, named IUCN-ROSA. (The World Conservation Union's former name was International Union for the Conservation of Nature and Natural Resources; because of its extended use the previous acronym has been maintained.) IUCN-ROSA assists governments and institutions in the development of policies and strategies, focussing on protection, sustainable use, natural resources management, equity and biological diversity. A comparatively small project refers to transboundary resource management, but seems to focus on wildlife and tourism. A larger programme is being developed in co-operation with the SADC Water Division, which refers to Water Demand Management.

2.4.2 National context

2.4.2.1 Lesotho

The Lesothian NGOs whose activities relate to transboundary river basin management all address the issues that arose through the LHWP (organisations related in other ways to the

subject have not been found). Two of them seem to be particularly active and capable. The oldest of them is the Transformation Resource Centre (TRC), formed in 1979, "an NGO committed to working for peace, democracy, human rights and participatory development." In addition to a Democracy project and a Work for Justice project, they run a Water project that focuses on the effects of the dam constructions of the LHWP. They monitor the resettlement process and have two field workers working with the affected communities. The TRC considers the compensation issues of the LHWP as still not settled, and it is beginning to work with the people who could be affected through the proposed construction of dams for the Lowlands Water Scheme. They have co-operated with IRN's efforts in the area.

The Highlands Church and Solidarity Action Group (HCSAG) was formed in 1987 due to preoccupation about the impacts the LHWP could have in the area. This organisation has also used field workers to document compensation and grievances in the area, including a qualitative study of 93 households that documented the fate of lodged complaints and analysed the perceptions of their new standards of living.

A number of other groups are probably also active in this subject. The Lesotho Highlands Water Commission holds fortnightly meetings with "the NGOs' representatives", according to [29].

2.4.2.2 South Africa

The relevance of South African NGOs has also been judged through their previous involvement in large-scale issues such as the LHWP. Resistance to this project also grew on the South African side, but the driving forces were not as much resettlement and compensation issues, but rather either environmental issues or a response to the rising water supply costs, blamed in part on the project.

The Group for Environmental Monitoring (GEM) is an NGO that was created as a challenge to the wildlife conservation paradigm of the South African white middle class, and advocates an understanding of the environment in relationship with socio-economic development. Its current programmes address national and global environmental policy and sustainable rural livelihoods; future projects plan to address climate change and environmental law.

The Alexandra Civic Organisation and the Soweto Civic are two township organisations that have been involved in the issue of township water supply. The rising water supply costs and their linkage with the LHWP prompted them to activism against the project in the late nineties. A coalition of NGOs formed which tried to pressure the authorities to discontinue the development of the project (the GEM also participated in these activities) [35].

The Wildlife and Environment Society of South Africa (WESSA) is South Africa's oldest and largest environmental NGO. It sees itself as an environmental watchdog, but also has educational objectives. Its main activities seem to relate to wildlife park formation and activism against particular projects, such as mining activities; a link to transboundary river basin management issues seems too weak to be of importance.

Agri SA is an autonomous body and represents the farmers' viewpoints on agricultural affairs [28]. It is a powerful lobbying organisation, with direct access to the organs of state and other authorities. It will probably be an important actor in water management, as its members manage large parts of privately owned land.

2.5 Interactions between regime elements

2.5.1 Importance of transboundary river basin management in the political system

Due to the water scarcity that affects certain areas in southern Africa and the uneven distribution of this resource (e.g. the enormous variation of resource availability within the

Orange Basin), transboundary water management has been an important concern for the political actors for considerable time. The policy changes that have occurred and are still occurring in the countries in the area have taken into consideration the best-practice knowledge available regarding policy and management; Integrated Water Resource Management, for instance, has been incorporated into both national (e.g. National Water Policy [4], and Internal Strategic Perspectives [9; 10; 11], South Africa) and international (e.g. river basin organisation agreements [58]; Revised SADC Protocol [49]) policy and law. The creation of the ORASECOM (as well as of other basin organisations in the area; see Section 2.2.1) and the importance transboundary river management is given within the SADC Water Division's Regional Strategic Action Plan show that the policy and law changes are being followed up by institutional development and research related to these issues, though the implementation of these changes has been relatively slow.

2.5.2 Stakeholder and public participation

The public's concern with the issue of transboundary river basin management seems more limited than the concern it has been given by the political system. Judging from the activities of NGOs in the area, involvement only arises in response to negative impacts that transboundary projects have had, most noticeably the LHWP. A deeper involvement with the issues of transboundary river management as such seems not to have taken place, probably due to its technical complexity and the absence of a flagship environmental problem related to it.

This lack of concern and involvement of the public could be due to transboundary river management being in an early stage of implementation, and also due to the changes the national water management systems are going through, particularly in South Africa and Namibia. The participation of stakeholders in the process is also not detectable, and their participation in water resource management is probably centring on these national decentralising processes, but agricultural and industrial stakeholders are probably going to progressively step up their involvement.

This situation, in which stakeholder participation is expressly wished for by the authorities but is not being found on the ground, can be at least partially attributed to the lack of adequate measures from the relevant authorities. In view of this situation, either the scope or the degree of implementation of the activities aimed at providing information and generating stakeholder participation need to be revised.

2.5.3 Role of the scientific community

The scientific community shows a larger degree of involvement than the stakeholders. The universities and research institutions show a very significant production of research on transboundary water management, from all kinds of perspectives. An international network of scientists and policy makers seems to be in place, whose joint work has included generating textbooks presenting thorough analysis of transboundary aspects, and placing these in the southern African context [40; 53]. In South Africa specifically, the importance of the Water Research Commission regarding research (both funding and determining the areas to be developed; see Section 2.3.2.2) and its close relationship with the Department for Water Affairs and Forestry ensure the existence of research related to the main processes – including policy ones – taking place in the water sector. Both the amount of local research and the interaction between the scientific community and the policy makers, then, seem to be adequate for the processes at hand.

2.5.4 Consideration of uncertainty in transboundary structures

The water management network – both national and international – that is coming into being in the area is obliged to consider extreme events as a main issue in water resource management, due to the comparatively high periodicity of droughts and floods in the area, and the "closed" nature of the basin, i.e. the total allocation of surface water resources in it. Within this context, no specific initiatives confronting change or decreasing predictability of extreme events have been identified within this network. Climate change, though, is recognised as a central issue in the region, and is addressed, at least on the policy level, by the NEPAD (see Section 2.1.1) and the Lesotho's National Environmental Policy (Section 2.1.2.1). Research analysing the interaction between climate change and the water sector in southern Africa is being carried out in the region (e.g. [39]), but no large-scale research programme has been identified. A recently approved GEF project, which will develop and implement a Strategic Action Programme for the Orange-Senqu River Basin, plans to incorporate climate change as a major factor within this strategic programme.

2.5.5 Network interrelations

The linkage between the water management network and other networks seem to be weak, with the exception of agriculture, due to the wide expanses of irrigated land in the area. The new water law in South Africa establishes a link between water allocations and the use/benefits associated to them, which would in turn relate very indirectly with the land use network.

2.6 Institutional change

The institutional changes that have occurred in the study area seem to be the product of two sets of political processes. One of them was the regime change in South Africa in the early nineties, and the transition to democracy, with its repercussion on Namibia's political status. This regime change provided the opportunity to rethink and readdress the principles and implementation of South Africa's political institutions, including those in charge of water management.

This change of the political regime provided the opportunity for a complete re-design of the water management approach to take into consideration the latest developments in water policy, resource management emerging at the international level. While the new system is still being implemented in South Africa, the positive evaluation of this reform process may have influenced the situation in other countries as well. In fact, many other countries of the region are currently reforming their water sectors, and according to Ndamba [41], "there is in fact a remarkable convergence of issues that are tackled through these reform activities".

The other influential development that seems to be a driving force for change are several processes generating growing regional integration between African states, such as the creation and development of the Southern African Development Community, and its incorporation of South Africa in 1994, the establishment of the African Union in 1999, the New Partnership for Africa's Development and the African Ministerial Council on Water (see Section 2.1.1 and 2.3.1). These associations have created a context in which international co-operation regarding water resources form a small part of a much wider series of co-operation efforts [58].

These developments, in addition to the importance of transboundary river basins in southern Africa, the scarcity of water in the region and its limiting effect on the region's development, as well as the international co-operation that has been initiated in the water policy area, have resulted in a development of the region's (national and international) water laws and

policies, and the creation of river basin organisations such as ORASECOM. The laws and policies seem to be very close to the best-practice knowledge currently available on the international level. They mostly are based on the principles of IWRM, consider the equity aspect of water and refer to basins as the natural management unity of the resource. There has been a large degree of external involvement helping to facilitate this development through a number of international fora in the region, e.g. the SADC/EU Conference on the Management of Shared River Basins (May 1997), the SADC/UNDP Water Sector Round Table Conference (December 1998) and the presentation of the Southern Africa Vision for Water Life and the Environment in the 21st Century in the context of the Second World Water Forum (2000) [17].

The implementation of these policies and laws, though, has only occurred slowly, both at the national and basin level. This, paradoxically, can also be related to the changes that gave rise to these new policies and laws, particularly at the international level. The complex transformation processes that are occurring at the national level may generate a reduction of the dynamism of international institutions such as ORASECOM.

A project that has shown a large degree of adaptiveness in water management in the region is the LHWP. The original treaty has been complemented by six protocols, for instance; the institutions and their relationship has also been changed over the years, in response to perceived problems (see Sections 2.2.2 and 2.3.1.3). At the moment it is questionable if the project will ever begin its second phase of development (of the four originally planned), due to a new assessment of the requirements and their possible solutions from the South African side.

The region has seen the development of very ambitious water projects. The ideas for these projects were usually generated decades before their implementation. The LHWP, for instance, was conceived in the 1950s, and its implementation began in the second half of the 1980s [28]. Especially South Africa has built huge infrastructure projects for the management of water resources, such as the series of dams that conform the Orange River Development Project, and infrastructure for intra-basin (e.g. LHWP) as well as inter basin transfers [18; 53]. At the moment, the idea of an expansion of intra- and inter basin transfer projects as the most effective way to deal with the growing water requirements of the region finds many supporters [53]; often-mentioned are transfers from the water-rich northern part of southern Africa (e.g. Zambia) to the water scarce southern part. These projects would create another element of change in the watercourse systems, requiring institutions and management practices of a flexible nature.

3 Description information management

3.1 Specification of information goals, needs & strategy

The complex system of water resource management in the Orange basin requires an extensive amount of data on the past and future development of water availability, water demand as well as water quality. For example, new negotiations will be necessary soon to clarify the allocation of the resource between Namibia and South Africa. A precise forecast on the further development of water resources in the Lower Orange is key to sound decision-making and fair negotiations. Thus information is needed on the international level to support such decision, but also on the national level to allow the individual states to position themselves in negotiations on transboundary resource use.

Major challenges arise for information gathering due to the high climate variability as a key determinant of Southern Africa's ecological dynamics and thus its environmental security. This high dependency on global climate variations aggravates the complexity of interplay among the various riparian states of the basin. Other important factors [53] are the assessment of the impact of growing populations on a relatively finite and variable water resource base as well as the existence of a large number of dams installed to store water during the unpredictable and long dry periods in the countries of the basin.

Information is available at the current stage about several of the DPSIR components for the Orange basin. This information is, however, still haphazard and too scarce to form a sound basis for decision-making on a basin scale level. This can to some extent be related to the fact that information is collected either at the national level or by several bilateral initiatives, in many cases supported by the involvement of international donors.

Main driving force of transboundary relevance in the entire basin is water scarcity and thus securing the availability of water for individual use, agriculture, industry as well as power generation (approx. 80-90% of the SADC region's electricity is produced in coal-fired power plants; large amounts of water are necessary for their operation). In order to adequately depict these driving forces, precise data about population, energy use and production, types of industry, agriculture and land use would be necessary.

Prevailing pressures in the basin resulting from human activities striving to meet the identified needs are the over-extraction of water resources, the pollution of the basin's water bodies by human, agricultural, industrial and mining uses. Changes in land use, mainly due to over-grazing and poorly suited cultivation practices, cause additional pressures on the system. Relevant data in this context entail the use of resources, in this case mainly water resources, emission to environmental media from the different use categories, information about prevailing land use patterns and cultivation practices.

The information cluster 'state of the environment' of the DPSIR framework relates to the condition of the environment in response to the pressures and encompasses the indicators water quality and quantity, soil quality as well as the health condition of humans. Impacts are then defined as the changes in the physical, chemical or biological state of the environment determining the quality of ecosystems and the welfare of human beings. Impacts in the context of the Orange basin comprise losses in environmental quality, economic impacts due to the limitation of agricultural and industrial productivity, but also the deterioration of human welfare, the social and economic performance of the society and also interstate disputes on water allocation. Data about the system state as well as certain impacts is available. Still, relevant data applies to varying scales, datasets need to be completed and linked to generate a comprehensive picture of the situation.

Responses then comprise policies adopted for the mitigation of these problems. These are taken at the national as well as international level and include for example the new water resources strategy of South Africa, approaches to support more sustainable water management in the other riparian states as well as international agreements, such as the ORASECOM on a basin-wide scale.

Information about policies is available, mostly in the national context, with the completeness of data varying among the different riparian states. At the international level, a better assessment of the co-ordination of the various bilateral and multilateral agreements would be necessary.

It is widely acknowledged that currently there are no integrated data and information systems which could be used to adequately address the use of the basin's water resources. There is an increasing awareness however that for effective future joint basin management a common base for information, production, dissemination and exchange is necessary. Also, the better involvement of stakeholders in the production of data and information is increasingly acknowledged.

In addition to national strategies, which aim to focus on the improvement of measurements and the better exchange of information, the further development of the ORASECOM towards meeting these tasks is considered crucial [16].

3.2 Information production

3.2.1 International level

At the international level, there have been several efforts to improve the information and knowledge base on water management in the Orange basin. These were initiated in the context of bilateral international agreements or by international donors or development organisations. Examples for these activities will be provided in the following sections:

Under the framework of the SADC Protocol on Shared Watercourses and specifically the Regional Strategic Action Plan for integrated water resources development and management developed by the SADC secretariat, a number of priority actions, interventions and projects for the region were defined. Of these priority activities several pertain to the acquisition, management and dissemination of information, as for example:

- the assessment of surface water courses,
- training in surveying, mapping and geographic information systems,
- the expansion of the SADC-HYCOS.

The SADC-HYCOS (Hydrological Cycle Observation System) goes back to initial surveys launched by the World Meteorological Organisation (WMO) in collaboration with the World Bank in 1995 in order to promote the exchange and use of water resources data and information using modern information technologies and the Internet and to strengthen the institutional capacities of national hydrological services for the collection and processing of data and improve the sharing of information on a basin-wide level. The implementation of the HYCOS for the SADC region was commenced in 1998 with the launch of the first implementation phase. In this phase data the following steps were completed:

- installation of equipment for the collection and transmission of data at 3-hourly intervals,
- provision of software to national hydrometeorological service to assist with the management of data,

- setting-up of a regional database combining new and historical data as well as information provided by the national hydrometeorological services, which is accessible through the Internet,
- the enhancement of regional co-operation between the national hydrometeorological services.

In the second implementation phase of the project, a comprehensive review of the past programme efforts is foreseen in order to propose appropriate improvements of the monitoring network and ensure that the equipment installed and the water resources information system are put to optimum use. Furthermore an expansion of the monitoring network and the information systems is planned so to provide for the easy accessibility of the data for all national hydrometeorological services.

The overarching goal is to improve the availability of consistent and reliable data. Sectors that are expected to benefit include flood control and disaster mitigation, drought forecasting and management, irrigation management, protection of aquatic ecosystems, and the monitoring of international agreements for shared watercourses.

Secondary benefits include capacity building and institutional strengthening as well as improved institutional linkages in the field of data exchange and information management. Additionally, an increased awareness of drought and flood susceptibility and improved information for water-dependent projects, which will support the assessment of the regional vulnerability, are also expected as benefits.

Similar to HYCOS efforts of the French GEF, the European Union and the German GTZ have aimed to contribute in the area of information provision and the integration of data. It becomes clear from recent assessments, however, that these efforts do not suffice to provide for an integrated perspective on the combined resources on a basin-wide, transboundary scale [16]. Thus major challenges lie ahead in ensuring the better exchange of data on all aspects of the DPSIR among the riparian states in the Orange basin.

3.2.2 National level

Due to its prominent role in the basin as well as its economic strength, major efforts are undertaken by South Africa. Efforts are co-ordinated by the DWAF and the newly created Catchment Management Agencies will take over the primary responsibility for the collection of relevant data according to the new South African National Water Resource Strategy. The Water Research Commission plays an important role in the context of providing supportive research outputs.

Currently, the DWAF-maintained monitoring systems collect some of the required data. However, the collection systems are inconsistent and lack in spatial coverage, with some areas remaining largely uncovered by monitoring and information collection systems. In some cases the quality of the data collected is not sufficient. There are furthermore deficits in the dissemination of and the access to collected information resources. The co-ordinative mechanism for data sharing among different national government departments, provincial and local governments, water boards, private sector organisations and water users is limited.

With the further implementation of the National Water Resources Strategy, the DWAF will be mainly responsible for policy and regulation. There is a clear awareness that the record keeping and archives function as well as other forms of information storage need to be improved for the entire water sector and that policy support, research, legal and evaluation functions as well as the information management function are closely related and interdependent. The capacities of DWAF will have to be strengthened over the coming years in order to better provide for the co-ordination of the various responsibilities and functions of these for to better support a comprehensive management information system.

The role of the Water Research Commission investigation is outlined in the National Water Resource Strategy: The WRC is the co-ordinator of water-related research and development in South Africa. Through its funding and networking activities it encourages the development of water-related knowledge and facilitates its dissemination and application. The WRC maintains close ties with the DWAF and regular liaison and co-ordination meetings between the two organisations ensure that the Department's research needs are known. The Department of Science and Technology and the National Research Foundation partner the DWAF and the WRC in ensuring that approaches to water research are consistent with South Africa's broad policy on science and innovation.

Uncertainties of measurements and forecasts are only dealt with to a limited extent. At the national level, in South Africa for example, DWAF foresees that the internal strategy perspectives for the individual water management areas will be subject to an annual review to ensure their consistency with transboundary management issues as well as changing boundary conditions. Thus constant adaptation and revision are part of the planning process. Still, the more explicit consideration of uncertainties would be necessary, taking into account the high variability of climatic conditions in the regions and the implications of these variations for the management of water resources.

3.3 Communication

At the level of international agreements, there are several provisions as to the collection, dissemination and sharing of data among the riparian states. In the framework of the SADC Protocol on Shared Watercourses, the sharing of information is considered central to the co-operation and economic integration in the region [55].

Under the ORASECOM agreement, parties are committed to sharing information relevant for river basin management, including information on river flow, droughts, floods irrigation development, water uses and infrastructure operations [18]. The Commission was set up to serve, among other functions, as a platform for the exchange but also as an institution for the production of information. The recent assessment of the Commission's achievement revealed however, that the efforts for sharing information in the framework of the ORASECOM agreement have not yet resulted in any significant exchange of data.

As there is a clear reference to the sharing of data in the National Water Resource Strategy of South Africa, an improvement of the data situation over the coming years can be expected. Also efforts like the SADC-HYCOS or initiatives by the German GTZ, the EU and other international organisations will contribute to better data bases and information systems also at an international level. This will however to a great extent depend on how this data exchange will be institutionalised by the different countries. Key players in this exchange would be the national hydrometeorological services and similar institutes. Assistance in capacity building for the generation and handling of data is still needed in some of the Orange basin countries.

A further aspect of communication is of course the provision of relevant information to affected stakeholders in the basin. The information of stakeholders is the first step towards ensuring a further involvement of stakeholders in further planning and decision-making processes in the basin. This communication channel is still not well established at the current stage due to deficits in the interaction with stakeholders in general.

There is a general understanding though that current efforts to improve data availability will also have positive repercussions on the dialogue with relevant stakeholders. As for example, SADC-HYCOS is expected to provide a positive communications opportunity due to its sub-regional character and its link to international organisations. Other initiatives also make a

clear reference to the relevance of stakeholder interaction. However, the degree to which this is realises varies significantly between the different projects.

Again, the picture is similar at the national level. For example, South Africa sets standards for the dissemination of information to stakeholders in its Generic Public Participation Guidelines [5]. The DWAF commits itself to the principles of accessibility of information (timely access to information, accessibility in terms of language and terminology, easily obtainable), awareness creation, capacity building and empowerment as well as feedback to and from stakeholders. Due to the still transitory nature of South African water institutions, it is hard to say if these principles are being followed. At the same time, the stipulated strategy marks an important step towards a stronger involvement of stakeholders in river basin management.

3.4 Information utilisation

Water resources data and information is a key precondition for effective water resources management. Particularly, detailed knowledge about the variability and availability is crucial for the sustainable management of resources in the semi-arid conditions in the SADC region and the Orange basin. A sound database depicting the interrelatedness of environmental factors at the transboundary scale would also contribute to strengthening the international river basin commissions and the SADC protocol.

As an example for the utilisation of information, the joint South African and Namibian Lower Orange River Management Study (LORMS) (started in 2002) can be quoted. The project aims to investigate ways to improve the management, development and operation of the Orange river to benefit both countries. The study provides a good description of the extent to which and predictable uses of waters of the basin must be subject of continuing review and that measures must be taken at the regional level to identify means to ensure a more efficient use of the basin's waters. A historic field analysis was conducted on water availability and deficits for hydropower generation but also for the maintenance of ecosystem function. The assessment made use of the data currently available while at the same time identifying a clear need for increasing monitoring efforts and more detailed studies.

The LORMS project is a prime example for the collaboration of two riparian states on the assessment of water management practices and future options resulting in concrete recommendations for initiatives. However, the collaboration between the riparian states in the utilisation of the information is still limited.

Further shortcomings exist with regard to the utilisation of information to address relevant stakeholders in river basin management. This would not only include the information of the public for the purpose of fostering the involvement of stakeholder groups in elaborating solutions but also the maintenance of public information systems about predictable and non-predictable water use questions and the availability of water. This aspect is of crucial importance in the SADC region and the Orange basin, considering the current lack of information among stakeholders and the general public about transboundary issues and the larger contexts that might influence their resource base. According to Savenije and van der Zaag 'the provision of information is an important pre-condition for private stakeholders, NGOs and the public at large to play constructive roles' [46].

4 Evaluation 'Adaptiveness'

4.1 Formal actors and informal networks

In terms of a cross-sectoral co-operation, the interaction of different governmental departments at the various administrative levels is still in an emerging state in the countries of the Orange basin. South Africa, in its water resources strategy, strongly advocates a stronger integration of water management with other relevant sectors, such as agriculture and industry. However, the actual implementation on the ground is only proceeding very slowly, as old structures and mechanisms are still quite dominant.

At the international level, under the framework of the SADC protocol as well as other agreements, the integration of water issues with other sector policies, as for example food security, agricultural and industrial policies is strongly promoted. Whether these interlinkages could be created however, to a large extent depends on the underlying power relations and interest structure of the respective actors.

When considering the involvement of lower level governments in decision-making at the international level, it can be observed that only the national level is of relevance for these processes and that local levels of governments usually do not play a role here. There is an increasing awareness however, that local levels should be stronger involved in these planning processes, as establishing co-operation on these levels is crucial also for reaching consensus at the national level.

International co-operation on river basin management has been institutionalised through several bilateral and multilateral agreements between the states of the Orange basin. National water laws, as for example those of South Africa, point to the relevance of those agreements for national water strategies. The power relations in the Orange basin are rather complex, as South Africa as a downstream country is more powerful than Lesotho as upstream country, but at the same time also needs to engage in negotiations with Namibia and Botswana. In the past, South Africa has had an enormous influence on water management in Lesotho in order to secure the access and availability of water resources for agricultural and other economic activities. Large scale infrastructure projects, while intended to benefit both countries, were in most cases initiated by South Africa. The relationship between South Africa and Namibia is mostly determined by negotiations on the use of water resources in the estuary region of the river basin. Before the formation of ORASECOM, Namibia and South Africa set up the Permanent Water Commission to provide technical advice focussing on the development and use of water resources in the shared river section. More recently, the two countries engaged in a joint research effort, the South African and Namibian Management Study (LORMS) directed at identifying ways and means to manage shared water resources more effectively for the benefit of both countries. The general impression is that conflicts are dealt with rather constructively with countries aiming to avoid conflicts by involving in negotiations when issues arise.

Regarding stakeholders, legal provisions designed to provide for a better involvement of local communities in developing and managing water resources according to their needs (Namibia and Botswana), or the involvement of stakeholders in the planning and implementation of water resources development processes (Lesotho and South Africa) have been emerging over the past years in the form of new water laws or water resource strategies throughout the region. Also, in the framework of international agreements, the importance of stakeholder involvement is highlighted in order to ensure the sustainable management of shared water resources.

The extent to which these provisions are put into practice is however still limited. This might be related to the developing stage of the new provisions, but also to lack of adequate methods for communication with the relevant stakeholders groups. In this respect, a differentiation needs to be undertaken. While everyday water management decisions still lack in stakeholder involvement, the visibility of large scale infrastructure projects has greatly contributed to the accessibility for stakeholder groups. Thus in the case of the LHWP, enough pressure was exerted to result in a memorandum of understanding securing the role of stakeholders in the process as well as regular consultations with stakeholders. Still, such far-reaching arrangements are the exception. In many cases, stakeholders, particularly in rural areas, do not even receive the necessary information on relevant water management issues. In many cases, national or local governments are not yet convinced of the necessity to involve other actors in planning and decision-making processes.

4.2 Legal framework

Legal frameworks for water management exist in all of the riparian countries in the Orange basin. All countries have aimed to tailor their national water law or at least their water resource strategies to address their growing water scarcity concerns and to increase available water resources through more sustainable water management practices. The link to transboundary water management issues is explicitly created in some of the legal provisions. South Africa is however the only country to have set-up an International Liaison Directorate within the DWAF.

At the international level, the main legal provisions in the field of water management comprise the SADC protocol on shared watercourses and the ORASECOM, the overarching legal entity charged with the overall management of the basin, as well as several bilateral agreement established between the various riparian states of the basin. The SADC protocol has been instrumental in providing a framework for the establishment of river basin management institutions, setting objectives for these institutions, defining their function as well as defining a financial and regulatory framework for such organisations.

National water laws, master plans or strategies have undergone several adjustments and updates over the past years. Namibia and Botswana for the most part maintain their older water laws and strategies and account for changing boundary conditions through several adjustments. Namibia has also developed a new national water strategy, which is supposed to provide the foundation for a new water bill to be approved by the Cabinet. Lesotho most recently developed a new water policy, while the old water law of 1978 is still in force. South Africa has completely reformed its water law after the democratisation in 1994 in order to completely revamp the water management system and provide for an equitable access to and the sustainable management of the resource. The National Water Resource Strategy developed consistent with the national water law needs to be updated and adjusted in five-year intervals.

International agreements, such as the SADC protocol, have been subject to revisions throughout the past years. International donors and other organisations have considerably contributed to this process. The joint river basin commission is still a very young institution, where structures still have to emerge, and ways of interactions need to be defined. The entire process is however expected to provide ample scope to develop a common understanding of the most pressing water management issues among the countries of the region and to contribute to the building of trust among the relevant actors.

4.3 Policy development and implementation

While water management practices in the past had been mostly tailored towards meeting short-term demands of individual countries in the basin, there is now an increasing awareness of the possible negative implications of large scale infrastructure projects, which might occur in the long-term in addition to the anticipated positive results. This scepticism mostly stems from negative experiences with the LHWP and particularly the environmental and social implications of such projects. Countries have become much more careful in planning and implementing such major interventions. In fact, the further continuation of the LHWP is still being discussed and the original project design and extent has already been altered substantially.

The range of possible measures discussed includes new alternatives. Demand management has become a viable option for addressing the threat of water scarcity in all four basin countries at a small-scale level. At the same time, the further development of water infrastructure, such as dams or pipelines for water transfer, are still considered necessary to meet increasing demand. In this respect, decisions taken today still limit the range of possible measures in the future. The degree to which such far-reaching decisions are based on ex-ante assessments and deliberations are much larger nowadays. Options concerning several riparian states are discussed among the affected parties, while at the same time national interests still prevail in the background.

There are still shortcomings in the actual implementation of plans and policies. For the most part this only occurs very slowly and in many cases only with support of the international donor community. For example ORASECOM is largely benefiting from contributions from the German GTZ, the French GEF as well as the EU for the drafting of an overall management plan for the Orange basin, capacity building for authorities and stakeholders, studies on water resources development as well as the promotion of water conservation and other strategies.

There is a common understanding as to where joint planning under the auspices of the river basin commission should lead within the next years. Expectations are high with regards to the possible positive outcomes of the efforts. In this respect, the concept of multilateralism has been widely adopted. At the same time pervious bilateral agreements have also been maintained and currently exist in parallel to ORASECOM. While it is argued that bilateral agreements are better suited for addressing mostly technical issues at this level, the lack of integration among all existing agreements might be a threat for the implementation of multilateral efforts.

4.4 Information management

While key importance is attributed to the production and dissemination of information, serious shortcomings still exist in the riparian states of the Orange river basin and also in the context of international agreements for transboundary river basin management. Data on various issues of water management is collected at the national level. For example, in the case of South Africa, following the stipulations of the National Water Resources Strategy, new monitoring guidelines have been developed. Several research institutions, such as the Water Research Commission, but also universities are involved in overseeing this process; they provide advice and research, but the actual collection of data remains the responsibility of the DWAF and other catchment authorities. The main task of information gathering is supposed to be performed by the catchment management agencies, and will be once they are operational. There is no reliable information about the situation in terms of information production and research in the other riparian states.

Major shortcomings exist with regard to the exchange of information among the different riparian states. In the framework of ORASECOM there is a pledge to exchange relevant data to support river basin management. However, no integrated data and information systems have yet been established. The need to bring forward this integration and exchange of data has been clearly identified though. There is also an increasing awareness for the implications of climatic variability on water resource management in the region. However, the data situation is not sufficient in order to conduct a comprehensive assessment of likely changes.

Information is only rarely used to actively reach out to relevant stakeholder groups. Some information is available on the web, but this is rather limited and it is unclear who has access to this data.

4.5 Financial

In the context of transboundary river basin management, relevant observations with respect to financial aspects relate to the involvement of the international donor community in the management scheme. These organisations have been quite instrumental in facilitating the process so far and continue to play an important role through providing financial support as well as know-how for introducing integrated water resource management practices. Due to their financial leverage international donors have had quite some leverage in the development of large infrastructure processes, such as the LHWP, and have in many cases contributed to the introduction of environmental and social standards in the management of these projects.

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