Final Draft
24 Feb. 2003

Water Resources Planning and Management in the Olifants Basin of South Africa: Past, Present and Future

M. de Lange, D. J. Merrey, H. Levite, and M. Svendsen

Chapter 10 of the IWMI Book on River Basin Management

Table of Contents

Water Resources Planning and Management in the Olifants Basin, South Africa: Past, Present and Future

Abstract

South Africa is seeking to revolutionize the way it manages its water resources. Water is especially scarce in South Africa. Further, there is a long history of providing large quantities of water to a favored minority while most of the population had little or no access even to basic water supplies. This paper discusses the changes being implemented with special reference to the Olifants River Basin, home to nearly 10% of the total population of South Africa. The paper characterizes the water resource and the heavy demands on it for agriculture, mining, domestic use, and environment. It then characterizes the wide range of stakeholders and their interests, and the changing legal, social, and institutional context. The inequality of stakeholders in terms of being able to express their views systematically is a key issue that emerges. The paper reports on an analysis of stakeholder interests and roles in the past, and likely interests and roles in the near future. It concludes by discussing a set of key challenges facing the future developing of the Olifants Basin, and by extension, South Africa.

1 Introduction

The singular history of South Africa has created huge development challenges, along with important opportunities to address them. During apartheid, rights to productive resources such as land, water and minerals were controlled by the dominant minority, while the remainder of the population was concentrated into isolated '*bantustans*' or 'homelands'. Although formal barriers to residence and economic activity were quickly dismantled in the wake of democratic elections held in 1994, the legacy of earlier policies persists in rural areas. This manifests itself in huge income disparities; dense concentrations of black South Africans in the regions of the former 'homelands'; a very skewed distribution of basic infrastructure such as roads, electricity, and piped water supplies; extremely high levels of unemployment, and a dualistic agricultural economy.

In irrigation this dualism is reflected in the disparity between the commercial and the subsistence or small-scale irrigation sector, with about 100,000 hectares of the national total of 1.3 million hectares being farmed by small-scale farmers. A sophisticated irrigation industry with extensive manufacturing and equipment distribution capacity serves the commercial sector, while small-scale farmers remain isolated from this capacity by insecure land tenure, and lack of formal education, capital, market access, and management experience. At the same time, the presence of such a sophisticated industry probably inhibits the development of a

more informal irrigation services sector. One of the results of these disparities is that, in the new government, there is an almost exclusive policy focus on the historically disadvantaged sector, in contrast to the previous focus on the commercial sector. Although agriculture directly generates less than 5% of South Africa's gross domestic product, it is only now gaining recognition for its importance in combating widespread rural poverty and as a stabilizing factor in the national economy. Taking a broader perspective on the contribution of agriculture to GDP and including associated support services and agro-industries, agriculture actually accounts for more 14% of the total. The GDP multiplier of agriculture is 1.51 overall. Further, out of an economically active population of 13.8 million people, at least 35% are directly or indirectly dependent on agriculture. About 10% of total export earnings of the country are from agriculture. Irrigation produces a quarter of the agricultural output on 11% of the cultivated land (see Hirschowitz, 2000; Mullins, 2002).

One of the early actions of the post-apartheid government was to formulate a new and progressive water policy that mandated, among other things, integrated management of water resources at the basin level. The vehicle for this is the Catchment Management Agency (CMA), which is intended to be the primary policy making and management entity at the basin level. The country is presently engaged in implementing this policy, and in the process, confronting a number of very challenging issues. These include the task of developing integrated representative governance of the CMA in a bi-polar social and economic environment, sharing of costs among water using sectors, and formalization and reallocation of water use entitlements in a context of growing water scarcity.

The present study analyzes management of a South African river basin under the old regime and policies, and that envisioned under the new one. The analysis employs a matrix of essential functions and key actors to identify the extent of coverage, gaps and overlaps, extent of participation, and needs for coordination. It focuses on one of the pilot basins in which the new approach is being developed and tested– the Olifants.

1.1 Overview

1.2 The Olifants Basin

The Olifants River Basin is located in the northeastern corner of South Africa and southern Mozambique (Figure 1).

The bulk of the basin lies in Limpopo and Mpumalanga Provinces, with a small portion in Gauteng Province. The river flows from southwest to northeast and, upon leaving South Africa, enters Mozambique and joins the Limpopo river before discharging into the Indian Ocean about 200 km north of the capital Maputo.

Figure 1: Location of the basin in the region

The Olifants River is about 770 kilometers long and, with its tributaries, drains 73,534 km^2. Under the new National Water Act, the Catchment Management Area (CMA) excludes the two northernmost tributaries, bringing the total drainage area under the future CMA to about 54,000 km^2, an area the size of Slovakia or Croatia.

The climate is semi-arid, with rain falling primarily during the summer (November to March). Precipitation averages 630 mm and potential evaporation is 1,700 mm. Annual rainfall along the narrow escarpment separating highveld from lowveld can be as high as 2,000 mm, and as low as 440 mm in parts of the middleveld. Although situated only 24 degrees south of the equator, much of the basin is located at relatively high elevations (300 to 2,300 meters above sea level). This explains its cool winters and the wide annual temperature variation, which ranges from –4 to 45°C.

The population of the basin was 3.4 million in 2000. Population densities vary considerably, depending on whether a particular area was a former black 'homeland' (*bantustan*) or a part of the former white area, with densities ranging from 100 to 350 people/km^2 in former black areas and 50 to 100 people/km^2 in former white areas. Whites currently comprise about 7 percent of the basin population. Ninety percent of the black population lives in rural areas in the basin. The rate of illiteracy in the basin is more than 50 percent.

The basin is divided into five hydrological areas generally regrouped in four ecological regions (Figure 2):

- the Upper Olifants which correspond to the Highveld region,
- the Upper Middle and Lower Middle Olifants represent the Middleveld region
- the Steelpoort basin assimilated to the Mountain area
- the Lower Olifants situated in the Lowveld region.

1.2.1 Highveld region

The upper basin or **Highveld region** has a higher rainfall than the Middleveld (average 682 mm as against 621 mm), and is characterised by extensive rainfed cropping and stock farming, coal mining and coal-fired power generation. Although the pollution impact of these activities is significant, the strategic importance is clear: 55% of South Africa's electricity is produced here. Annually, around 200 million cubic meters of water is imported from the neighbouring Vaal River basin for water-cooling the power plants.

Another interesting characteristic of the upper basin is that the landscape is dotted with natural pans and farm dams. Users in the Middleveld point out that they experience prolonged effects of droughts, since these pans and dams in the upper basin have to fill up before significant runoff reaches the Middleveld.

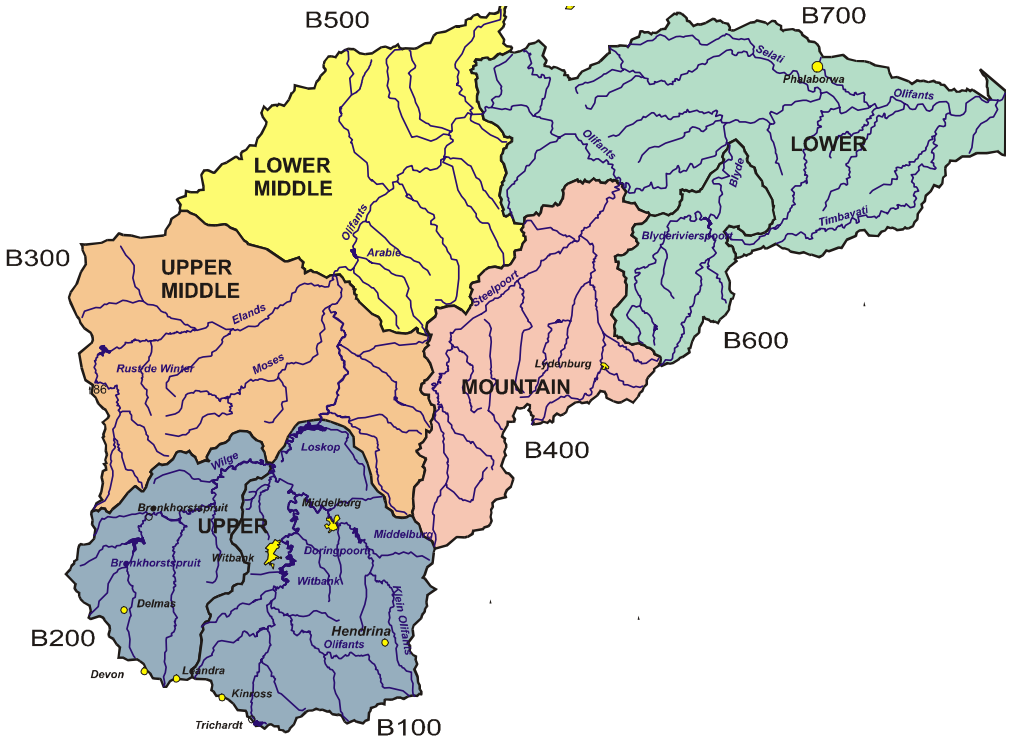

Figure 2 : Main hydrological regions

1.2.2 Middleveld region

The **Middle Olifants** stretches for about 300 km along the Olifants River from below Loskop dam to the dramatic drop down the escarpment near Hoedspruit. This escarpment area is famous for its natural beauty and exciting river rafting when the river flows full. However, this beauty and pleasure is in stark contrast to the plight of the one million people living in the old 'homeland' area in the Middleveld. This is one of the poorest regions in the country, where 75% of the population cannot read or write, and infant mortality, hunger and crime are rife.

The area directly below Loskop dam is quite different from the barren situation in the old homeland. Loskop dam was built by poor white labor as a public works programme after the second world war. Below the dam are 28,800 hectares of intensively irrigated area growing a variety of crops, with a trend towards permanent high value crops, including large citrus plantations and export table grape production under hail netting.

1.2.3 Mountain region

There is intensive irrigation in Steelpoort sub-basin and extensive mining activity in the valley. Potential expansion of platinum mining near the Steelpoort-Olifants confluence may result in the construction of another major dam on the Olifants River.

1.2.4 Lowveld region

Except for the upper part of this area (Blyde river sub-basin), there is little irrigation along the Olifants River below the escarpment**,** possibly because of poor soils. This region is characterised by game farms and industrial activity concentrated at the town of Phalaborwa, on the border of the famous Kruger National Park conservation area. The impact of the industrial effluent on the quality of the water entering the Kruger Park is of major concern to conservationists.

2 Basin Hydrology

2.1 Supply

Water resources originate either from precipitation, which is transformed into runoff, evaporates, or flows in the ground, or are imported from neighboring basins.

2.1.1 Rainfall

Rainfall has an average value of 630 mm per annum in the basin, ranging from 500 mm to 1000 mm depending on the region, with high rainfall along the Drakensberg escarpment where values of up to 2000 mm are possible.

Table 1 gives the precipitation figures by sub-region.

Table 1: Precipitation per region

Water Management Region	Mean Annual Precipitation (mm)
Upper Olifants River	**682**
Upper Middle	**621**
Mountain	**679**
Lower Middle	**550**
Lower	**631**

Source: BKS (2002: Appendix C, page 4-2 [Table 11]).

There is a distinct rainy season between October to April, with the heaviest rain generally occurring in January. But the main characteristic of the precipitation is its high degree of unevenness, spatially, throughout the year, and inter-annually.

2.1.2 Surface water

The mean annual runoff (MAR) calculated under 'virgin conditions', that is, without the introduction of exotic vegetation such as afforestation with eucalyptus species, and without the impact of human activities would be 1,992 millions cubic meters (MCM). The average value of observed runoff is around 1,235 MCM at the mouth of the basin.

The Mountain region (Steelpoort sub-basin) as well as Blyde river (part of the Lowveld) provide the largest contribution, that is about 42% of the runoff. The wide range in MAR follows the high inter-annual variability of the precipitation pattern.

Table 2: Runoff per sub-region

Water Management Region	MAR (million m^3)	Range MAR (million m^3)
Upper Olifants River	**466**	**134 – 1233**
Upper Middle	**200**	**86 – 538**
Mountain	**397**	**147 – 769**
Lower Middle	**107**	**23 – 555**
Lower	**822**	**255 – 2351**
TOTAL	**1992**	

Source: BKS, 2002: Appendix C, page 4-2 [Table 11]).

Typically high flows occur from December to February and decline until September. The Olifants River experiences periods of no flow in the Kruger Park on the border with Mozambique. A major feature of the basin is also its capacity to generate extreme flows, with dreadful floods, especially affecting Mozambique. During the last flooding period in February 2000, the flow in the Olifants peaked at 3,800 m^3sec^{-1} at the mouth.

A recent study of surface water resources (Midgley et al., 1994) presents relationships between rainfall and runoff by location in the basin. To generate significant runoff, rainfall has to be sizeable. In this regard, the mountainous regions play the most significant role. It appears that groundwater is probably of major importance in maintaining base flow in the river.

2.1.3 Groundwater

Total groundwater recharge in the basin is estimated by the Department of Water Affairs and Forestry (DWAF) to be 3% to 6% of the mean annual precipitation. This would amount to approximately 1,800 MCM. Most of this recharge occurs during

periods of heavy precipitation and it is suspected that the majority of water reaching the water table does so via macro pores (cracks, fissures, etc) in the soil rather than through the actual soil body (Ashton, 2000).

Groundwater is an important source of water supply for many small towns, villages and small-scale farms, where it is used for stock watering and some irrigation, especially on Springbok Flats in the Middleveld Region. The largest share of the catchment's exploitable groundwater exists in a relatively shallow weathered aquifer that gives average yields in the vicinity of one liter per second. Areas of higher potential (five liters per second and more) do occur in the area of the Steelpoort River, while roughly half of the catchment to the west of the Drakensberg Mountains may be classified as having moderate potential (one to three liters per second).

2.1.4 Storage, imports, exports, and return flows

There are approximately 2,500 dams in the basin including 31 major dams, defined as those storing more than 2 MCM. The total of storage of major dams is 1,100 MCM with a firm yield of 645 MCM per year. Small and minor dams supply additional storage capacity of 193 MCM. This storage capacity also represents an important source of loss by evaporation estimated for all dams to be around 159 MCM.

Figure 3 shows the historical pattern of water resource development in the basin. As seen, periods of rapid growth took place in the late 1930s and again between 1970 and 1990. Plans for several additional dams in the basin exist, but await approval and funding.

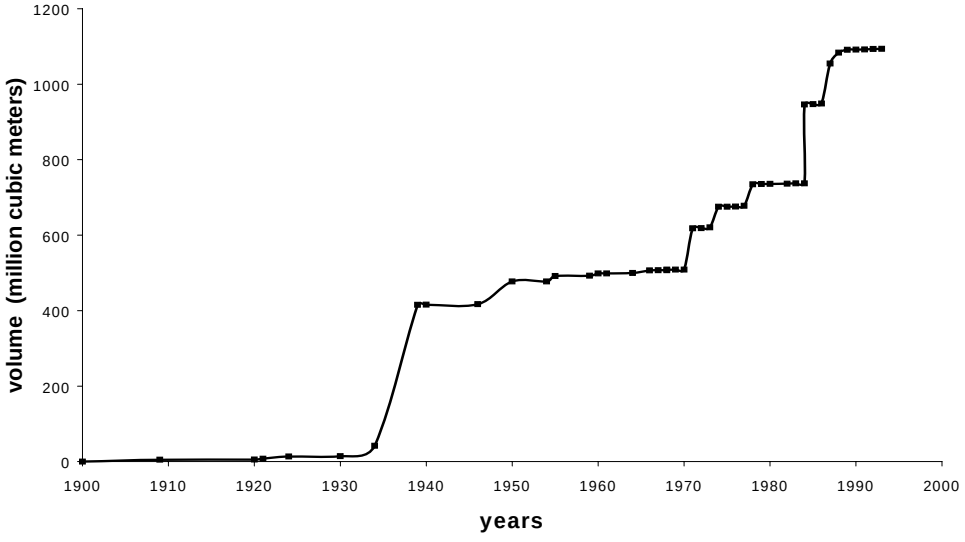

Figure 3: Development of water resources in the Olifants basin (*adapted from Midgley et al., 1994*)

Imports of water occur in the upper part of the basin, primarily for coal-fired power stations. Quantity of imports totals around 200 MCM annually and is derived from the adjacent Komati, Usutu and Vaal River basins. Comparable volumes of water are not reliably available in the upper reaches of the Olifants Basin itself and the quality of the available water is often unsuitable. Small amounts of water are exported from the basin to Pietersburg (5 MCM) and these exports are slated to expand in the future due to growing demand for domestic water supply there.

Return flows are not well estimated. BKS (2002: ?? cannot find it!) gives the figure of 42.3 MCM, mainly generated by urban areas in the Upper and Lower part of the basin. Return flows from mining activities are relatively small, varying from 0% to 20%, due to recycling processes. However the high pollution levels in the river indicate that releases that do occur are often heavily polluted. Little is known about return flows from irrigation and this portion of the basin water budget requires further study.

2.2 Demand

There are various estimates for total water demand, even in the same report, suggesting the estimates are approximate at best. BKS (2002:Table 3.2) provides total water demand figures of 1,125.1 MCM per annum in 1995 and a prediction it will rise to 1, 356.5 MCM by 2010. These figures include use of imported water and can be broken down among users as described in Table 3.[1] It should be noted the ecological and basic needs reserve, and the obligation to Mozambique as the downstream riparian are not included.

Table 3: Trends in Water Demand in the Olifants Basin

Use	1995	2010	Remarks
Irrigation	540.3	593	107,000 hectares, 95 % white commercial farming. 9% increase projected mostly in the Upper Middle, Lower Middle and Lowveld regions. Major crops : cotton, grapes,citrus, vegetables and grain
Livestock	27.8	33.1	Total of 2.3 million large stock units by 2010. Mainly in the Highveld and from boreholes (70%).
Urban (including smaller industries)	117.8	221.8	This 55% increase is likely to result from improving living conditions and population expansion, especially in the former homelands.
Mining	94.3	93.8	In the Highveld region, open cast coal mining uses both water from the catchment and imports from the Komati, Usutu and Vaal Rivers. In the Mountain region, mines are a major user of both surface and

[1] In Appendix C, page 3-13, Figure 7, the figures for 1995 and 2010total water demand are 995.8 and 1232.3 MCM respectively.

			borehole water. The Lowveld part of the basin contains numerous mines, but most of these are gold mines and have low water requirements, though they may have appreciable pollution potential.
Afforestation	55.4	63.6	Indigenous forests will probably remain at 11,500 hectares and permits for 15,000 hectares of additional commercial afforestation will have been granted. It is envisaged that the existing 60,000 hectares of exotic afforestation will only increase by a further 7,000 hectares.
Reserve	?	?	Determination underway
International requirements	?	?	Not determined. The Olifants is the largest contributor of the flow into Massingir Dam in Mozambique.

Source: BKS (2002:Appendix C, Figures 2-7).

2.2.1 Water Balance

The basin is a water-stressed catchment and has to import high-quality water from neighboring catchments for economically important uses in the upper basin. In the Upper region there is a surplus of 218 million m3 per year currently, dropping to an estimated 168 million m3 by 2010. In the Upper Middle there is already a deficit of 60 million in 1995 growing to 79 million m3/year by 2010. The Lower Middle region shows little surplus. Taking into consideration the need for meeting ecological and downstream requirements, it is expected that water resources will be fully utilized by 2010 in the Upper, Upper Middle and Lower Middle regions.

For the Mountain region, the water balance demonstrates surplus water available for further development. The Lower region is apparently in the same situation, with surplus water flows from the Blyde River sub-basin and the escarpment. The Selati river (near Phalaborwa) is experiencing water shortages and transfers are planned from the neighboring Letaba river basin to solve the problem (BKS, 2002:6-1—6-2).

2.2.2 Water Quality

The basin faces significant water quality problems, due to mining activities, industries, power generation and agricultural use of water. The impacts of these pollutions (*high salinity, high concentrations of metals, low pH*) are probably multiple with serious ecological impacts. Particularly of concern in the downstream Kruger National Park which is a major tourist attraction in South Africa and more importantly very worrisome health impacts, since some people are drinking surface water without any treatment.

3 Legal, Policy and Institutional Environment

3.1 Water Policy and Water Law

3.1.1 Pre-1994

With the establishment of a Dutch settlement at the Cape of Good Hope in 1652, customary principles governing access to water for stock watering and domestic use were supplemented and gradually replaced with ideas of European origin as the Cape Colony expanded. Over time, a pastiche of principles with roots in Roman, Dutch, and English water law emerged to govern water allocation in South Africa (Thompson, 2001). Initially, allocation policy employed the public trust doctrine, which gave the state (or the Dutch East India Company) the right to control and allocate use. Later a strong riparian component was added, giving individual landowners adjacent to natural watercourses the right to use water on those lands, subject to the rights of other similar landowners. Generally the riparian principle was employed by large white commercial farmers to secure water for irrigation. Appropriative rights to abstract water and use it elsewhere were also granted on a case by case basis. Water was classed as private or public, with water arising on a landowner's property entirely his to use. Flows in public streams were apportioned into 'normal' and 'surplus' flows, with different rules applying to each. These rules developed as the need arose from intensifying economic activity to regulate use among the commercial farms, mines, and urban concentrations of the minority European population. In sum, during the apartheid era the white government, commercial farmers, mining firms and other interests established well-defined formalized laws and institutions based on riparian rights, which excluded a very large majority of the population (van Koppen, et al., 2003).

3.1.2 Post-1994

The introduction of democratic government in 1994 demanded changes in the skewed distribution of access to water for both basic and productive purposes and offered a rare opportunity for comprehensive review of all water related legislation to develop a modern water policy more appropriate to a water scarce region. This was done in a very deliberate and conscientious way under the farsighted Minister of Water Affairs and Forestry, Kader Asmal (see Box 1), and resulted in the new National Water Act of 1998 that is widely regarded as a model piece of legislation.

The Birth of a new National Water Policy

May 1994	Review of all water related legislation initiated
Nov 1994	*Water Supply* white paper published
Nov 1996	*Fundamental Principles* paper approved by cabinet
April 1997	*Water Policy* white paper published
Sept 1997	Water Services Act promulgated
Aug 1998	National Water Act promulgated

Box 1. Water policy timeline

Two fundamental provisions in the 1996 constitutional bill of rights give 'basic rights' status to access to water to support life and for personal hygiene and a healthy environment, both now and for future generations. These constitutional rights undergird two fundamental pieces of new water legislation, the National Water Act (NWA) and the Water Services Act (WSA). The new water policy, as embodied in the White Paper on National Water Policy for South Africa, marks a radical departure from the previous legal regime. Basic principles are shown in Box 2.

- All water in the water cycle is a part of an indivisible national asset
- This asset is held in trust for society by the national government
- Water to meet basic human needs, to sustain the environment, and to meet legitimate needs of neighboring countries is reserved
- All other water uses must be beneficial in the public interest
- The riparian system of allocation is abolished
- Allocations will no longer be permanent but for a reasonable period, e.g. 40 years and can be traded
- Water resources will be managed on a catchment basis by specialized bodies
- All water use in the water cycle is subject to one or more charges intended to reflect the full financial costs of protecting and managing the water resource
- Water-based waste disposal is subject to appropriate charges
- Charges for water for basic human needs and for small scale productive purposes may be waived for disadvantaged groups

White Paper on a National Water Policy for South Africa (1997)

Box 2. Principles of the National Water Policy

South Africa's new water law reserves committed outflows to neighbouring countries. The SADC countries are signatories to a 'SADC protocol on shared watercourse systems' based on the Helsinki Rules, the Dublin principles and Agenda 21 of the Rio Earth Summit. The SADC protocol strives to maintain a balance between development needs of the member countries and the need for environmental protection and conservation. Signatories to the protocol commit themselves to seeking peaceful solutions to disputes. The protocol provides for the formation of basin-wide commissions, such as those for the Okavango and the Limpopo.

3.2 Actors

The new water law principles declare all water in the hydrological cycle to be an indivisible national asset, held in trust by national government (see Box 2). This consolidates the role of government in both *water resources management* and *water services provision*. Highly fragmented resource management across apartheid borders is being replaced by a catchment-based management system that follows natural, rather than internal political boundaries. Privatization of services provision is possible, but strictly governed by national legislation, administered through new local government structures.

In the few short years since promulgation of the NWA, the water users have by-and-large remained the same, but there is a much greater emphasis since 1994 on basic service provision to historically marginalised communities. The Government has embarked on a major investment program to provide basic water supplies to the

poor. New legislation also enables the establishment of Water User Associations for user-management of shared local infrastructure - an option previously open to commercial farmers only. Further, the NWA establishes mechanisms for public participation that enables reallocation of water to redress past racial and gender discrimination.

3.2.1 Government Agencies

3.2.1.1 Department of Water Affairs and Forestry (DWAF)

During the apartheid era, the national Department of Water Affairs was responsible for water resources management in the white areas of the Republic, while sister departments in the former homelands and self-governing territories concentrated largely on basic services provision. This fragmentation created severe problems in water resources management. In the white areas, water services were rendered by well-resourced municipalities, leading to huge disparities in service levels between the white and homeland areas.

The 1996 constitution established water as a national competency, vesting responsibility for water resources and services in the Department of Water Affairs and Forestry (DWAF). The Department was fundamentally transformed in terms of its functions and staff (i.e., in terms of race, gender and disciplines) to respond to its new mandate. DWAF embarked on an aggressive program to speed up basic water and sanitation service delivery to the marginalised areas and changed the resources management paradigm from a supply-driven to demand-driven approach.

The National Water Act requires DWAF to develop a National Water Resources Strategy (NWRS) to create CMAs in the 19 Water Management Areas, and to delegate catchment-based water resources management functions to these CMAs. Each CMA will develop its own Catchment Management Strategy through a participative process with water users in its area.

Through the Water Services Act, DWAF mandates local government structures as Water Services Authorities (WSAs) and either local government, Water Boards or private sector entities as Water Services Providers (WSPs).

3.2.1.2 National Department of Agriculture/ Provincial Departments of Agriculture

After 1994, nine provinces were created integrating the former four white provinces, six ‘self-governing’ territories and four ‘independent’ states. In the 1996 constitution, agriculture is a 'concurrent function', meaning it is a shared responsibility between the new National Department of Agriculture (NDA) and the nine Provincial Departments of Agriculture (PDAs).

The former homeland departments of agriculture had played a significant role in creating irrigation infrastructure (often through parastatal corporations) and some of the PDAs have inherited responsibility for the operation, maintenance and refurbishment of these schemes. National policy currently promotes Irrigation Management Transfer (IMT) to the users.

The homeland governments' role in water allocation for agriculture was carried out through the link between land and water under the Water Act of 1956. Extension

officers, together with tribal authorities, controlled the issuing and repeal of 'Permission to Occupy' (PTO) certificates to smallholder farmers. It is still unclear which direction tenure reform in the communal areas will take under the new government, but through the repeal of the riparian principle under the new National Water Act, the direct link between land and water allocation has been broken.

PDAs still retain significant responsibility for irrigation infrastructure created previously. In the Limpopo Province, for example, the PDA has inherited about 200?? irrigation schemes of various types. Many are no longer functioning because the subsidies previously provided have been withdrawn and no new farmer-based structures are yet in place. The Province has launched a very ambitious 'revitalization' program to organize farmers into Water Users' Associations and help them achieve the capacity to take over and manage their irrigation schemes profitably.

3.2.1.3 Other government departments

Before 1994 several departments played a much stronger role in water resources management, while more control now vests in DWAF through the new NWA. However, the Department of Mineral and Energy Affairs and the Department of Environmental Affairs and Tourism still play a role in the protection and restoration of water resources through their requirements for Environmental Planning and Management Reports and Environmental Impact Assessments, respectively.

3.2.1.4 Former Homeland governments

In pursuit of the goal of separate institutions for each racial and ethnic group, apartheid-era governments attempted to divide the country gradually into various independent and autonomous racially-homogeneous States. National States had a large degree of independence, while self-governing territories were to be gradually led to independent State status. Virtually no country other than South Africa recognized this system. The Olifants basin encompassed small portions of the national State of Bophuthatswana and included sections of three self-governing territories -- Lebowa, KwaNdebele, and Gazankulu (Thompson, et al., 2001). There were various departments in these homeland governments that dealt with water-related matters, but because only certain functions were transferred to the homeland administrations while others were retained by the Republic of South Africa, there was considerable confusion over some basic functions such as the issuance of water use permits. Homelands were abolished in 1996 with the adoption of the national constitution.

3.2.1.5 South African Development Trust Corporation and other parastatals

The Development Trust Corporation, created originally in 1936 as the South African Native Trust, was responsible, among other things, for supplying basic infrastructure in the homelands, including water-related infrastructure. It did this directly and acting through the various homeland Development Corporations which it was responsible for establishing, financing, and maintaining. It was dissolved with the implementation of the new constitution in 1996 and its water-related functions transferred to DWAF.

3.2.1.6 Traditional leaders

Historic tribal leadership in the Olifants basin was seriously undermined during the apartheid period. For instance, in an area that would traditionally be the domain of four tribal chiefs, the apartheid government ordained more than a hundred new chiefs, mostly from among lower ranking *indunas* and *kraal* heads who were willing to cooperate with the apartheid regime. This fragmentation, together with an influx of people through forced removals from white areas, created serious conflicts over tribal boundaries. These new 'traditional leaders' served in homeland government structures and areas of resistance to the regime were neglected in development initiatives. They had considerable authority over access to resources such as water and land (van Koppen, et al., 2003).

In the new dispensation, tribal leadership is again at the heart of deep conflict: this time over shared local governance with new democratically elected structures. In the deep rural areas, especially the older generation swear allegiance to their chiefs and believe that the spiraling crime rate is at least in part related to the disrespect for the traditional systems and leadership. In turn, the new democratic structures are battling to establish themselves with limited resources and virtually no experience nor systems for service delivery. In an attempt at integration, the tribal heads are automatically members of the new local councils, while other members are elected. As one community in the Olifants basin recently pointed out to their chief in a public meeting: "these youngsters will come and go depending on election results, but you will stay, therefore we need you to take the lead for the sake of our development."

3.2.1.7 Local government/ municipalities

Local government is responsible for water services delivery, while the new CMAs will be responsible for water resources management. Local government structures in the Olifants basin must be represented in the CMA.

Before 1994, 'municipalities' were established for service delivery in all cities and white towns of 200 or more houses. Their functions were limited to white urban concentrations, while rural areas were the responsibility of regional services councils. Separate structures were responsible for service delivery to blacks in the homelands.

After 1994, these boundaries were abolished and a period of restructuring followed. Most recently, a system has been adopted through which the entire country is divided into three types of local government structures: metropoles (class A); shoulder-to-shoulder municipal areas (B); which are grouped together into 42 District Councils (C). In effect, the former municipalities have seen the boundaries redrawn to include the rural hinterland.

3.2.1.8 Water Court/Tribunal

Under the 1956 Water Act, a specialized Water Court ruled on disputes between rights holders. In the new legal framework, water use entitlements will be issued by the CMAs according to a water allocation plan that will form part of the catchment management strategy. People can appeal to the Minister on issues of unjust administrative process, followed by appeal to a newly established Water Tribunal.

3.2.2 Boards and Agencies

3.2.2.1 Catchment Management Agencies

The NWA mandates the Minister of Water Affairs and Forestry to develop catchment-based water resources management through the creation of CMAs in the 19 Water Management Areas. Each CMA will develop and review on a five-yearly basis its own Catchment Management Strategy through a participative process with water users in its area. As the CMA develops the necessary capacity, DWAF will progressively delegate functions to it. This is not true devolution of power, since the Minister has the right to revoke delegations if he is convinced that a CMA is falling short of its commitments.

The CMA Board must be representative of the range of water users in the catchment. The Minister appoints Board members through the following process. First (s)he appoints an advisory council to identify water user groups and relevant institutions in the basin. The Minister invites these institutions or organizations to nominate a candidate for appointment to the CMA Board. If (s)he is not satisfied with the suitability of a nominee, (s)he can ask for an alternative. The Minister then appoints the nominees and if necessary, 'tops up' the Board with additional members to achieve racial and gender balance.

The CMA Board appoints a Chief Executive Officer to develop and manage the CMA office or operational structure. This office may develop its own capacity to perform the full range of water resources functions, or it may contract out some or all of these functions. The NWA authorizes the CMA to collect a catchment management charge from water users to cover its costs.

As of early 2003 no CMA has yet been established, though proposals for several, including for the Olifants basin (BKS, 2002), are nearly ready to be submitted to the Minister. In the case of the Olifants, there has been a long period of attempting to consult with stakeholders in the basin as a basis for preparing a proposal. While the well-organized commercial sectors have participated actively, it has been relatively difficult to find effective means to consult the poor people scattered throughout the basin, particularly those residing in the former homeland areas (Wester et al., 2003). Such consultation will be a continuous process which will hopefully be done more effectively through the CMA when it is established. The proposed name of the CMA is the “Lepelle Catchment Management Agency.”

3.2.2.2 Water Boards and other Water Services Providers (WSPs)

Water Boards were developed to provide services and perform water management functions beyond the scope of the old municipalities. Increasingly, they engaged in regional water supply schemes primarily for industrial and domestic use. Water Boards are now regulated under the Water Services Act together with other Water Services Providers, where their role in water resources management is considered incidental rather than intentional.

3.2.2.3 Irrigation Boards and Water User Associations

The 1956 Water Act provided for the establishment of membership-based organizations called Irrigation Boards, through which groups of farmers could join forces to develop infrastructure and jointly manage their water supply - essentially a type of water user association. These Irrigation Boards were eligible for a one-third capital subsidy on shared water supply infrastructure, but membership was legally restricted to people who had title to the land receiving services from the Irrigation Board. This effectively excluded black membership in white Irrigation Boards, since blacks were excluded from land ownership in 'white areas', but there was also no similar institution available to groups of black farmers with similar needs. Irrigation services in the homelands were supplied by government or parastatal corporations and participating farmers were passive recipients with no power to demand adequate services.

The National Water Act of 1998 calls for the transformation of existing Irrigation Boards into Water User Associations (WUAs) and removes title deed as a membership requirement. It thus also enables the establishment of WUAs on communally owned tribal or state land. Indeed, the NWA authorizes the issuance of water use entitlements - and by extension membership of WUAs - to water users rather than land owners. This is of particular importance in tribal areas where Permission To Occupy (PTO) certificates have traditionally been issued to men, but where women are predominantly the users of the land and water.

As of early 2003 only a few Irrigation Boards nationally have been officially transformed into WUAs, and only one formal WUA has been established on a small-scale irrigation scheme in the Olifants Basin.

3.2.3 Farmers

3.2.3.1 Commercial irrigators

Irrigation farmers account for more than half of national water use and a quarter of the agricultural output in South Africa, irrigating 1.3 million hectares. The commercial irrigation sector produces a wide range of crops for export and local use. It is supported by a sophisticated irrigation equipment manufacturing industry - indeed, micro irrigation technology originated in South Africa before it was developed into a major industry in Israel and the United States. Backward and forward linkages to input suppliers, service providers, processing, value-adding and export industries is not accurately quantified, but significant both in terms of the national economy and employment.

Commercial irrigators fall roughly into three categories in terms of their access to water. About one-third of the irrigated area fall under Irrigation Boards or Water User Associations as discussed above, while another third is served from government water schemes, most of which are at some stage of hand-over to user-management. The balance derived their water rights from the riparian principle and are withdrawing water directly from rivers and streams. The latter group had no need to participate in user management groups, a situation that is likely to change with the implementation of catchment-based water resources management.

Commercial irrigation in the Olifants river basin is almost a microcosm of the national situation, with government schemes, Irrigation Board schemes and unassociated farmers, as discussed above, and a wide variety of crops being grown. Also, in their attitude to the new dispensation a wide cross-section from the most conservative to the most liberal is found in this basin. Commercial farmers are well-organized, but often overwhelmed and uncertain about the implications of the NWA. The commercial farmers have expressed their concern about the affordability to water users of the establishment and operation of a CMA.

3.2.3.2 Emerging irrigators and other village-level economic actors

Some of the poorest rural areas in the country are found in this basin. Recently, South Africa's 42 new District Councils were ranked in terms of poverty indicators for the implementation of the President's Integrated Rural Development Programme (IRDP) and the greater part of the Olifants basin came out among the top priorities for development.

Smallholder irrigation has had a troubled history of imposed development and state managed irrigation infrastructure in a context of serious mistrust between the unlikely 'benefactor' and 'beneficiaries'. The 1600 ha Arabie-Olifants and other smallholder irrigation schemes in the basin have suffered in varying degree from the dependency created by this approach. Only a small portion of the irrigated area in the Olifants basin is occupied by smallholders, but a relatively large number of families derived at least part of their livelihoods from irrigation, either on the formal government schemes or on much smaller communal vegetable gardens or homestead food gardens. Not surprisingly, recent withdrawal of government management and subsidization of the schemes resulted in the collapse of most of the production here, with serious effects on food security in the area. However, amidst the collapse of the large systems, the communal gardens and informal food producers have largely continued their activities as before.

In these poverty-stricken areas, the opportunities for expansion of both own food production and income generation from agriculture and other small-scale village-based economic activities (such as brick-making, ice-making, poultry rearing, car-washing) are largely dependent on the availability of water.

While their need for access to water is desperate, this sector is probably the most disorganized and under-represented of all water user sectors in the Olifants and many other South African river basins. The concept of Small-scale Water Users Forums (SWUFs) with representation in representative, decision-making and operational structures within the CMA framework has been proposed in the draft CMA proposal to address this problem (BKS, 2002).

3.2.3.3 Non-irrigating farmers

To date, no other dryland (rainfed) crops besides commercial forestry have been declared to be Streamflow Reduction Activities (SFRAs), although there has been some speculation around water-hungry sugar production. This is however not a significant crop in the Olifants. Livestock farming depends largely on groundwater.

3.2.4 Industrial Firms

3.2.4.1 Mining companies

Coal mining dominates in the upper or Highveld region of Olifants basin, while the mining and processing of platinum and related minerals is a growth sector in the Middleveld. Copper and phosphates mining and associated industries are the most important economic actors in the Lowveld area.

3.2.4.2 Power generator (ESKOM)

The Olifants basin is of national strategic importance since more than half of the country's electricity is generated in coal-fired power stations in the coal-rich Highveld region of this basin. The electricity provider, ESKOM, is a significant player in several of the inter-basin transfer schemes across the country and in the Olifants it also depends on the transfer of high quality water from other basins for its cooling towers.

3.2.4.3 Forest products firms

Two national forestry and forest products companies are active in the Olifants basin. Although the forestry activity in the Olifants is limited compared to other basins, the industry has been well-represented in public consultations. Through the NWA, commercial forestry has been declared a Streamflow Reduction Activity (SFRA), which is viewed as a water use under the Act and therefore subject to all provisions in the Act that applies to other water uses, including allocation rules, water charges and measures for the protection of water resources.

3.2.4.4 Tourism firms

Several tourism companies operate river rafting and other attractions, especially in the escarpment area. River rafting and fishing is entirely dependent on the flow in the river and therefore on dams operations, while water quality is also significant. It is unlikely that tourism firms will significantly influence water resources management decisions, unless justified through significant growth in the industry. Like many other users, though, these firms stand to benefit from improved and timely information on water releases from the major dams in the system.

3.2.5 Environmental advocacy groups

The Olifants is one of six significant rivers crossing the Kruger National Park. Pressure on mining companies and other industries because of their impact on Olifants water quality by the time it enters the Park, resulted in the founding of the Olifants River Forum (ORF) in the early nineties. In the early stages of consultation to form a CMA, there was a vague expectation that the ORF may become the CMA, but it quickly became apparent that its history and limited membership base excluded this possibility. ORF now sees its role as that of an environmental watchdog and remains very active.

3.2.6 Development banks

Water infrastructure has in the past been funded almost exclusively by government and in the case of the former homelands, funds for irrigation development was administered through the Development Bank of Southern Africa. The new pricing policy promotes private financing and insists on transparency on the required components for sustainable financing, not only of infrastructure development, but also of its operation, maintenance and provision for future replacement. It is therefore expected that commercial financing institutions will increasingly play a role in the construction of and rehabilitation of infrastructure.

4 Essential Functions for River Basin Management

Burton (1999) has identified 11 essential functions of basin management; these have been further developed by Svendsen et al. in chapter 3. A somewhat modified listing of these functions is used in Table 4, crossed with the key actors identified in the previous section. These functions are replicated, as appropriate, across four broad categories -- surface water, ground water, wastewater disposal, and agricultural return flows. Cells are marked to indicate the level of activity of actors in a particular functional area. Information is drawn from interviews, printed materials and internet postings. A number of interesting points emerge from a comparison of Table 4a, which reflects the situation during apartheid (pre-1994) and Table 4b, which conjectures about the possible scenario five years after the expected establishment of a Catchment Management Agency for the Olifants. This projection is made on the basis of a group discussion with key officials in DWAF in July 2001.

A few general observations emerging from Table 4 are in order. First, the functions of DWAF are likely to change dramatically as the new institutional framework comes into place. Second, while some institutions from the previous regime have now disappeared (such as South Africa Development Trust and homeland governments), new ones are still in the process of formation. The first CMAs should be established in 2003; WUAs began being established in 2002 as DWAF worked out the detailed procedures, basic principles, etc. The Table reflects a new idea that emerged with regard to WUAs: the concept of distinguishing between ‘grassroots’ and ‘umbrella’ WUAs. Initial interpretations of the NWA held that where there were both commercial and small-scale emerging farmers in one area, they must all be members of one WUA. However, based on experiences in the Olifants, it was realized that it may often be useful to enable smaller groups of water users sharing a sub-scheme to organize around their water infrastructure; and the various smaller WUAs could be federated into a larger WUA to address mutual problems. Finally, in both Tables there are a lot of blank cells. For the past, these often indicate gaps, i.e., issues not addressed. In Table 4b, we see more ‘x’ but there are still many gaps, reflecting uncertainty about the future arrangements.

The next sub-sections provide additional observations based in the consultation with the stakeholders around the essential functions framework.

4.1 Water resources management

Before 1994, DWAF dominated the management and regulation of surface water resources and water quality, but with limited jurisdiction in the homeland areas. There was limited activity in the planning and allocation or control of groundwater and diffuse returns.

The intention is that the Minister of Water Affairs and Forestry will progressively delegate these functions to Catchment Management Agencies, as the CMAs achieve adequate capacity to assume such functions. DWAF will develop and maintain a national resource classification system against which the CMA will manage its resources in accordance with agreed resource quality objectives. In effect, DWAF will be transformed from a planning and implementation agency to one that does national level planning, provides technical support to CMAs and local water service agencies, and regulates all of these. The structure and personnel of DWAF have already begun to be transformed to meet these new responsibilities.

4.2 Water services provision - domestic and industrial use

Before 1994 DWAF played a dominant role in bulk water supply, but was generally not involved in service provision to end users. For domestic and industrial use, this was the domain of the homeland governments, Water Boards and urban municipalities.

Several changes in the South African government system affect the way in which water services will be provided in future. Most importantly, the new local government operates in newly demarcated shoulder-to-shoulder municipalities that erase the fragmentation along racial boundaries and consolidate jurisdiction over functions formerly held by the homeland structures, tribal authorities, urban-focussed municipal areas and regional services councils. These new municipalities are the new Water Services Authorities under the Water Services Act of 1997, and can act as Water Services Providers (WSPs) themselves or contract this function out to the private sector, Water Boards or public sector WSPs.

4.3 Water services provision - agricultural use

The dominant water users in agriculture are the white commercial irrigation farmers, accounting for more than half of the national water use. Before 1994, roughly one-third of the 1.3 million irrigated hectares was serviced by Government Water Schemes, another third through Irrigation Boards and the balance drawn directly from rivers by riparian users. Irrigation Boards acted as a type of water user association, providing services to its members, occasionally also supplying water to the municipality of the nearby rural town. However, only properties with full title deed were eligible for membership, effectively excluding blacks, who were prohibited from owning titled land.

All of this is now changing. Land and water rights have been separated by law, and there are some black water users that must be accommodated in the transformation of Irrigation Boards to WUAs. In fact, most applications for transforming Boards to WUAs in 2002 were rejected by DWAF because they were not sufficiently inclusive

(Faysse, 2003). Small scale irrigation farmers are getting organized into WUAs, albeit not rapidly. In stressed river basins, the licensing process could very well lead to reductions in water allocations to commercial farmers, though this remains to be seen.

5 Enabling Conditions

The essential functions and actors' roles depicted in Table 4 provide a static view of responsibilities. Additional attributes of well-functioning basin governance systems relate to its dynamics. We term these attributes enabling conditions.

Enabling conditions are features of the institutional environment at the basin level that must be present, in some measure, to achieve good governance and management of the basin. These attributes are not specific to any one actor, but apply to all actors and their interactions and comprise necessary, but not sufficient normative conditions for success. Basic enabling conditions are shown in Box 3. A full analysis of these factors is beyond the scope of this paper. A brief sketch of each in the context of the Olifants river basin illustrates the concepts and indicates broad strengths and weaknesses (see also Wester et al., 2003; van Koppen et al. 2003).

Box 3: Enabling Conditions

- Political Attributes
  - Strong political leadership
  - Negotiated change
  - Representation of interests
  - Deliberate measures to balance power
- Informational Attributes
  - Process transparency
  - Information availability
  - Information trustworthiness
  - Information accessibility
- Legal Authority
  - Appropriate institutions
  - Adequate powers
- Resources
  - Human
  - Financial
  - Institutional
  - Infrastructural

5.1 Political Attributes

South Africa's negotiated transition from white minority rule to democracy is legendary and is embodied in its 1996 Constitution. This early success firmly established negotiation as the preferred *modus operandi* and representativeness, legitimacy, equity and sustainability became requirements of the new political environment. The introduction of democratic governance gave South Africa's post 1994 government an unprecedented mandate for change. This mandate for major change brought uncertainty that dislodged vested interests sufficiently to enable fundamental policy review. In reviewing the water law, Professor Kader Asmal's strong political leadership resulted in this window of opportunity being seized to introduce a new system of inclusive representation and balanced power in water resources decision-making.

.

Table 4a. Past basin management functions and key actors - pre-1994

Key Actors	Surface Water									Groundwater							Waste water						Diffuse returns				
	Plan (basin-level)	Allocate Water	Construct Facilities	Distribute Water	Maintain Facilities	Monitor Quality	Ensure Quality	Protect Against Flooding	Protect Ecology	Plan (basin-level)	Allocate Water	Construct Facilities	Withdraw/Distribute	Maintain Facilities	Monitor Quality	Ensure Quality	Authorize discharges	Construct Facilities	Operate Facilities	Maintain Facilities	Monitor Quality	Enforce Quality	Authorize discharges	Construct Facilities	Maintain Facilities	Monitor Quality	Enforce Quality
DWAF	X	X	X	X	X	X	X	X	o	o	o						X				X	X					
NDA/PDAs			X					X																			
Other government departments	o								X																		
Water court/tribunal		X																									
SA Development Trust Corporation and other parastatals			X	X	o																						
Homeland governments	o	o	X	X	o			o				X	X	o				o	o	o	o						
Municipalities			X	X	X			X				X	X	X				X	X	X	o						
Traditional leaders		o							o																		
CMA																											
Water Boards			X	X	X																						
Water service providers																											
Irrigation Boards			X	X	X																			o	o		
Water User Associations (umbrella)																											
Water User Associations (grassroots)																											
Emerging irrigators																											
Commercial irrigators			o		o							X		X										o	o		
Other small-scale economic actors																											
Non-irrigating farmers			o		o							o		o													
Mining firms			o		o							o		X				o	o	o	o						
Power generator (ESKOM)																		o	o	o	o						
Tourism firms																											
Forest products firms																											
Other manufacturers																											
Environmental advocacy groups									o																		
Developments banks			X															X									

Note: **'X'** indicates activity; **'o'** indicates limited activity.

Table 4b. Projected basin management functions and key actors - five years after CMA establishment

Key Actors	Surface Water									Groundwater							Waste water						Diffuse returns				
	Plan (basin-level)	Allocate Water	Construct Facilities	Distribute Water	Maintain Facilities	Monitor Quality	Ensure Quality	Protect Against Flooding	Protect Ecology	Plan (basin-level)	Allocate Water	Construct Facilities	Withdraw/Distribute	Maintain Facilities	Monitor Quality	Ensure Quality	Authorize discharges	Construct Facilities	Operate Facilities	Maintain Facilities	Monitor Quality	Enforce Quality	Authorize discharges	Construct Facilities	Maintain Facilities	Monitor Quality	Enforce Quality
DWAF	o	o	X	?	?	o	X	o	X						o	X											
NDA/PDAs			o					o	o																		o
Other government departments									X							X											o
Water court/tribunal		X					o		X		X					o											
SA Development Trust Corporation and other parastatals																											
Homeland governments																											
Municipalities			X	X	X	o						X	X	X	X			X	X	X	X						
Traditional leaders									?																		?
CMA	X	X		?	?	X	X	?	X	X	X				X	X	X				X	X					
Water Boards			X	X	X	X						X	X	X	X												
Water service providers			X	X	X	o						X	X	X	X												
Irrigation Boards																											
Water User Associations (umbrella)		o	o	X	X						o				X												
Water User Associations (grassroots)			X	X	X						?	X	X	X													
Emerging irrigators																											
Commercial irrigators			o		o							X	X	X													
Other small-scale economic actors																											
Non-irrigating farmers			o		o							o	o	o													
Mining firms			o		o							o	X	X				X	X	X	X						
Power generator (ESKOM)																		X	X	X	X						
Tourism firms																											
Forest products firms																											
Other manufacturers																											
Environmental advocacy groups									X																		
Developments banks			X															X									

Note: **'X'** indicates activity; **'o'** indicates limited activity.

The new system had to create mechanisms through which water users across the board could make themselves heard and understood, enabling gradual and systematic redress of racial and gender inequities, whilst ensuring a secure base for economic growth. This is a major challenge in policy and implementation. Lack of access - both through lack of rights and lack of infrastructure - are priority issues of the rural poor in the Olifants basin. However, their adequate representation is hard to achieve: large numbers of people live in remote areas, excluded through the cost of transportation and lack of organization of small-scale water users. Industrialists and commercial irrigation farmers are better endowed to participate in consultation processes and are concerned about continued access and water quality issues. The environment is well represented, as reflected in the strong provisions in the NWA for priority allocations to maintain the integrity of the resource.

The proposed Catchment Management Agencies ignore internal political boundaries, playing both to the strengths and weaknesses of the new dispensation. The South African situation is in contrast to countries like Turkey, where a long history of strong and stable local government made these structures ideal vehicles for the establishment of their new Water User Associations. In South Africa, local government structures were deeply problematic: well-resourced white municipalities and regional councils historically excluded black representation, while structures in the former homeland areas were extremely weak and had to grapple with major ideological differences between traditional tribal leadership and the new democratically-elected representation. Apart from the advantages from a natural resource perspective of water management along natural boundaries, the thinking was that this deliberate disregard for political boundaries would enable the CMAs to continue their business throughout successive political changes. Nevertheless, the Constitution provides for ‘cooperative governance’ where there are overlapping functions. The CMAs will have to find ways to engage effectively with the local governments, who both represent the citizens’ interests and have responsibilities to provide water and sanitation services.

5.2 Informational Attributes

It is often said by South Africa's neighbors that they lack the resources to conduct public consultation processes as comprehensive as those characterizing South African policy-making. The ongoing cost of consultation during implementation was the subject of exhaustive debate during the water law review. Compromise was reached by toning down the specifics around consultation requirements in the NWA. It has been argued that on the one hand the consultation process in the Olifants basin for establishing the CMA was not fully effective in reaching the large majority of poor stakeholders; and on the other hand, the long consultation process is delaying taking action to address some of the serious issues and problems of the basin (Wester et al., 2003).

One of the lessons of the water law consultations was the importance of trusted information as a basis for consultation and negotiation. Good information is crucial to delineate areas of agreement and disagreement so as to structure and inform debate, but of little use if the source is doubted. Equally, good information becomes useful in negotiation and decision-making only when it is accessible by all interested

and affected parties. South Africa is well equipped to use the most modern techniques for data gathering, storage and knowledge creation, but faces a major challenge in presenting information in a meaningful way to the wide range of interests in the sector. Those most in need of water for basic and productive uses are poorly equipped to access and interpret information from the national systems.

Indeed, good information has the power to defuse unnecessary tensions - while misinformation and lack of information are powerful tools in infusing conflict. For example, during public consultation on South Africa's largest inter-basin transfer scheme, from the Orange River system to the economic heartland around Johannesburg through the Lesotho Highlands scheme, irrigation farmers along the lower Orange were concerned that their future was in jeopardy. A rumor spread quickly that the water crisis in Johannesburg was due to an estimated six million illegal immigrants in and around the city. A quick back-of -the-envelope calculation put an end to the rumor: the basic water needs of six million people would only irrigate about 5000 ha, a fraction of the irrigation along the Orange and less than half a percent of the irrigated area nationally.

The language of consultation is a particularly important tool in processes of inclusion and exclusion. Preparatory consultations in the vernacular are a powerful technique to prepare the rural poor to engage with other water user sectors. This problem is recognized but not yet fully addressed.

5.3 Legal Authority

South Africa is particularly blessed with a strong legal framework for water resources management. Water is viewed as an indivisible national asset, held in custody by the state. Consequently, significant powers vest in the Minister of Water Affairs and Forestry. Legal authority is not expected to be a constraining factor in the implementation of basin management - indeed the NWA promotes the establishment of CMAs, at the initiative of either water users in the Water Management Area, or of the Minister.

5.4 Resources

Water resources management functions will be delegated to CMAs in nineteen Water Management Areas. Currently, some functions are performed at DWAF head-office in Pretoria, while others are the responsibility of its regional offices. Demand may well outstrip supply of human, financial, institutional and infrastructural resources to service such a large number of water management offices. Modern water resources management is dependent on a range of specialist skills that may be unaffordable and unattainable by all nineteen CMAs in the short to medium term. In the new political framework another challenge would be to find leadership with command of the technical, social and political skills required by the job. Water managers of the previous era were highly skilled technically, but circumstances required little in the way of the wider range of skills necessary in the new framework.

6 Conclusion: Salient Characteristics of Olifants Basin Management

Projections about the future of integrated water resources management in the Olifants basin need to be informed by the current policy and legislative framework, as well as historic factors and issues of water scarcity.

There is a single source of authority and power. The Constitution and the NWA vests the custodianship of South Africa's water in the Minister of Water Affairs and Forestry. While this enables DWAF to keep tight control on the CMAs' adherence to national policy, as expressed in the National Water Resources Strategy, it implies that the process is externally induced and driven. As such, the CMA may be tempted to inflate its empire with functions better addressed at either national or local levels. This may exacerbate problems of sustainable financing. A distinct advantage of this single source of authority is that water 'rights', called 'water use entitlements' in the NWA, are well-defined. Work is currently underway by DWAF to redefine former water 'rights' to 'water use entitlements.'

Poverty and poor representation of the neediest sectors. It is still unclear to what extent the CMA will have a developmental agenda focused on addressing poverty, though the latest draft of the CMA proposal (BKS, 2002) does recognize this role. Schreiner et al. (2002) suggest two scenarios are possible: 'public participation' that is captured by the powerful, thus reinforcing marginalization of the disadvantaged; or a scenario that builds poverty eradication and achieving gender equity into the initial design of the CMA. While lack of access to water for domestic use is still a very serious problem in the former homelands in the Olifants, this water for 'basic human needs' is a well-protected right in terms of both the Constitution and the NWA. Therefore, services development, which is the domain of local government, rather than WRM functions are of importance to this sector. However, in the realm of small-scale economic activity, the CMA activities could potentially affect tremendously the ability of the poor to improve their livelihoods. Information flows need to be designed to reach all water user sectors, but especially those with limited access to modern media.

From administrative to public processes for water allocation. Water allocation was historically largely an administrative process with no public involvement. However, the NWA introduces mechanisms for public interaction at a relatively localized level, through the development of an 'allocation plan' in the CMA's five-yearly Catchment Management Strategy. This implies a shift from user-to-official interaction to a much more direct negotiation among user groups. In a context of growing water scarcity, conflict management is likely to become increasingly important. This is a vitally important issue. Powerful interests, such as mining and large-scale commercial sectors, still have a very strong voice, and of course have strong arguments for protecting their access to water: mining and agriculture in the Olifants basin are major earners of foreign exchange. On the other hand, there are concerns as to whether this 'status quo' is best for the millions of poor people living in the basin, with little or no access to water for their own productive uses. Further, there are large uncertainties regarding the degree to which there will be unmet water demands in the future in this basin and the extent to which these can be met by better demand management (Levite et al., 2002).

Growing water quality issues. Intensification of economic activities like mining, industry and farming, as well as growing population densities will put increasing pressure on the quality of water resources. Innovations like the existing agreements on quality management through 'controlled releases' of polluted water from coal mines during high-flow periods, will gain importance, but will eventually need to enter the next, more costly phase of treatment. Water quality impacts of dense settlements and agricultural outflows will demand attention, especially in the light of the national standards, requirements for the maintenance of an ecological reserve and achievement of resource quality objectives.

In sum, South Africa is at an early stage of its long road to effective integrated management of its water resources in a way that will meet growing demand for water while conserving its environment. While its legislation and policies are ahead of those of many countries, it faces special major challenges. Both nationally and specifically in many of its basins, it faces potentially serious gaps between growing demand for water and the available resources. It needs to focus far more than it has on how to use the water productively while also reducing the current gross inequities and achieving the aspirations of its poor majority to benefit from this and other resources.

7 Bibliography

Ashton, J. 2000. Conceptual Overview of the Olifants River Basin's Groundwater, South Africa. African Water Issues Research Unit, University of Pretoria.

BKS. 2002. Proposal for the establishment of a Catchment Management Agency for the Olifants water management area. Department of Water Affairs. Draft, Version 2.2.

Burton, M. 1999. Note on proposed framework and activities. Prepared for the IWMI/DSI/CEVMER Research Programme on Institutional Support Systems for Sustainable Management of Irrigation in Water-Short Basins. Izmir, Turkey.

Faysse, N. 2003. Possible outcomes of smallholders' participation in water resource management institutions in South Africa. Draft paper under review for publication. Pretoria, South Africa: IWMI.

Hirschowitz, R. 2000. Measuring poverty in South Africa. Pretoria: Statistics South Africa.

Levite, H., H. Sally, J. Cour. Water demand management scenarios in a water-stressed basin in South Africa. Paper presented at the 3rd WARFSA/Waternet Symposium, Dar-es-Salaam, Tanzania, 30-31 October 2002.

Midgley, D. C., W. V. Pitman and D. Middleton. 1994. Surface Water Resources of South Africa 1990. Water Research Commission, Pretoria, South Africa.

Mullins, D. 2002. Calculation of sectoral multipliers. Pretoria: Conningarth Economists.

Schreiner, B., B. van Koppen, and T. Khumbane. 2002. From bucket to basin: A new paradigm for water management, poverty eradication and gender equity. *In*: A. Turton and R. Henwood, eds., Hydropolitics in the developing world: A Southern

African perspective. Pretoria: African Water Issues Research Unit (University of Pretoria).

Thompson, H., C. M. Stimie, E. Richters, and S. Perret. 2001. Policies, legislation and organizations related to water in South Africa, with special reference to the Olifants Basin. IWMI Working Paper 19 (South Africa Working Paper 7). Colombo, Sri Lanka: IWMI.

Van Koppen, B., N. Jha, and D. J. Merrey. 2003 (forthcoming). Redressing racial inequities through water law in South Africa: Revisiting old contradictions? Comprehensive Assessment of Water Management in Agriculture Research Paper 3. Colombo, Sri Lanka: IWMI.

Wallgren, O. 2000. Water allocation in the Olifants River Basin, South Africa: an evaluation of policy options. Unpublished M.S. Thesis. University of Waterloo, Waterloo Ontario, Canada.

Wester, P., D. J. Merrey, and M. de Lange. 2003 (forthcoming). Boundaries of consent: Stakeholder representation in river basin management in Mexico and South Africa. World Development [WE WILL HAVE EXACT REFERENCE SOON]