Centre on Regulation and Competition

WORKING PAPER SERIES

Paper No. 89

PIONEERING REDISTRIBUTIVE REGULATORY REFORM. A STUDY OF IMPLEMENTATION OF A CATCHMENT MANAGEMENT AGENCY FOR THE INKOMATI WATER MANAGEMENT AREA, SOUTH AFRICA

Julia Brown and Phil Woodhouse
University of Manchester

November 2004

ISBN: 1-904056-87-3

Further details: Centre Secretary
Published by: Centre on Regulation and Competition,
Institute for Development Policy and Management, University of Manchester,
Harold Hankins Building, Precinct Centre, Oxford Road, Manchester M13 9QH, UK
Tel: +44-161 275 2798 Fax: +44-161 275 0808
Email: crc@manchester.ac.uk Web: www.competition-regulation.org.uk

Pioneering Redistributive Regulatory Reform. A Study of implementation of a Catchment Management Agency for the Inkomati Water Management Area, South Africa

Abstract

The 1998 National Water Act is one of a number of environmental legislative reforms promulgated in post apartheid South Africa that reflects international principles of good environmental practice while seeking to redress past inequity of access to natural resources. The Act incorporates a set of guiding principles agreed at the 1992 Dublin International Conference on Water and the Environment (ICWE), including: Integrated Catchment Management (ICM); stakeholder participation; devolution/decentralisation and placing an economic value on water. The reforms, which radically change the principles of ownership, access and use of water in South Africa, are internationally regarded as a pioneering attempt to regulate water use in ways that are environmentally sound and socially fair. A key element of the regulatory framework is the establishment of decentralised Catchment Management Agencies (CMAs) representing the interests of different water users, and funded by the levy on all water use of a Catchment Management Charge. Irrigation Boards, which represent the interests of the irrigation sector and manage the resource on the micro scale, are to be transformed into more inclusive Water User Associations. The paper presents empirical findings from a detailed study of the Inkomati Water Management Area, where the CMA process is most advanced. Detailed case studies of sub-catchments were undertaken to explore how the various existing and potential water users negotiate their future water use within the emerging framework of the CMA. Water use has been heavily developed in the catchment by industry, commercial forestry, and irrigated agriculture, and water scarcity now presents an obstacle to expansion of water supply for household use in black communities, for irrigation by black farmers, and for environmental conservation. Along with the formal positions of the institutions involved, the key issues of transformation are examined, and the ICWE principles are evaluated as a basis for designing regulation of water use.

INTRODUCTION: GUIDING PRINCIPLES ON WATER RESOURCE MANAGEMENT AND SOUTH AFRICA'S 1998 NATIONAL WATER ACT

Following constitutional reform and the establishment of majority rule in 1994, the South African government embarked on a process of legislative reform to provide the basis for more equitable development. For the governance of water, the legislative framework was established through the Water Services Act (1997), concerned with provision of water supply and sanitation services, and the National Water Act (1998), which covers the broader management of water resources. While the two elements of water management are linked, this paper is primarily concerned with the implementation of the National Water Act.

South Africa's National Water Act of 1998 is widely regarded as a pioneer of an international wave of reform in the water sector, including the EU Water Framework Directive (2000) and Mexico's National Water Plan (2001-2006), which embodied a set of guiding principles agreed at the 1992 International Conference on Water and the Environment (ICWE)[1] in Dublin (Calder, 1999; Heathcote, 1998; World Bank, 1993, 2003[2]). The key ICWE principles are:

1. The River Basin is a natural unit of analysis and management. A holistic approach to water management is advocated, i.e. *Integrated Catchment Management.*
2. A *Participatory* approach is advocated – all stakeholders (with particular reference to women) should be involved in the planning and management of water resources.
3. Action should to be taken at the lowest appropriate level (subsidiarity). This will necessitate the *devolution/decentralisation* of management.
4. Water has an *economic value*. Economic instruments should be used to encourage the efficient use of the resource.

The National Water Act of 1998 not only seeks to implement these principles, but also to regulate water use in a way that is socially fair by seeking to redress past inequalities. The purpose of the Act is stated (section 2) as:

"to ensure that the nation's water resources are protected, used, developed, conserved, managed, and controlled in ways that take into account…..

- meeting basic human needs of present and future generations;
- promoting equitable access to water;

- redressing the results of past racial and gender discrimination;
- promoting the efficient, sustainable and beneficial use of water in the public interest
- facilitating economic and social development;
- providing for growing demand for water use;
- protecting aquatic and associated ecosystems and their biodiversity;
- reducing and preventing pollution and degradation of water resources;
- meeting international obligations;
- promoting dam safety;
- managing floods and droughts.

And, for achieving this purpose, to establish suitable institutions and to ensure that they have appropriate community, racial and gender representation".

The four ICWE principles are manifest in the National Water Act in the following ways:

Integrated Catchment Management is pursued through redefinition of water property rights, and, in particular, the abolition of the distinction between 'private' and 'public' water recognised by earlier legislation (the 1956 Water Act), and, in consequence, effective extinction of water rights tied to ownership of riparian land. Under the 1998 Act, water is "an indivisible national asset" and the National Government will act as the custodian in the public interest (DWAF, 1997). The 1998 Act also broadened the definition of water use to include any activities which result in a reduction of stream flow (e.g. forest plantations), a deterioration of the water resource (e.g. waste, effluent, or cooling water disposal), or the removal and disposal of underground water (e.g. mining). The 1998 Act also requires the definition of a "Reserve": the guarantee of water to meet basic human needs and to maintain environmental sustainability

Integrated catchment management is to be achieved following the principle of *devolution / decentralisation of water management.* The new legislation divides South Africa into 19 Water Management Areas (WMAs) each of which will be managed by a single Catchment Management Agency (CMA), representing the interests of different water users at the catchment level. Central government (the Department of Water Affairs and Forestry – DWAF) will not delegate all of its current water resource functions to the newly established CMA. Rather, the delegation of functions will be phased over time as and when the CMA is

deemed a 'responsible authority'. According to section 80 of the National Water Act, the CMAs will have three initial functions:

- To investigate and advise on the protection, use, development, conservation, management and control of water resources in its WMA.
- To develop a catchment management strategy
- To coordinate the related activities of water management institutions within the WMA.

Over time, the DWAF may delegate far-reaching powers to the CMA. For example water allocation to different users could be determined by the decentralised CMA, which may require all water users to apply for a licence to continue using water so as to achieve a fairer allocation of water, to improve the efficiency of resource management or to protect water quality (section 43).

The operation of the CMA is conceived as *participatory.* Under the National Water Act, the governing board of a CMA is to be appointed by the Minister of Water Affairs "with the objective of achieving a balance among the interests of water users, potential water users, local and provincial government and environmental interest groups" (section 8.1 of the Act). The Minister must also appoint an advisory committee which will make recommendations on which organs of the state and bodies representing different sectors and other interests within the WMA of the CMA should be represented or reflected on the governing board, and also the number of persons which each of them should be invited to nominate. The composition and balance of the CMA Governing Board is of crucial importance because it is a likely indication of the future commitment of the CMA to a redistributive agenda. A second key component of the devolved management of water resources is the Water User Associations (WUAs). Chapter 8 of the 1998 Act outlines the establishment of WUAs as water management institutions that operate at a restricted local level and are effectively "cooperative associations of individual water users who wish to undertake water-related activities for their mutual benefit" (section 92). Irrigation Boards, which currently manage water resources at local level on behalf of the commercial agricultural sector, are to be transformed into more inclusive WUAs (section 98). The Act also envisages situations whereby the management of smallholder schemes in former homeland areas will be devolved to the users, who would then form WUAs to manage their particular schemes (DWAF, 2000a, p.1) according to the powers and duties that are assigned or delegated to it.

The fourth of the ICWE principles, that water has an *economic value*, is reflected in the provision of the National Water Act (chapter 5) that all water use, regardless of where it occurs in the water cycle, is now subject to a Water Resource Management Charge. The charge will fund the prototype CMA (generally the local DWAF technical staff), and ultimately the full CMA's activities. The rate charged may vary across the 19 WMAs and different tariffs are levied for agriculture, domestic/industrial use, and forestry. Some or all charges may be waived for disadvantaged groups to promote equitable access for productive purposes such as agriculture (Woodhouse and Hassan, 1999, p.30). The economic valuation of water is also expected to result in more efficient water use, as allocations of water to users will not be permanent, but for a 'reasonable' period, and may be traded with other users, subject to ministerial consent.

It is important to note that the Act intends that allocation of water amongst users other than the 'Reserve' (basic human and environmental needs) should be guided by social equity and economic efficiency goals. Actions to achieve each of these two goals need to be carefully managed if they are not to be conflicting. For example, steps towards the goal of greater equity would broaden the social base across which benefits of water use are shared by changing the allocation mechanisms that have skewed access to water resources towards a minority of the population. However, to achieve economic efficiency, water resources should be allocated so as to yield the greatest economic benefit per unit of water. Within South Africa at present the concentration of water management expertise within white-dominated commercial agriculture means that increasing water access for previously disadvantaged groups is likely, in the short term at least, to reduce efficiency. A key issue in debates of water allocation is, therefore, how water allocation can achieve benefits that are socially optimal.

Table 1: Stakeholder Interview Matrix.

Reference	Organisation	Position
DWAF/M-1	DWAF Mpumalanga	Regional Director: Mpumalanga
DWAF/M-2	DWAF Mpumalanga	Chief Engineer, Water Resources Management Directorate
DWAF/P-1	DWAF Pretoria	Water Quality Directorate
DWAF/P-2	DWAF Pretoria	Director of Catchment Management, Institutional Oversight Directorate
DWAF/P-3	DWAF Pretoria	Deputy Director: Catchment Management, Institutional Oversight Directorate

DWAF/P-4	DWAF Pretoria	Chief Engineer: Water Resource Planning (East)
DAL-1	Department of Land Affairs (Mpumalanga)	Deputy Director: Policy Implementation Support Mpumalanga
DLA-2	Department of Land Affairs (Mpumalanga)	Chief Planner: Monitoring and Evaluation
DoA-1	Department of Agriculture (Mpumalanga)	Research Technical Directorate
DoE	Department of Environment (Mpumalanga)	official
MM-1	Mbombela Municipality	Town Planner
MM-2	Mbombela Municipality (Hazy View)	Engineering Technician
NM-1	Nkomazi Municipality	Chief of Technical Services (West)
KNP-1	Kruger National Park	Water Manager
KNP-2	Kruger National Park	Head People and Conservation Unit
MPB-1	Mpumalanga Parks Board	Scientific Services
KOBWA-1	Komati Basin Water Authority	Water Management Unit Management
MAFU-1	Mpumalanga African Farmers Union	Representative for Malelane and Chairman of CMA Advisory Committee.
Phiva-1	Phiva Irrigation Scheme	Former Chairman
Phiva-2	Phiva Irrigation Scheme	Current Chairman
FA-1	Siyabuyela Farmers Association	Representative and interpreter at meeting at Malekutu
EC-1	Elands Valley Conservancy	Representative
SF-1	Sappi Forest Products	Safety, Health, Environment and Quality Manager
TSB-1 *	TSB	Director Cane and Sugar Production
TSB-2 **	TSB	Manager of Grower Affairs
TSB-3	TSB	Small Grower Development Officer
CMIB-1 *	Crocodile Major Irrigation Board	Chairman
LIB-1**	Lomati Irrigation Board	Former Chairman and Chairman of Technical Committee
KIB-1	Komati Irrigation Board	Chairman
SVIB-1	Sabie Valley Irrigation Board	Chairman
BHIB-1	Burgers Hall Irrigation Board	Chairman
WRVCB-1	White River Valley Conservation Board	Secretary
EVIB	Elands Valley Irrigation Board	Chairman

Implementation of the National Water Act remains at an early stage. In the six years that have elapsed, it is clear that the establishment of CMAs is very uneven across the 19 WMAs in South Africa. The CMA process is most advanced in the Inkomati WMA, where a CMA was officially launched on 30th March 2004. It is an opportune moment both to explore how implementation of the different elements of the Act has affected water use patterns and to assess its potential impact on equity and efficiency of water use. Using a detailed empirical case study of the implementation of this Act in the Inkomati Water Catchment Area, in Mpumalanga Province, this paper explores the ways in which different sets of stakeholders

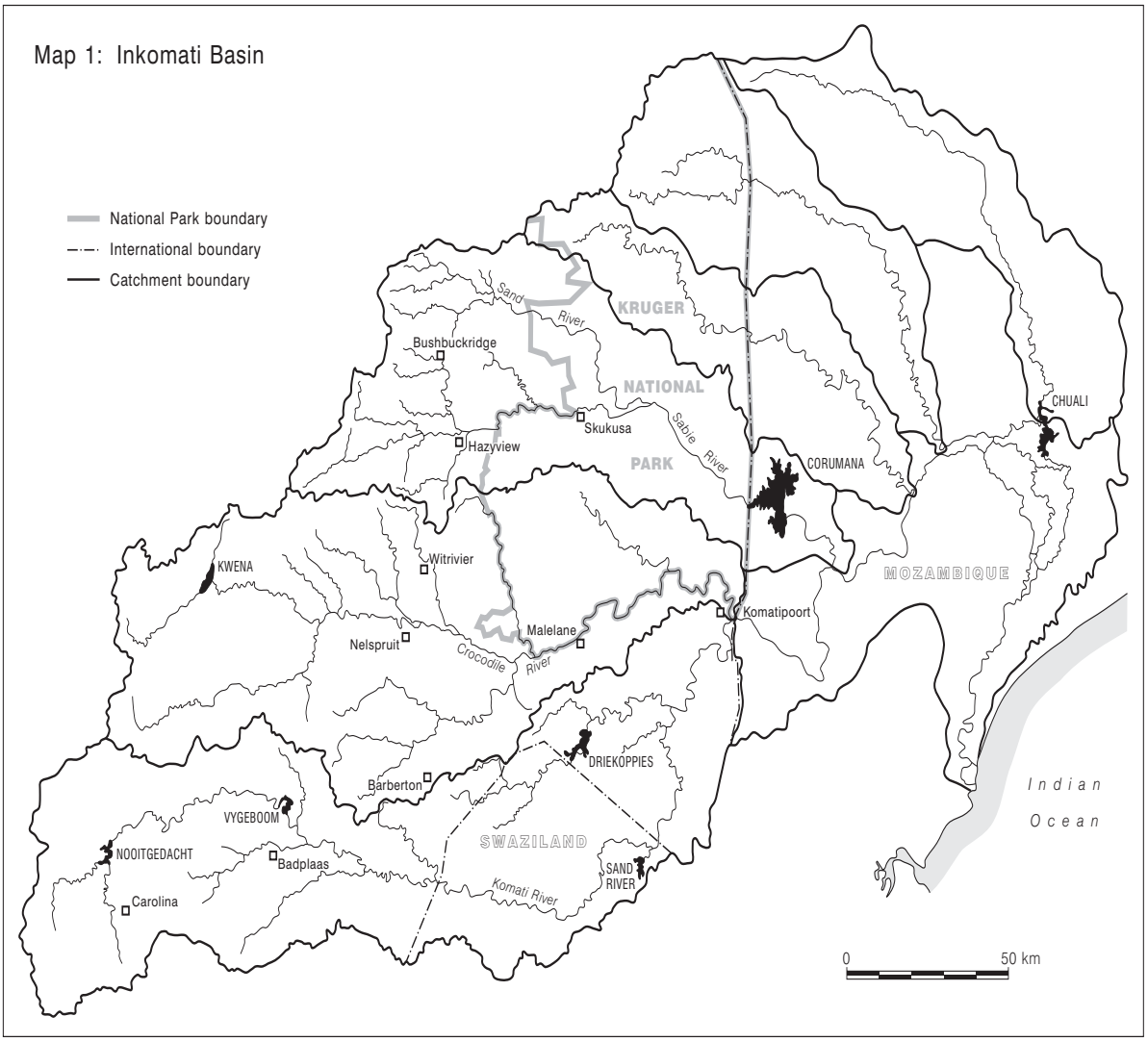
negotiate the implementation of the legislative framework, and the implications for the redistributive impact of the regulatory reforms. The report is based on fieldwork in South Africa during February and March 2004. Four weeks were spent interviewing key stakeholders in the Inkomati WMA. The region was experiencing a severe drought at the time of fieldwork and it is important to recognise the influence of this context upon the findings of the research. Time was also spent in Pretoria talking to Head Office DWAF officials. Documentary sources have also been studied. A stakeholder referencing system has been employed throughout the report, details of the stakeholders consulted are given in Table 1.

THE INKOMATI WATER MANAGEMENT AREA

General Characteristics

The Inkomati WMA is located in north-eastern South Africa and borders Mozambique to the East and Swaziland to the South-East. Administratively, the majority of the Inkomati WMA falls within Mpumalanga Province, with a portion within Northern Province. Three principle river catchments make up the Inkomati WMA: the Komati, the Crocodile and Sabie-Sand. All drain in an easterly direction and eventually flow over the border into Mozambique. The Great Escarpment, which divides the WMA into the Highveld plateau area in the west (2,000m above sea level) and the Lowveld to the east (140m above sea level), is the most striking topographical feature of the Inkomati WMA. Rainfall, which is strongly seasonal, occurs mainly in the summer months and ranges from 400 mm to 1,000 over most of the Lowveld through to 1,500 mm in mountainous reaches of the escarpment. Annual evaporation rates vary across the WMA, from less than 1,400mm on the Highveld to more than 1,900mm in the Lowveld, and as a result irrigation requirements vary (DWAF, 1998, p.1). DWAF estimates that in 2003 the Mean Annual Runoff for the whole WMA was 3,022 million m^3/annum (DWAF, 2004, p.15). Vegetation and land use patterns reflect the topography and climatic conditions. Water resource infrastructure is well developed in the Inkomati. The Komati River is the most altered and regulated river with numerous weirs. The Sabie is the most ecologically pristine river (DWAF, 2004, p.iv). Major dams have been constructed on many of the rivers in the WMA, including: the Vygeboom and Nooitgedacht in the Komati (West of Swaziland), the Maguga dam (303M m^3 capacity) on the Komati River (inside Swaziland) and Driekoppies dam (237M m^3 capacity) on the Lomati River in the Komati catchment (North of Swaziland). Both Driekoppies and Maguga were built in the past decade to provide water for irrigated agriculture although the most recently constructed (Maguga) has never been filled to capacity due to persistent drought in recent years. The

recently constructed Injaka dam, (120M m^3 capacity) on a tributary of the Sabie, was built



to augment domestic water supplies.

Main Water Users in the Inkomati

It is clear that *irrigated agriculture* is the dominant water user in the Inkomati, accounting for 57 percent of the total requirements. Within the individual catchments, with the exception of the Komati West of Swaziland, irrigation has the largest water requirement: 73 percent in the Komati North of Swaziland, 62 percent in the Crocodile and 50 percent in the Sabie/Sand catchment. The geography of irrigated agriculture still largely reflects its development under the apartheid era, almost entirely in white farming areas. Topography and climate have resulted in three basic irrigation zones. In the Highveld (Komati West of Swaziland and Upper Crocodile catchment), where rainfall is higher, fodder and vegetable crops are grown. In the 'Middleveld' (Sabie and Central Crocodile) irrigation is used for

tropical and sub-tropical fruit. In the Lowveld (Komati North of Swaziland and Lower Crocodile, together known as 'Nkomazi') sugarcane predominates along with some citrus and tropical fruits. Irrigation development opportunities in the former homeland areas of the Inkomati WMA have been far more restricted, Woodhouse and Hassan (1999, p.10-11) identified five categories of irrigation activity by black farmers: 1) smallholder sugar cane (average 7 ha) in the Nkomazi area; 2) smallholder irrigation of maize and vegetables on formal schemes built by homeland administrations; 3) non-formal smallholder irrigation for commercial vegetable production; 4) 'community gardens' microplots irrigated by buckets or gravity tanks supplied from streams; 5) 'backyard irrigation' using water from household supplies.

Table 2: Water Requirements for the various water users in the Inkomati for the year 2003 (million m^3 /annum), 2004.(Source: DWAF,2004:55)

Catchments	Komati (West of Swaziland)	Komati (North of Swaziland)	Crocodile	Sabie/Sand	**Total Inkomati WMA**	
						%
Irrigation	21	222	257	65	565	*57.0*
Urban	2	3	35	22	62	*6.3*
Rural	4	6	7	4	21	*2.1*
Mining	-	1	23	0	24	*2.4*
Afforestation	23	12	42	37	114	*11.5*
Total Requirements	**50**	244	**364**	**128**	**542**	
International requirements	-	60	49	0	109	*11.0*
Transfers	97	-	0	0	97	*9.8*
Grand Total	**147**	**304**	**413**	**128**	**992**	

Forestry accounts for 11 percent of total water requirements in the WMA. Covering an area of 3,357$Km^{2,}$ commercial plantations, primarily eucalyptus and pine, dominate the upper reaches of the catchments. Forestry is therefore only an important water user in the Sabie catchment (29 percent) and to a lesser extent the Crocodile catchment (10 percent). Under the terms of the 1998 Act, plantations are considered to be a heavy user of water resources in the sense that they reduce stream flow. DWAF 2004 Internal Strategic Perspective (ISP) document indicates that the sector will not receive new water use licences to expand further the area under forestry.

Whilst not differentiated by DWAF in their figures, *industry and manufacturing* are significant users of water. The single largest water requirement (66 percent)) in the Komati (West of Swaziland) is for 97 million m^3/annum transferred (Table 2) into the adjacent Olifants WMA

for cooling Eskom's coal-fired power stations. This water use is deemed "strategic" by DWAF, and the 2004 ISP document states "Water will continue to be transferred" (DWAF, 2004, p.ix). Other industrial users of water, taking into consideration the widened definition of water use, include the Sappi Kraft paper mill at Ngodwana in the Elands Valley (upper Crocodile catchment) and the two TSB sugar mills in the Lower Crocodile. As Table 2 indicates, mining and quarrying activities are the only significant water users in the Crocodile catchment, where they account for 5.5 percent of water use. The manufacturing sector, which in 1997 accounted for 24.6 percent of the WMA's GGP, is based around Nelspruit, the Inkomati's largest urban centre (DWAF, 2003, p.9).

Primary water use reflects the population distribution which is to be found in formerly white towns such as Nelspruit and White River (Crocodile) and in the densely populated black former homeland areas of Ka Ngwane, Lebowa and Gazankulu. The Injaka dam was constructed to augment supplies to the large black population on the Upper Sabie and Sand catchment (Bushbuckridge area), estimated at 0.5 million in 1995, and expected to reach 0.93 million by 2010. The provision of domestic water is governed by separate legislation, the 1997 Water Services Act, but the high level of assurance of supply required to meet domestic demand, coupled with the high priority accorded to domestic supply (an allowance of 25 litres per person per day) as part of the 'Reserve' under the 1998 National Water Act, means that primary water use is likely to significantly reduce availability for other uses, particularly during drought periods (see section 4.1 for allocations to primary and irrigation use following the construction of the Driekoppies dam). Despite legal requirements, adequate domestic supply is still an issue in many of the former homeland areas (see section 4.2 below), and even historically 'white' towns such as White River experienced shortages during the recent drought period (WRVCB-1).

In addition to primary use projections, the water requirements of the *'Reserve'* will need to cover flows to sustain ecology. These are more complicated to determine, but are likely to be significant in the Inkomati WMA. The Sabie-Sand and some tributaries of the Crocodile flow through the Kruger National Park (KNP) and Sabie-Sand Game Reserve. These areas lie downstream of the main (irrigation and forestry) users, and, if flow levels entering the KNP are too low, the ecological functioning of the park will be affected.

South Africa has also to meet international agreements (for example the Interim IncoMaputu Water Use Agreement) with Mozambique on cross-border flows. *International*

requirements are therefore an important water use in the Crocodile (12 percent) and Komati North of Swaziland (20 percent) catchments.

The *water balance* (the reconciliation of water requirements and water availability) for the various catchments in the Inkomati indicates that there is a negative balance in all but the Sabie, which is projected to have a surplus of 31 million m^3 /a (DWAF, 2004, p.38). There is a shortfall of 41 million m^3 /a in Komati West of Swaziland (DWAF, 2004:31), 6 million m^3 /a in Komati North of Swaziland (DWAF, 2004, p.37), and 149 million m^3 /a in the Crocodile (DWAF, 2004, p.42). During the recent drought period, with the exception of the Sabie, the rest of the WMA experienced severe water shortages, despite the construction of two major dams (Driekoppies and Maguga) within the last decade.

INSTITUTIONAL FRAMEWORK

The formal roles of the various actors and agencies with an interest in water resource management and the CMA will now be outlined.

DWAF

Under the terms of the 1998 Act, the Minister for Water Affairs is responsible for water resources in South Africa, and the Department of Water Affairs and Forestry (DWAF), based in Pretoria, is responsible for implementing the National Water Act, including approval of all CMA proposals. The Mpumalanga DWAF Regional Office, in Nelspruit, is charged with managing water resources in the Inkomati WMA and the adjacent Olifants WMA, effectively undertaking the CMA functions, until the CMA is deemed to have sufficient capacity and expertise. At the time this study was undertaken DWAF Mpumalanga had four sub-directorates: Forestry, Planning and Development, Water Quality, and Water Resources Management. The last of these is responsible for reviewing all water licence applications, registration of licences, verification of registered water use, maintenance of dams and other infrastructure, and compliance with international obligations. The Nelspruit office began engaging stakeholders in the CMA process in 1997 (Woodhouse and Hassan, 1999), as outlined in Figure 1, and discussed more fully in Section 5.1. The proposed structure of the Inkomati CMA is illustrated in Figure 2.

Mpumalanga Department of Agriculture (DoA)

The DoA is responsible for providing support to all farmers in the province. In practice, the DoA was formed largely from agricultural departments of the former homeland

administrations following the end of apartheid, and it focuses most of its attention on black farmers in the former homeland areas. The DoA's two main roles are, firstly, to provide technical extension to black farmers 'emerging' as commercial producers, and, secondly, to support applications for water licences to those farmers. The role of the DoA is explored in two case studies (section 4.1 and 4.2), below.

Mpumalanga Department of Land Affairs (DLA)

Land reform in South Africa has three basic components: land restitution; land redistribution and tenure reform. The land reform programme aims to transfer 30 percent of all agricultural land over to black people over a period of 15 years (DLA:6). The importance of water to the success of the agricultural land reform programmes has only recently been recognised by DLA (DLA-2). The role of the DLA's Land Redistribution for Agricultural Development (LRAD) programme is explored in the first case study (4.1).

Municipalities

From 1st July 2003 municipalities, the lowest tier of local government, became the Water Service Authority (as defined in the 1997 Water Services Act) with a regulatory responsibility for domestic water supply and sanitation services. Two municipalities were included in this study: Mbombela (covering Nelspruit and the area bounded by the Kruger Park to the east and the Sabie river to the north), and Nkomazi. In the latter, the Water Service Authority was also the water service provider, responsible for delivery of water supply and sanitation. In Mbombela, the provision of water services for about about 50 percent of the municipality had been contracted out in 1999 to a private company, the Greater Nelspruit Utility Company, in which the British company, BiWater, has a majority shareholding (Smith et al, 2003). The responsibility of municipalities for water supply means that, as well as being the representative of the local population, they are important stakeholders in the management of water resources in the Inkomati.

Commercial Farmers

With the exception of small schemes run by homeland administrations, irrigated agriculture in the Inkomati has historically been the preserve of white commercial farmers, who, through membership of Irrigation Boards, have a long tradition of organisation to secure access to water, and most of the government's investment in storage dams in the Inkomati WMA has been designed to serve their needs (Woodhouse, 1995). Commercial farming is capital intensive and – apart from sugar – focuses on high value fruit and vegetable crops.

In addition to irrigation boards, commercial farming promotes its interests locally through local action committees and lobbying campaigns (e.g. the Onderberg Water Plan), and retains its own legal advisers. Agri SA represents commercial farming nationally, and many farmers are also members of crop-specific grower associations that undertake research and provide their members with technical advice.

Irrigation Boards

Under the 1956 Water Act, large parts of the Inkomati WMA were designated Government Water Control Areas which meant it was mandatory for irrigators to be members of Irrigation Boards (IBs), which have effectively become the day-to-day managers of the resource at the local level, (scheduling irrigation, operating water works, and prosecuting members who are found to be stealing water). IBs constitute the main body of expertise and information about water use in their locality, and water resource management is therefore highly decentralised. With the exception of the Lomati and Komati IBs, few of the IBs in the Inkomati WMA have any black farmer members. The administrative control of IBs is often concentrated, for example the Nkomazi Major IB and the Crocodile River Main IB, each of which covers three minor IBs, share an office and secretary. Unsurprisingly, IBs in the Nkomazi area work closely together on common issues and, as a result, they can present a powerful and united front. Most of the IBs have invested heavily in infrastructure: some have paid for the construction of canals, weirs and water management systems. Under the terms of the 1998 Act the IBs are in a period of transition, to form broader, more inclusive Water User Associations (WUAs). This issue is explored in section 5.1. Overall, commercial farmers and the IBs they control are in a potentially strong negotiating position in terms of influencing the future direction of the CMA because they possess the most detailed local knowledge of water use by agriculture. Further, as the largest water user, commercial agriculture will contribute the largest proportion of the Water Resource Management Charge and therefore the CMA will be largely financially dependent on this sector.

'Emerging' Farmers

A consequence of the labour and land policies under apartheid is that black farmers do not have a long history of irrigated farming in the Inkomati WMA. As outlined in section 2.2, not only are 'emerging' black farmers still relatively inexperienced in the day to day operations of high input farming, but they have yet to develop strong networks. The Mpumalanga African Farmers Union represents the emerging farmers in the province, but, with the

exception of those emerging farmers in the Nkomazi area, who have been targeted for development assistance (refer to section 4.1), few are members of irrigation boards, and quantitative understanding of water resource management issues among emerging farmers across the Inkomati is low. Overall, the emerging farming sector is potentially in a weak negotiating position vis a vis commercial farmers and other sectors. The issue of representation of the interests of emerging farmers in the CMA is explored in sections 5.2.2 and 5.2.3.

Industrial Interests

Sappi Kraft paper mill and the TSB mills are the main industrial users of water in the Inkomati WMA and as such are important stakeholders in the CMA process. Transvaal Sugar Limited (TSB) owns the two[3] mills in the Nkomazi locality that together process all the sugar produced in the area. As the sole purchaser of sugar cane, TSB is an important stakeholder within the Nkomazi area, wielding considerable power over its growers and the irrigation boards[4]. TSB provides technical support to emerging sugar cane growers in the Nkomazi area.TSB also has a potentially powerful position in the Inkomati CMA because sugar accounts for over a third of the land irrigated in WMA.

Komati Basin Water Authority (KOBWA)

Rivers in the Komati catchment cross international boundaries. The Komati River crosses three international boundaries; the Lomati flows through Swaziland before entering South Africa. Under the terms of treaty between South Africa and Swaziland KOBWA was established and was charged with the design, building and management of Driekoppies dam inside South African territory and Maguga in Swaziland. Its role is to manage the dams to satisfy the needs of the farmers whilst meeting international legal requirements.

Forestry

Occupying the upper portions of the catchments where water is most plentiful, commercial plantations effectively intercept water thereby potentially denying water to downstream users when water is scarce. Down stream users, especially commercial farmers and their irrigation boards and environmental interest groups, have for many years been highly critical of this pre-emptive water use by forestry and by the sectors' wide use of eucalyptus, a heavy water consuming species.

The forestry sector recognises that its past environmental record was poor, but argues that this was due to shifting of regulatory responsibility for the sector between government departments (from Department of Forestry, to Environmental Affairs and, most recently, to DWAF) meant there was no continuity of approach, and a failure to police permits led to exploitation of the system. As a result, planting occurred in unsuitable areas and the use of eucalyptus exacerbated problems.

The 1972 Forestry Act, through the introduction of a permit system, regulated forestry for the first time, and by the mid 1980's, attempts were being made by the sector to rectify past-mismanagement. Since the change of government in 1994, there has been tighter monitoring of the system and under the 1998 National Water Act, stream flow reduction caused by forestry is deemed a water use, and is subject to a Water Resource Management Charge.

Sappi Forest Products – one of South Africa's largest commercial forestry companies – is involved in a number of initiatives which suggest an effort is being made to redress concerns over the development of the sector. Fifteen years ago there was only one Environmental Manager: now there 15. A Stream Flow Reduction Committee, with representatives from DWAF and the forestry sector, has been set up to discuss permits and related business. The Forest Environment Liaison Committee – organised by Sappi – meets four times a year. Here, members of the public can raise objections and ask questions which Sappi then address. Sappi feels the initiative has worked well.

The large plantation companies are now implementing Delineation Models, which involve a scoping study after an area is felled. Soil samples are taken, terrain is considered and any replanting has to be at least 30 metres away from streams or wetlands to minimise impact on stream flow. Sappi has made a commitment that by 2010 it will have removed incorrectly planted trees (i.e. too close to wetlands). The cost of implementing this model to Sappi is an estimated loss of 5,000 ha under plantation.

Sappi and the other large plantations have close links with the "Working for Water" programme undertaking to clear exotic vegetation from water courses in the upper catchments. All this has done much to restore forestry's imagine as a 'good citizen' (Woodhouse and Hassan, 1999, p.44). Indeed Department of Environment (Mpumalanga) acknowledges the efforts made to demonstrate environmental responsibility.

The sector itself believes it should have received more credit for the efforts than has been the case, and that the continuing criticism is unjust. In times of water stress, such as the droughts of 2003-2004, irrigators blame the forestry plantations as the cause of empty dams. Sappi argues that automatically blaming forestry for low dam levels is unfair and cites the case of the almost of empty Kwena dam where there is no forestry in the area. Moreover, they argue, plantations themselves have been affected by drought, losing six months' growth in a two-year period.

However, environmental NGOs, such as Timber Watch, regard the efforts of major forestry companies as merely a public relations exercise, and continue to exert pressure for the removal of exotic trees and the planting of hemp (for the production of paper). Sappi argues that this would require flat land, annual replanting (which would impact soils), and would produce more toxic waste in processing than pine. The company maintains that plantations are the most beneficial use of land in upper catchment areas, "unfortunate" as this may be from the point of view of downstream users, but that, if a more appropriate land use could be found, then Sappi would be "fine with this"..

Environmental Interests

The sector is well represented by local government departments, the KNP, Environmental NGOs, and local conservancies established by farmers seeking diversification into wildlife – based enterprises. The *Mpumalanga Parks Board* is in charge of assessing and protecting the biodiversity of the whole province, but it does not have any regulatory function. The *Department of Environmental Affairs and Tourism* has some regulatory functions. It produces the State of the Environment report and is the lead agency for Environmental Impact Assessments for the province (refer to section 4.3). Environmental interests have been instrumental in developing ideas on integrated catchment management. The *Kruger National Park* (KNP) initiated the Sabie River Working Group and the Save the Sand Project run by Association for Water and Rural Development (AWARD). AWARD have developed programmes for the integrated management of the Sand sub-catchment. The KNP is probably the most important and influential environmental interest group in the Inkomati. It is affected by upstream users and has in the past been viewed as obstructive to development of water infrastructure, particularly in the homeland areas (Woodhouse, 1995). However, recently it has shown itself more willing to negotiate the relocation of new weirs to less sensitive areas (see 4.2 below). A new Crocodile Catchment Forum has been set up

with DWAF in February 2004 to discuss water management issues in the Lower Crocodile area. This new initiative places the KNP in an important and potentially influential position in this catchment. Overall, the environmental sector, through the government agencies and NGOs, has considerable technical expertise and strong organisation (see 4.3) and therefore considerable potential to counterbalance the commercial farming sector in the CMA in terms of water resource management issues. The environmental sector is also likely to play an important role in the determination of the ecological reserve.

Having summarised the principle stakeholder groups in the Inkomati WMA, the following section explores their interaction through a series of three case studies of specific water use situations within the WMA. The implications of these case studies for implementing redistributive regulatory reform are discussed in section 5.

WATER MANAGEMENT CASE STUDIES IN THE INKOMATI WMA

Expansion of Irrigated Sugar Production in the Nkomazi Area

The Nkomazi is roughly an equilateral triangle that includes the Lower Komati River (Komati North of Swaziland) sub-catchment, largely corresponding to the former homeland area of Ka Ngwane, and the Onderberg (Lower Crocodile sub-catchment) area of large scale white commercial farming. There are important stakeholders on all sides: Mozambique (East), Swaziland (West) and the KNP (North).

A range of irrigated crops is grown in the Nkomazi (total area 56,780 ha): bananas 4,400 ha; citrus 6,000 ha; lychee 3,300 ha; mango 1,150ha; papaya 700 ha; vegetables 200 ha, and 17 percent of South Africa's sugar cane (44,000 ha), which dominates the area, occupying 77 percent of the irrigated area (TSB-2).

The Nkomazi Irrigation Expansion Programme (NIEP) was initiated under the Ka Ngwane administration to promote small scale sugar farming by black farmers, thus generating employment and skill development for communities in this area of high unemployment. The Mpumalanga DoA took over the responsibility for the scheme in 1994. Sugar was chosen over other crops by the planners: "it is an excellent crop for emerging farmers" because it is easy for inexperienced growers to manage (DoA-1): it can be harvested in the first season, unlike tree crops; the TSB mills guaranteed a local market, providing a dependable income that made sugar the preferred option for black emerging farmers, despite higher likely returns on alternative crops, and the risk of dependency associated with a sugar

monoculture (Woodhouse and Hassan, 1999, p.20). It was claimed that through sugar cultivation, emerging farmers would acquire transferable managerial and marketing expertise giving the option to diversify later. The decision to build the Driekoppies and Maguga dams played an important role in the development of the NIEP scheme, and an allocation of water for irrigation development was made available to the Ka Ngwane administration as part of the South Africa-Swaziland treaty on the construction of Driekoppies. The DoA distributed the allocation amongst tribal authorities in the Nkomazi, and DWAF issued permits for water licence rights.

The first phase of the NIEP scheme, between 1993 and 1998, saw 7,094 ha of sugar planted (NOWAC, 1999, p.10). Funding difficulties stalled the scheme between 1998 and 2000, but development of a second phase has been possible from 2000 because funding has been available from the LRAD programme (Land Redistribution and Agricultural Development). LRAD is a sub-programme of DLA's Land Redistribution programme that has been used to facilitate the purchase of commercial white-owned farms on a willing buyer, willing seller basis. In the Nkomazi the LRAD programme, commonly known as the "seven project" since it covers seven different areas (Phiva, Mzinti, Magudu, Sikhwahlane, Ntunda, Langeloop and Vlakbult), has for the first time been modified to allow the development of agriculture on tribal (state owned) land, rather than funding the purchase of white-owned farms. LRAD provides an initial R20,000 grant with further funding in the form of low interest loans from the Land Bank on a sliding scale depending on what communities (organised into associations) are able to accumulate (DLA, p.8). To date, a total of 1,829 ha of land with irrigation rights has been allocated to 241 farmers under Phase 2 of NIEP, (DLA-1) each participating farmer in the scheme receiving about 7 ha. A DLA official believes that the sugar expansion programme is "good empowerment" (DLA-1), but the growers in the NIEP/LRAD scheme do not own the title to the land. In effect, they are leasing it from the chief who grants a "permission to occupy". Lack of collateral has implications when applying for finance, so the Land Bank keeps the TSB contract as security.

The NIEP expansion raises two key issues that highlight obstacles to redistribution of water under the 1998 National Water Act. The first of these is that water scarcity means that redistribution is highly contested by existing water users. The second is that technical and managerial expertise needed to maintain the efficiency of use of water redistributed to new users (essentially from white to black farmers in this case) may not be readily available, thus

counterposing increased equity against efficiency of water use and further intensifying opposition to redistribution. These two issues are examined further below.

Water Scarcity in the Nkomazi

It is clear that Nkomazi has been badly affected by drought. Both the Maguga and Driekoppies dams were only about one fifth full in April 2003, and, according to KOBWA, no releases from the dams were being made at the end of February 2004 (KOBWA-1). However, the lack of transparent and reliable figures makes it difficult to quantify the exact deficit in the Nkomazi area. DWAF puts the deficit at 149 million m^3/annum for the Crocodile Catchment; 6 million m^3/annum, for the Lower Komati (DWAF, 2004, pp.42,37). However, this figure takes into account the potential supply from the Maguga dam, although this dam has never been full and stood at only 20 percent capacity in late February 2004. Further, increases in primary water demand for the growing Nkomazi population mean that the deficit for the Lower Komati is probably nearer 40 million m^3/annum, as quoted in DWAF's National Water Resource Strategy in September 2003 (DWAF, 2003, p.23). South Africa's IncoMaputu Agreement with Mozambique allows some manoeuvre in times of drought and flood, and, in February 2004, the 2 m^3/second flow into Mozambique at Komatipoort was cut to 1 m^3/second, with DWAF contemplating a further cut to 0.7 m^3/second: "if we limit our own people, there must be restrictions across the border, too" (DWAF/M-1).

As a consequence of the drought, in 2003 and 2004 severe restrictions on irrigators had to be enforced, with commercial farmers' allocations cut by 65 percent, and emerging farmers' by 40 percent during 2003, the differential existing because DWAF deemed emerging farmers less able to cope with a reduced supply (DWAF, 2004b). Rising tensions between the two groups of farmers are fuelled by the deeply contested reasons for the water scarcity. DWAF, who ultimately controls the licences for new irrigation development, maintains "more water has been allocated than is available" and that the Nkomazi is "basically a closed catchment" (DWAF/M-2) in which no more water allocation licences will be granted (DWAF, 2004, p.39), and has even formally asked the DoA to withdraw their applications for water use licences to expand the NIEP (DWAF, 2003, p.39). DWAF states that 30 percent of the allocations from the Driekoppies and Maguga dams have been made to emerging farmers and that "efforts to reallocate the resource to emerging farmers should focus on other catchments" (DWAF, 2004, p.39). The DoA refutes DWAF's assertion that there is no more water available for the expansion of the NIEP scheme and believes DoA is still owed 11.7Mm^3/a from the agreement that Ka Ngwane negotiated with DWAF in 1992

over the construction of the Driekoppies dam (DoA-1). DWAF maintains that since the change in government, that agreement is "null and void", and that DWAF has had to change the irrigation allocation by reserving more water for primary use with a higher level of assurance (DoA-1). According to DWAF a "one off" allocation of 9,500 ha was made to the Ka Ngwane administration after the completion of the dam: this formed the basis for the NIEP scheme (DWAF/M-2). How much water was actually made available for the NIEP scheme is unclear, however, and this has implications for the further expansion of the programme.

However, the situation is exacerbated by what DWAF sees as unauthorised water use by commercial farmers, particularly in relation to the large number of farm dams of unknown storage capacity. Emerging farmers also are increasingly suspicious of commercial farmers' activities in drought periods. They ask TSB officers "Why is their sugar looking green and healthy?" (TSB-3). Many are unaware of the existence of farm dams and the inconspicuous drip irrigation. According to TSB, emerging farmers do not understand the difference between pumping volumes and pumping hours (TSB-3). However, TSB figures reveal that the increase in land under sugar (2,391 hectares out of a total increase of 2,964 ha in 2003) was by large-scale growers though no new licences were issued. A TSB official explained this was achieved because "undeveloped' water rights (previously allocated but unused) were taken up once assurance of supply risks were lessened by the construction of the two dams. DWAF, however, has already questioned the commercial farmers' rateable hectarage and contends that the Lomati IB's list of rateable areas does not correspond to past allocations made to commercial farmers. Faysse (2003:2) reports the disagreement could "concern up to 4,000ha". DWAF has identified Nkomazi as the site of a pilot compulsory licensing scheme, because it is a particularly water stressed area (DWAF/M-2), and has embarked on a process of verification of water use that will for the first time provide an inventory of on-farm water storage.

Intense competition for water means that water stealing by farmers is common during droughts, and the Irrigation Boards in the Nkomazi, in response to earlier droughts, have made considerable investments in infrastructure and management systems to prevent cases of farmers (commercial farmers) stealing water. The Komati IB invested R2 million in a radio-controlled system that automatically switches off farmers' pumps when they have operated for the permitted time. The IB Chairman says he is "one hundred percent convinced that there is no stealing by commercial farmers", and is now looking to expand

the control system to the NIEP emerging farmers because water stealing is an issue, because he claims he regularly finds sprinklers running all night (KIB-1). An earlier attempt by the IB to install WAMS on black smallholders' plots foundered when the equipment was washed away in the floods of 2000.

With IB membership in the Nkomazi expanding to include black farmers in the NIEP, the IB has identified a common threat to unite all farmers: the transfer of water out of the Upper Komati catchment to Eskom power stations for "strategic purposes" (a higher priority over irrigation water) "an artery high up is trapped before it gets to us" (KIB-1). Eskom supplies electricity to Botswana, Namibia, Southern Mozambique and Swaziland, and the Komati IB sees Eskom as "basically exporting our water". DWAF has responded by stating there needs to be clarity over Eskom's exact current and future water requirements, but the Komati IB intends to take up the issue of the Eskom transfer with the new CMA.

As "there is no additional water in the system" (DWAF/M-2), ways of improving the efficient use of the resource must be investigated if there are to be any further irrigation developments in the Nkomazi. TSB, who have a vested interest in supporting sugar cane production, challenge the perception that sugar is an inherently water inefficient crop. TSB maintains that it is only during January and February that sugar requires more water than citrus and believes that over-irrigation by 20 percent outside these critical two months accounts for most of the inefficiency (TSB-2). From observation in the Nkomazi it is clear that many emerging farmers are wasting water through evaporation by using inefficient overhead sprinklers in the middle of the day, and Faysse (2004, p.11) found that emerging farmers tend to over water in the early stages of cane development. It is widely reported that drip irrigation uses 30 percent less water than over-head sprinklers (Woodhouse and Hassan 1999, p.19), and the Komati IB Chairman claims commercial farmers are converting to drip irrigation as they can afford it. However, the high cost – converting 30ha would cost R25,000 (KIB-1) – means it is only worthwhile on large plots where economies of scale are valid (AC-1). Moreover, a switch to more efficient technology will not necessarily release more water for other users. A TSB manager suggests it is likely that farmers will simply increase the area under irrigated sugar to make the investment more cost effective (TSB-1). TSB also argue that the first step to achieving their own estates' recent increased productivity was to get the scheduling of irrigation right (TSB-2), implying that better management may be of more immediate importance for emerging farmers than increased investment in irrigation equipment. This highlights the lack of technical and managerial

experience of many emerging farmers now growing sugar in the Nkomazi, and which raise questions about the viability of the NIEP as a route to redistribute the benefits of water use.

Is Sugar a Viable Route out of Poverty for Africans in the Nkomazi?

There are discrepancies between reports of how much cane is contributed by small scale farmers. According to TSB, small growers accounted for 15 percent of total Nkomazi production in 2003, and 22 percent in 2003 (TSB delivery figures). Waalewijn's study (2002, p.50) indicated 41 percent of the cane at the Komatipoort Mill came from small growers, but this has been misinterpreted in other reports as referring to the output for the whole Nkomazi area.

Initially hailed as a success, many of the NIEP projects are currently struggling. The floods of 2000 had a devastating effect on Phase 1 of NIEP. Many of the pumps were out of action for 8 months with no contingency money to fall back on, and growers are still trying to recover. The Phiva project was one of the first NIEP Phase 2 (LRAD funded) 'Seven Projects' to be planted in August 2001. The former project Chairman felt that too much money went to consultant engineers who set up the scheme without involving the growers, who learnt nothing from the experience (Phiva-1). After operating for two and a half years the Phiva representatives conclude that "sugar is a deadly game" Phiva-1). Scheme members are losing enthusiasm and debts are mounting. Many have reduced their use of fertilisers to cut costs which affects yields. The Rural Action Committee (TRAC), an NGO working with rural black communities, suggest that there is evidence that, since the introduction in March 2003 of a minimum wage, illegal Mozambican workers are used by emerging farmers as cheap labour, rather than generating employment for local people (TRAC-1). These are indications that the redistribution and development goals of the NIEP scheme are not being met.

TSB's Grower Affairs Manager questions whether the most suitable people have been allocated plots, claiming 30 percent are not good farmers (TSB-2). According to a TSB Development Officer many of the NIEP scheme members are elderly and illiterate, and others are not committed to farming as a livelhood, but may be teachers or government officials who used their connections to join the scheme.

However, it seems training in technical and managerial skills is essential if sugar is to be used as a stepping stone out of poverty (Woodhouse and Hassan 1999, p.21). TSB has a strong interest in assisting farmers to make a success of cane growing and provides its own

extension service. The Small Grower Unit was established in 1994 with 5 sugar cane Development Officers and an Agricultural Specialist. There have been talks since 2000 to merge the service with the DoA's extension service since the overlap and conflicting advice is unsatisfactory. The DoA currently has 4 officers in the Nkomazi, but the quality of service is heavily criticised (TSB-3 and Phiva-1). Also both TSB and DoA advisory staff (seconded from South African Sugar Association), whose services are free, have a strong sugar industry bias, and may not be in the best position to provide generic managerial advice enabling farmers ultimately to diversify away from sugar. A private consultant believes that free advice is not valued or heeded: he himself offers a 5 year contract to teach farming and managerial skills to failing emerging farmers and believes that advice that is paid for will be respected (AC-1).

Are there Irrigated Alternatives to Sugar as a Route out of Poverty?

The planners of NIEP argued that a dependable income from sugar would enable emerging farmers to establish themselves and acquire management skills necessary to diversify into higher value crops, thereby promoting the goals of equity with efficiency. Woodhouse and Hassan (1999, p.19) questioned whether the NIEP scheme represented the most economically efficient use of an increasingly scarce resource (water), and interviews in 2004 suggested many small scale sugar growers were in crisis with some calling to diversify away from sugar: "let us divorce ourselves from sugar and go into vegetables" (Phiva-1). However, the 10 year agreement that farmers must sign with TSB prohibits emerging farmers from converting any of their land to other crops. TSB also argues that taking sugar out of production to grow vegetables/bananas/citrus would "flood the market" (TSB-2). Bananas, for example, are consumed locally within South Africa and demand is finite. Clearly, encouraging diversification is not in TSB's interests, unless the supply of cane increases in other quarters, and, if anything, sugar is becoming entrenched in the Nkomazi. There are undoubtedly advantages to the contract with TSB: it is claimed to be an appropriate length of time for people who know nothing of farming; and it provides technical support, security and access to loans (the contract acts as collateral), (DLA-1). On the negative side it hands a lot of power to TSB that may ultimately stifle diversification. One consultant believes, however, that the contract carries no legal weight and, ultimately, TSB are just as dependent on the growers (AC-1).

If this is the case, the main barrier to diversification is lack of a ready and secure market for other crops. Unlike commercial farmers, emerging farmers do not have the backing of long

established support structures and a 100 year-old union. The issue of scale is important too, so that cooperative organisational arrangements would have to be set up for small farmers to succeed (MAFU-1). Emerging farmers live away from their plots, and, unlike sugar, crop security could be a problem for fruit or vegetable crops (DoA-1). The stable income from sugar in normal circumstances is still attractive, bearing in mind the severe market instability experienced for citrus and other crops. There is therefore little evidence to indicate that diversification will occur in the near future, and TSB argues that there are possibilities for expanding the area under sugar that would not involve additional water licences. Farmers could exchange citrus or banana crops for sugar for example. It may be that the success of the NIEP as a mechanism for redistribution under a future Inkomati CMA will be determined by broader shifts in the international market for sugar. Current low prices are the result of EU and USA tariffs on imported sugar. If these were lifted, prices should rise and TSB could increase production, although Brazil and Australia could be in competition.

Conclusions

Nkomazi represents a politically important site of intense competition for water between existing and aspirant water users, and DWAF has made it clear that the Nkomazi will be one of the first areas to be subject to compulsory licences. DWAF's ISP identifies three options: trading with existing lawful users, reducing the assurance of supply to other users or development of the resource (more dams) to provide more water. The CMA is likely to be involved in reviewing the water issue in the Nkomazi area and the composition of the Governing Board could have implications for who gains a licence to irrigate in the Nkomazi and as a result the future direction of the NIEP programme.

The Nkomazi offers an insight into the complexity of reforming existing water use within a legal framework. Entrenched water use patterns can be very resistant to change and require not only institutional reform, but also commitment to address technical and market structures that reinforce existing differential use of water. The intense competition for water between existing and aspirant water users presents a major challenge to achieving appropriate representation of competing interests on the CMA. Furthermore the strong asymmetry of information and expertise between different stakeholders severely compromises the redistributive prospects of devolved water allocation by a CMA. The role of central (DWAF) agency is evidently important in ensuring greater transparency of information, as in the verification of water use exercise now under way in the Nkomazi. The Nkomazi case also demonstrates that there may be technical areas, such as farm

management, in which state agencies' competence lags behind that of the commercial sector. It also seems clear that the existing process of land allocation through tribal authorities may not result in the most productive use of irrigation. This situation seems unlikely to be improved, and may be exacerbated, by the recent promulgation of the Communal Land Rights bill, which effectively gives chiefs more control over land allocation in former homeland areas.

A Dam for the Gutshwa River, Nsikasi Area

The second case-study looks at the proposed dam for the Gutshwa River, Nsikasi, in the former homeland area of Ka Ngwane, bordered on the East by the KNP and on the West by white commercial farming. Certain key objectives of the 1998 National Water Act are highlighted in this study area, namely: meeting basic human needs of present and future generations; promoting equitable access to water; redressing the results of past racial discrimination.

A meeting was convened at Malekutu with representation from two local farmers' associations, from the Malekutu community, and teachers from a local school. Communities in the area are "crying out for the dam" (FA-1). Local government (DWAF and DoA) plans are for a dam to develop agriculture (socio-economic). Local communities would like to see the dam built in order to augment primary water supplies too. The construction plans for the dam date back to 1989. The view was expressed at the meeting that the dam would go some way to redress the historical investment imbalance. Under apartheid, "the whites were given more opportunities", having bore holes and dams constructed for them. Yet after 10 years of democracy, there is no change, and farmers in the Gutshwa area are understandably frustrated. The Nkomazi area, on the other hand, is more fortunate because it is the location of two new dams and the NIEP development scheme. The presence of a powerful industrial concern in the area, TSB, who champion the programme, is also significant. There is a clear imbalance of opportunity according to location.

Rain-fed agriculture is practised in this area. Recent drought conditions have focused attention on the need for the dam: farmers decided against planting this season because of past experiences of drought. The DoA, local Government, the Executive Mayor of Nelspruit and the Tribal Authority all support the dam, but it is "still an issue". The problem is finance, projected to cost R121 million, and the DoA believes that the Provincial Government needs to budget for the dam (DoA-1). The KNP did for a time express concern over the dam

because it was feared it would interfere with the natural flow of the Nsikasi River (running due south just inside the Western boundary of the KNP) with possible adverse effects on wildlife. The KNP is now more willing to cooperate since it realises a dam would actually improve sediment levels and water balance within the park (DoA-1).

The vision of the DoA Research and Technical Directorate is for the area to grow high value crops for export e.g. strawberries, flowers and salad crops. Sugar is not an option because Gutshwa is too distant from the TSB mills (DoA-1). The farmers recognise that they would require assistance with cultivating irrigated crops (their experience is with rain fed crops) and with marketing, and it would fall to the DoA and its extension officers to provide this. However, those present at the meeting were highly critical of the assistance they had received from DoA extension officers to date. They felt the standard of technical assistance on offer was unsatisfactory, and corruption was hinted at, one instance being the "disappearance" of forms for the year 2000 flood compensation: farmers still await their claims, despite filling in the forms twice (FA-1). A lack of trust prevails.

For those at the farmers' meeting, the dam at Gutshwa is not simply for agriculture – they are looking to the dam to supplement domestic water supplies. At the present time untreated river water is for many their source of water for domestic use. Treated water is available once a week for a one hour period at Kabokwane, 10Km away. Transporting and storing a week's supply is difficult. Mbombela Municipality was scheduled to take over from DWAF in July 2003 the responsibility of providing water services to the Northern Nsikasi. However, the infrastructure was in such a poor state that the change-over will now be June 2005 after a R60 million investment by DWAF to upgrade, insisted upon by Mbombela. Malekutu is at the end of a supply line, and water rarely reaches the end of the line. The Municipality built 15 bore holes in December 2003 but found that only 4 were usable. They are forced to resort to water tanker "jojos", but stealing and vandalism cause problems (MM-1).

DWAF recognises that the dam is important, and a priority to the communities in the area. However, a discussion with a DWAF Mpumalanga official suggested that the dam was unlikely to be constructed in the near future, because plans for the dam (agricultural use) place it in the "socio-economic" category. DWAF is "not motivated because it <the dam> will not cater for the water services side", which is the priority. DWAF sees its role as looking at the whole WMA and deciding where to use its limited resources to benefit as many people

as possible (DWAF/M-1). Competing demands for water infrastructure development mean difficult and often unpopular decisions have to be made. This role will eventually be taken over by the CMA, who may have a different set of priorities.

The close proximity of the KNP to communities living in this former homeland area adds another dynamic to this case study. The KNP admitted that relations needed improving, and to this end it established the Social Ecology Unit in 1994 (renamed People and Conservation). The Unit has two objectives; first to develop strategies that will allow local people to benefit from the park, for example the sale of curios at the gates to the KNP. The second is environmental education. The Western border of the park has been divided into 46 units and each is meant to have a Social Ecologist. The impact of the unit is very limited, however, partly due to staff shortages (around 50 percent), and because it does not work with the whole community, rather with what it terms "interested and affected" groups. None of the farmers or community members at the meeting in Malekutu had heard of the Social Ecology Unit. The reason for this is that the unit believes that "farming and conservation are two different land use patterns" (KNP-2). The communities in the Malekutu area currently have no relationship with the KNP.

This case study exemplifies the fractured institutional framework for rural groups in areas which, unlike the Nkomazi area, are not the object of development by large-scale commercial enterprise. Key challenges a CMA needs to overcome are the way integrated catchment management agendas may be obscured by individual agencies' commitment to particular priorities, such as 'conservation' or 'agriculture', and lack of communication between agencies reinforcing a sense that these priorities are mutually exclusive, rather than potentially complementary. Above all, the case illustrates the obstacles to more remote rural communities getting their concerns heard.

Proposed Expansion to Sappi Kraft Paper Mill, Ngodwana

Sappi Kraft Paper Mill, situated at Ngodwana 50 Km from Nelspruit in the Elands Valley, has been operating since 1966. The mill, one of the largest in South Africa, recently submitted a proposal to expand production by 69 percent, simultaneously improving environmental performance (Golder Associates, 2003, p.1). Apart from the expansion scheme, Sappi Kraft is involved in a Reserve Determination scheme for the Elands River, and an Integrated Water Management Plan (IWMP) jointly with DWAF. The company's literature gives the impression that the expansion programme will improve the environmental performance of

the mill when, in fact, the improvement of the mill's environmental record is a condition of its licence from DWAF.

At Ngodwana large-scale industrial interests are in conflict with environmental concerns. Stakeholder participation lies at the heart of the National Water Act, and the case study illustrates how a motivated, organised and articulate set of stakeholders can present effective opposition to the expansion plans of a large company with important local economic impact. The case has resulted in a full Environmental Impact Assessment (EIA), currently under way in line with the 1997 Environment and Conservation Act (Golder Associates, 2003, p.1), that will to be submitted to the Department of the Environment for final decision over the project. All stages of the EIA are made available for public review, and a leading environmental stakeholder, the Elands Valley Conservancy, was "happy" with the level of consultation, and felt that the EIA contractor, Golder Associates, "really tried to be unbiased" (EC-1).

Table 3.

Date	Activity at the Sappi Kraft	DWAF
1963		DWAF grants a water use permit
1966	Mill commissioned	
1967	Irrigation of effluent (1 million litres per day) commences	
1972	Irrigation area extended to 50 hectares (current fields)	
1978	Sappi applies for effluent permit for the irrigation of 1 million litres per day over 53 hectares	DWAF grants a water effluent permit
1981	Sappi requests a permit to irrigate high-chloride effluent, stating it will be a temporary measure, and alternatives are being researched. Construction began for a major expansion at the Mill	
1982	At the request of DWAF, Sappi conducts 2 year study into chloride effluent. Results indicated that as long as the effluent was limited to colluvial soils, it would take several years for chloride to reach the Elands River.	
1984	Irrigation of high chloride effluent begins.	
1985	Monitoring of effluent volumes and quality starts	
1987	Sappi applies for effluent permit.	
1988	Chloride first detected in the Elands River	DWAF issues an effluent irrigation permit.
1989		DWAF indicates that Sappi should aim to irrigate less than 15 Ml/d by 1991, that chloride should be removed by August 1989 and requests action plan. DWAF replies to permit application made in 1981.
1990	Soil survey reveals that soils are unsuitable for further irrigation	
1992	Study reveals that irrigation area is hydraulically overloaded. Sappi determines that DWAF's suggestion is not feasible.	DWAF states that irrigation is a temporary solution, requests a management plan, EIA and geo-hydrological investigation. Indicates that pump, store and release option is accepted
1993	Sappi develops Geohydrological mode to predict chloride, sodium and sulphate ingress rates. Investigates feasibility of using Braam Raubenheimer dam to dilute pollutants. Re-investigates pump, store and release option and effects of ozone bleaching on the chloride levels in the Crocodile River. Results presented to DWAF.	DWAF indicates that a new permit will not be issued unless Sappi commits to implementing ozone bleaching.
1994	Investigation reveals that irrigation fields are able to sustain vegetation for the next 15 years. Sappi commits to R80 million for the installation of ozone bleaching. Several studies into effluent irrigation are conducted at DWAF's request.	DWAF requests second opinion on geohydrological model. States that ozone bleaching must be commissioned by December 1995. DWAF indicates that irrigation is a temporary solution.
1995	Sappi commits to spending R0.5 per year for the next 3 years on effluent reduction research.	DWAF submits draft permit for discussion. Re-iterates that irrigation must be phased out and requests a programme. Sappi is given 2 years to implement programme and is told that "unaffordability" will not be accepted as a reason.
1996	Ozone bleaching commissioned at the mill. Was not utilised to its full capacity due to technical and operation problems	DWAF issues permit for irrigation valid until September 2000
1997	Study conducted to determine feasibility of diluting Elands/Crocodile rivers by releasing water from Ngodwana dam. Shown to be only feasible for short periods and not in times of drought.	
1998	Sappi initiates IWMP process in order to provide the basis for a water licence.	
2000		DWAF issues licence valid for one year from September 2000.
2001	Sappi applies for a new water licence in terms of the National Water Act.	
2002	Proposed completion of IWMP - October 2003	
2003	Scoping Phase of EIA for mill expansion proposal.	DWAF states that the irrigation practice should be phased out over time (50 percent by 2006 and 100 percent before 2010).

Sappi Kraft was unable to provide information for this case study ("a sensitive time for the mill" according to the Communications Officer), which therefore relies on secondary data drawn from the Draft EIA Scoping Report (Golder Associates, 2003), as well as interviews with a member of the Elands Valley Conservancy (UN), the Chairman of the Elands Valley Irrigation Board and Sappi Forest Products' Safety, Health, Environment and Quality Manager. The first part of the case study deals with stakeholder concerns related to the mill's current operations, the second section looks at foreseeable problems linked to the expansion.

Ngodwana Mill's Current Operations

The mill is an indirect user of water because the majority of the pine and eucalyptus it processes is grown in the Inkomati WMA, and a direct user in that chloride pollution is seeping into the Elands River. As outlined in Section 1 under the 1998 Act, the definition of water use has been widened to include any activity that results in a deterioration of the water resource (e.g. effluent disposal) or the reduction of stream flow (e.g. forest plantations).

Air quality, of concern to stakeholders, and focusing mainly on odour from the stacks, is a source of discomfort and health concerns to residents and also a threat to the tourist industry (the N4 is the main tourist route from Pretoria/Johannesburg to Nelspruit), (Golder Associates, 2003, p.4). The odour issue is outside the sphere of DWAF and the National Water Act and as such it is not considered here.

The issue of water quality fielded the greatest number of concerns (25) in the Issues and Response section of the Scoping Report. Since the late 1960's, chloride effluent from processing has saturated the irrigated fields and entered the Elands River (1988) via the underlying aquifers, affecting downstream users of water. The Scoping Report suggests the Mill's environmental record could be worse: Sappi has commissioned research into alternative procedures and has made investments into ozone bleaching technology. A "Best Practice Review" (part of the IWMP process) found that at Sappi, up to 60 percent less water was used and considerably less effluent produced than in comparably aged mills. However, a mill using current Best Available Technology would outperform Sappi on both fronts (Golder Associates, 2003, pp.8-10). The responses by Sappi to the environmental concerns could be interpreted as gestures to secure effluent renewal permits from DWAF.

The record of DWAF in regulating the effluent from the mill has come under criticism. Table 3 provides an overview of DWAF's involvement. Scientific studies predicted that the effluent fields would reach saturation point within 10 years. Following the 1984 expansion of the mill DWAF issued a 10 year permit, at the end of which other arrangements for the disposal of effluent were to be made (Golder Associates, 2003, p.7). William Sutton, of Elandshoek Community, complained of three five year extensions: "It is a major concern that a 10 year permit has been extended to 25 years" (Golder Associates, 2003, p.13). Paul Herbts of DWAF Pretoria defends DWAF's record: "DWAF is consistently urging Sappi to phase out irrigation" (page 14), but records indicate ultimatums have not been enforced. Dr Simon Evered of WESSA supports DWAF's condition for the new licence (50 percent reduction of irrigation by 2005 and the practice ceasing by 2010) "with the trust that DWAF would not alter their position in this regard" (Golder Associates, 2003, p.14). An atmosphere of distrust prevails among stakeholders because of broken earlier assurances. The promise made in 1964 to the local community that "not one drop of effluent would be discharged to the river", (Richard Spoor) has not been kept. Environmental interest groups voiced criticisms: Philip Owen of Geasphere wanted to know "why no solution has been forthcoming if the irrigation pastures have reached saturation point decades ago and the chemicals have been leaching ever since" (ibid, p.12). WESSA also expressed concern over hazardous (carcinogenic) organochlorides and Mrs Mary Lebotsky (Mount Carmel Conservancy) drew attention to river pH levels (ibid, p.8). Farmers in the Elands Valley are troubled by chloride pollution issues – the Meklers of Camperdown Farm growing avocados, and the Lowveld Tobacco Growers Association, (ibid: 7). Mr Richard Spoor (lawyer) accuses Sappi of wielding its economic and political influence "to the disadvantage of the local people and the environment" (ibid, p.20).

The Proposed Expansion[5]

One of the aims of the 1998 National Water Act was to facilitate economic development, and, according to Sappi, expansion would enable the company to remain globally competitive and economically viable in the future. However, the most up-to-date technology would not reduce the amount of water used or effluent irrigation generated: rather, more pulp would be produced more efficiently in terms of water use and effluent generation. According to Forestry South Africa (the NGO representing commercial forestry concerns in South Africa), which is supportive of the expansion programme, the "No-go alternative" would result in no updating, and an outdated, inefficient plant.

An important part of the proposal is the conversion of 25,000 ha of pine in Mpumpalanga Province to eucalyptus by 2020 (Golder Associates, 2003, p.15). This has met with fierce criticism. According to the SHEQ Manager this would not necessarily involve new plantations; rather, using eucalyptus that is around but surplus to current requirements, or alternatively switching back to planting eucalyptus in areas originally licensed for eucalyptus but planted in pine (this would need to be approved by DWAF). An advantage of switching to eucalyptus would be a reduction of solid waste produced by the mill. Disadvantages are that eucalyptus "are more extravagant water users in an already stressed area" (Geasphere), and "the possible decrease in water run-off from the catchment" (Mr Herbert Naumann, Elands Valley Conservancy).

Other concerns related to the expansion of the mill are expressed by Tony Hall of Houtbosloop Environmental Action Link, Schagen; who predicts "increased use of water resources and general degradation of the environment". Farming interests noted the increased pollution after the 1984 expansion and expect the same outcome despite assurances to the contrary (The Mecklers of Camperdown Farm). They believe that as Sappi is a multi-national operation it has "ample funds to clean up their operations once and for all" (page 19, Issues and Response Report). Mrs Naumann of the Elands Valley Conservancy ("We are involved in all initiatives") points out that the Mill is forced to make environmental improvements, regardless of the expansion, in order to obtain a new licence, (EC-1).

The social benefits of the Mill expansion are limited. Several stakeholders (Philip Owen of Geasphere and Tony Hall of Environmental Action Link) are critical that the Sappi expansion will not create any new permanent employment opportunities at the Mill: the workforce will remain at its current level. Sappi suggests that it is possible that new jobs in the plantations could arise (page 29, Issues and Response Report).

The Issues and Response Report indicates that the stakeholder response was comprehensive and powerful. Because of new legislation (1997 Environment and Conservation Act), stakeholder views have to be included and responded to. Sappi, put on the defensive, has been forced to go for a full EIA because of the criticisms made. The EIA process could take up to two years and MDACE is "seriously under resourced" with only 6 officials who are involved in the EIA process for the whole province (DoE-1). Sappi's SHEQ

Manager said he "doubts that the expansion will happen", (SF-1) and the Elands Conservancy thinks "it could go either way" (EC-1).

This case study provides an example where stakeholders have actively participated in a decision-making process, as laid down by a new piece of environmental legislation. The case study also raises questions over DWAF's capacity to regulate large industrial interests that have implications for its future role in regulating the activities of CMAs and WUAs.

KEY ISSUES OF TRANSFORMATION

The CMA Process

The Inkomati CMA was formally launched on 30th March 2004. This study suggests a number of issues relating to the establishment of the CMA that affect its operations and ultimately the achievement of the goals of the legislative reform. Key among these issues is the institutional capacity to carry forward the process of reform, and the obstacles and opportunities for recruiting stakeholders to support it. We will first review the process by which the Inkomati CMA has been established, and then identify a number of key challenges.

As Figure 1 indicates, the engagement of stakeholders in the CMA proposal process began before the 1998 Water Act was promulgated, seven years ago. The reference group (representatives from the three catchment forums) finalised their proposal and submitted it to DWAF in Sept 2000, since when the reference group has not met and there has been little activity. The time that has elapsed and seeming lack of progress in actually establishing the CMA is of concern to many of the stakeholders, and it is recognised by DWAF's Institutional Oversight Directorate in Pretoria that initially it was "too optimistic" in believing that the Act could be implemented quickly (DWAF/P-2). The 1998 Act did not specify any criteria to evaluate CMA proposals and as a result the Inkomati proposal was shelved for 18 months.

Figure 1 - Timeline of Inkomati CMA Process (to scale).

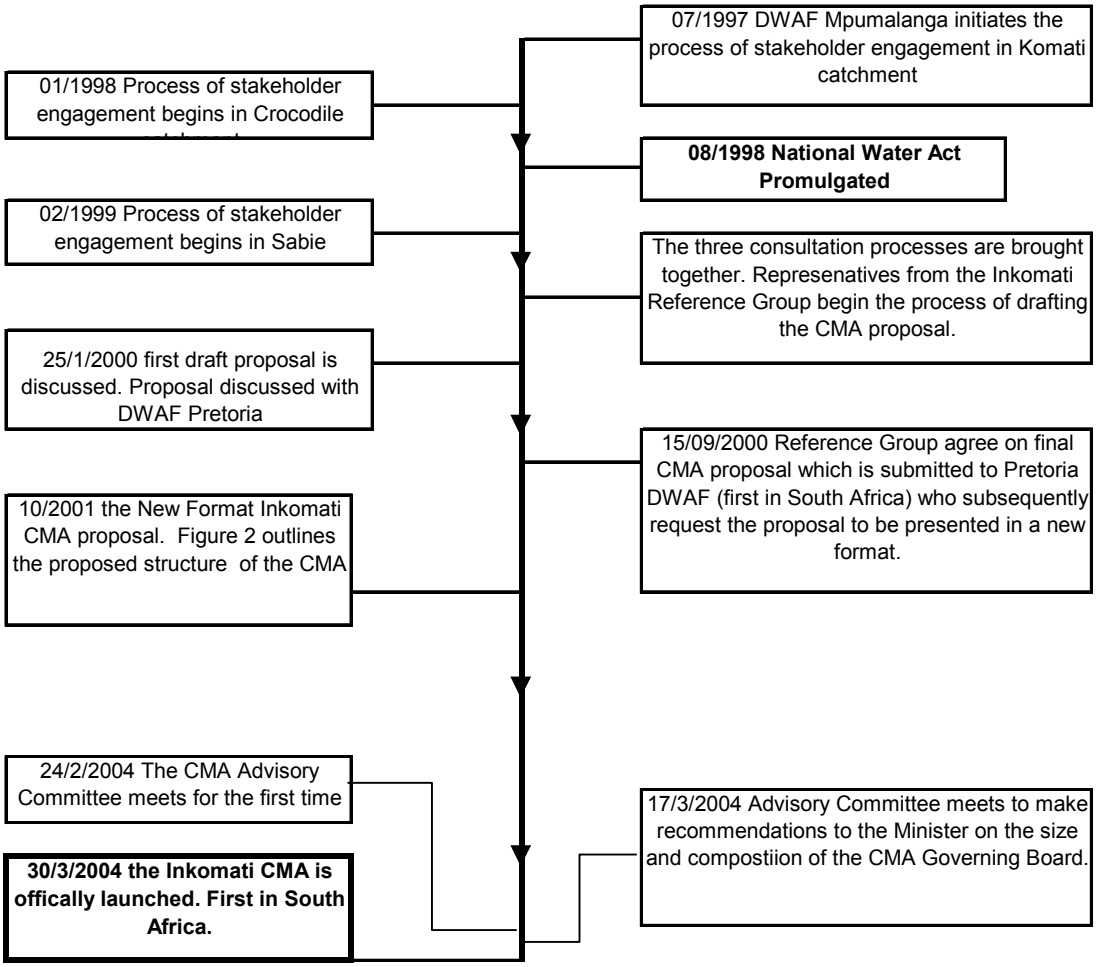
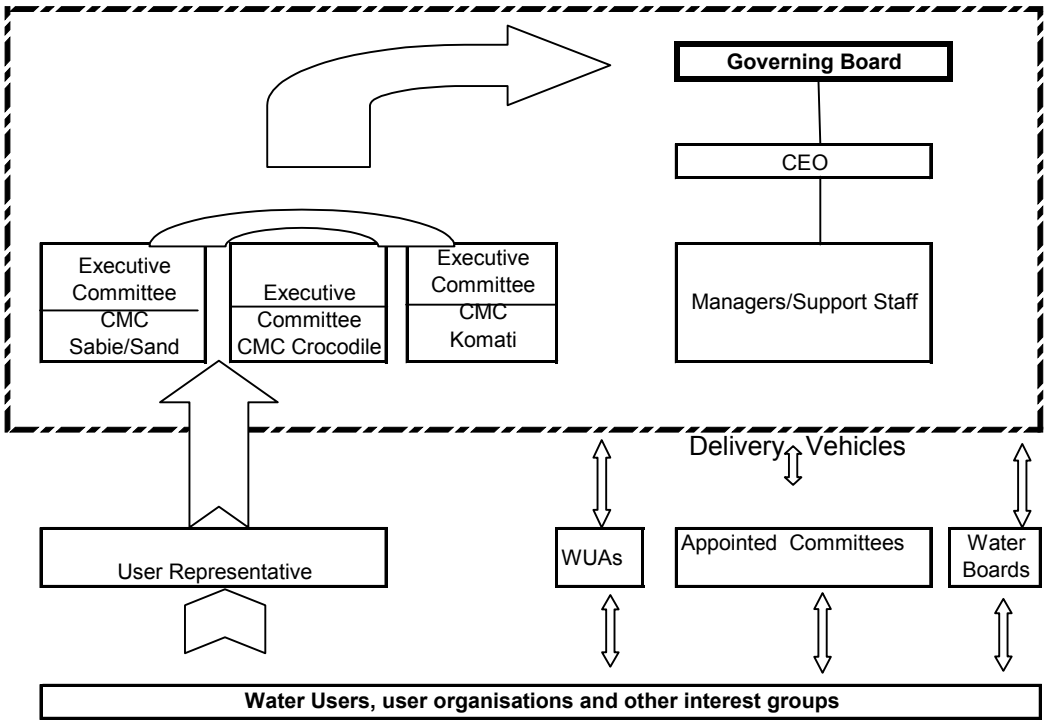


Figure 2 - Proposed CMA structure (surrounded by box). As outlined in the Proposal.



DWAF Mpumalanga's Chief Engineer (Water Resources Directorate) believes that DWAF "should not have tackled the Inkomati first" because it is the "most controversial" and complicated WMA in South Africa. This challenge was compounded by the severe shortage of DWAF personnel at regional level, let alone any with experience of institutional change. In the event, the Water Quality Directorate Deputy Director championed the CMA proposal process, making extensive use of external consultants to facilitate the institutional process (Woodhouse and Hassan, 1999, p.34).

However, when she relocated to DWAF Pretoria, her role was not taken on by the remaining staff: the Water Resources Director felt that with his engineering background, the institutional side was outside his personal experience; he would have felt "uncomfortable" driving the process (DWAF/M-2). As a result, a lot of CMA institutional memory was lost and a vacuum created in the regional office that has yet to be filled. After more than two years, activity to establish the Inkomati CMA gained momentum in early 2004 when an Institutional Oversight Manager was appointed at DWAF. It was suggested in one interview that the timing reflected a concern to see at least one CMA established before the 2004 general election. The Advisory Committee met for the first time in late February 2004 and the Inkomati CMA was officially launched on 30th March 2004. At the time of fieldwork, DWAF announced plans to establish a further three CMAs in quick succession over the next two years. Following the election, however, it is not clear what the perspective of the new Minister is and whether there could be a change of emphasis.

The loss of impetus during 2002 and 2003 meant the continuous dialogue with stakeholders on the CMA process ceased, and the forums and reference group fell apart. In the interim, many stakeholder contact details have changed and several representatives, particularly in industry, have left the area. This created difficulties when trying to re-engage the stakeholders. DWAF's experience for other WMAs is that a forum that is formed around the CMA proposal tends to fall away once the objective is achieved, whereas a forum that is formed to address a more locally important issue, and which subsequently works on the CMA proposal, is more likely to continue. The dissipation of public awareness (already weak) of the CMA in the Inkomati WMA presents serious problems for involving stakeholders in further steps, of which the most immediately important is public consultation on the Catchment Management Strategy. The findings of this study are supported by the results of a recent survey of awareness of the Inkomati WMA and the CMA commissioned by DWAF (Q&A, 2004). Thirteen focus groups, of which ten were from black urban or rural

populations, were undertaken in the WMA, each with 6-8 respondents. Without exception, respondents in all groups had no idea what a CMA or CMS is. Nor was there awareness of the forums and consultative opportunities established by DWAF (Q&A, 2004, p.40).

Black Representation on the CMA

DWAF recognises that achieving fair and balanced stakeholder representation and involvement is difficult in the Inkomati WMA because of the presence of powerful stakeholders (controlling interests): commercial farmers and their Irrigation Boards, industry (Sappi Kraft and TSB), commercial forestry and environmental groups (the KNP in particular), and the likelihood of their domination. DWAF therefore sees its role in the Inkomati as that of "honest broker" to ensure the "playing fields are levelled" (DWAF/P-2). Woodhouse and Hassan noted that during the early consultation process (1999, p.35) in the Komati and Crocodile catchments, DWAF achieved wider black representation in consultation meetings than had initially been the case in catchment forums. However, despite DWAF's attempt to act as 'honest broker' and encourage black representatives to attend CMA consultation meetings, awareness has seemingly not been disseminated among the black constituent population. Even emerging farmers interviewed as part of this study had virtually no knowledge of the CMA and the consultation process, although there are differences in awareness according to location. In the Nkomazi, emerging sugar farmers are involved with Irrigation Boards and have learnt something of the situation. This was confirmed in discussions with representatives of the Phiva Irrigation Scheme who "learn what little they do about the CMA process from the Irrigation Board" (Komati), (Phiva-1). Farmers and community members in the Gutshwa case study knew nothing about the CMA. The long interval since the CMA consultation process may be a contributing factor, but the evident low level of awareness among the black population raises questions over the legitimacy of the CMA as an organisation that represents the interests of all water users in the area.

There is also recognition that effective representation is not achieved simply by black stakeholders being physically present in meetings. Rather, it is achieved through their active involvement in discussions. Waalwijn (2002) has claimed that effectiveness of black representatives on IBs is constrained because their mandates are often unclear. In addition, greater understanding of water resource management issues, as well as quantitative knowledge of the resource, puts commercial farmers and to some extent environmental groups in a stronger negotiation position vis a vis black emerging farmers. Although emerging sugar cane farmers in the Nkomazi have acquired more experience of water

management than rain-fed farmers in the Gutshwa case study, a Lomati IB representative admitted that a lack of technical understanding hindered their full participation in the board's meetings (LIB-1). Therefore, and despite the Chairman of the CMA Advisory Committee being a black MAFU official, the question of black representation remains a concern.

In these circumstances black representation is to an extent upheld not by local black stakeholders, but by NGOs like AWARD, or government agencies who are closely involved in issues that affect black communities. In addition to DWAF itself, these include Department of Land affairs (DLA), and the elected local (municipal) government. The Gutshwa Dam case study suggests that one potential problem with this type of proxy representation is that black communities' needs can become filtered through the particular sectoral agenda of the agency representing them, when what is needed is cross-sectoral analysis and dialogue. The DLA has only recently acknowledged that the "problem of water is a concern for land reform" (DLA-1). As the Nkomazi case-study illustrates, DWAF's decision to stop issuing licences for irrigation is having an impact because it is difficult to "improve livelihoods without water" and the water issue is slowing the land redistribution programme (DLA-2). Yet despite this, the DLA was absent from the CMA consultation process until January 1999, (Woodhouse and Hassan, 1999:36). While it is now recognised that DLA was not "as active as it should have been", and the new (January 2003) DLA Deputy Director for Policy Implementation and Support for Mpumalanga has "registered with DWAF" to be involved in future CMA developments (DLA-1), it remains to be seen how effective the representation of black land issues will be in the new CMA.

As outlined in section 2, municipal government has taken over from DWAF the water services role. The Nsikasi case study illustrates the supply of primary water remains an urgent priority in the former homeland areas, and the water services and water resource management functions are closely linked. However, research for DWAF has highlighted serious concerns by many users over their local government representatives (Q&A, 2004, p.14), who have to date had little involvement with the CMA process, from whom ultimately water supplies will be obtained. The role of Local Government was discussed at the second Advisory Committee meeting (17th March 2004), which agreed, in line with the requirements of the 1998 NWA, to take steps to ensure Local Government representation on the CMA governing board.

Transformation of Irrigation Boards

This section will focus on WUAs that come about as the result of the transformation of existing organisations, in this case Irrigation Boards (IBs). All 27 IBs in the Inkomati WMA submitted proposals to transform into WUAs during 1999/2000, and all were rejected by DWAF, on the grounds that they were insufficiently representative of different water users. Currently there are no WUAs approved in the area, and the process of formulating proposals is raising questions about how such organisations are conceptualised within the new legislation. While it is not disputed that IBs have previously been the preserve of white commercial farmers, the process of transforming them into more inclusive WUAs needs to recognise the important differences in the powers exercised by different IBs and the ways these differences inform the type of transition to be achieved. This study interviewed members of seven IBs (Table 1 and Table 4) to obtain their views of the proposed transformation to WUAs. An important difference between IBs is whether, under earlier (1956) legislation they were within a Government Water Control Area (GWCA). Within such areas the state asserted control over all water abstractions, generally delegating management to a local agency – in this instance the local IB. Therefore, the Crocodile (CMIB), Komati (KIB) and Lomati (LIB) Irrigation Boards had delegated powers to control all water abstraction from the rivers under their jurisdiction. In the case of rivers not within a GWCA, the powers of an IBs were limited to those decided by its members, and did not extend to water users who were not members, even though drawing water from the same river (Woodhouse, 1995). This distinction has a perceptible influence upon the expectations that different IBs have of their role following transformation to WUAs.

Table 4. Irrigation Boards interviewed on transformation to WUAs.

Catchment	Irrigation Board	Government Water Control Area (1956 Water Act)
Sabie	Sabie Valley Irrigation Board (SVIB)	No
	White Waters /Burgers Hall Irrigation Board (BHIB)	No
Crocodile	Elands Valley Irrigation Board (EVIB)	No
	White River Valley Conservation Board (WRVCB)	No
	Crocodile Main Irrigation Board (CMIB)	Yes
Komati	Komati Irrigation Board (KIB)	Yes
	Lomati Irrigation Board (LIB)	Yes

The *Sabie Valley Irrigation Board* (SVIB) manages a canal owned and run by 61 farmer members. The canal also supplies primary water to Hazyview town, and Mbombela

municipality has a representative sitting on the SVIB board. The municipality feels it has a "very good relationship" with the SVIB (MM-2). The SVIB Chairman feels the IB membership is already diverse and "quite well represented" (SVIB-1). The SVIB does not fall within a GWCA and as a result not all local farmers are members of the IB. Some fifty farmers, known as "River Farmers" because they pump water directly from the Sabie River, until recently (1999) had no contact with the SVIB. DWAF has stipulated that the SVIB has to collect the Water Resource Management Charge from all farmers in the Sabie valley. Despite concerns that it does not have the powers to force the River Farmers to pay the charge (SVIB-1), SVIB used contingency canal repair money to fund a new constitution that would see it transform into a WUA. At the time the SVIB thought that transformation meant they had to "get the river farmers involved" and it was "basically a change of name". DWAF rejected the proposal for failing to embrace emerging farmers outside Hazyview. SVIB feels "it was not made clear [they would] have to include the others". Overall the SVIB is "Quite unhappy about the whole set-up" because they now have to "accommodate people who have no interest in the canal", (SVIB-1). SVIB feels that transformation has been pushed onto them and they are receiving no backing from DWAF. The most serious transformation issue, however, is that since they understand that it is not compulsory to join a WUA, and can see no incentive for water users to do so ("why should you join because if you join you have to pay money"), SVIB are concerned: "What hold have we to collect the levy?" (WUA charges and WRM charge), (SVIB-1).

The *White Waters Main Irrigation Board* owns and operates the Da Gama dam and supplies water to the minor boards such as the Burgers Hall Irrigation Board (BHIB). BHIB only supplies water to its 66 irrigation members. There is also a land claim group of emerging farmers (who own seven farms) in the area, who currently have one representative on the BHIB. There are several land claims in the area, so potentially, the number of emerging farmers could increase. BHIB "made a few proposals [to transform] but all have been rejected" by DWAF who felt they were not representative enough. The IB has "no problem" including land claim emerging farmers, but they feel DWAF wants the BHIB to include "outsiders that are nothing to do with the Irrigation Board". They face the dilemma "who do you invite to join who have our interests at heart?" The members of the BHIB see themselves primarily as farmers, and do not want to deal with the transformation issue (BHIB-1).

Both the *Elands Valley Irrigation Board* (the EVIB) and the *White River Valley Conservation Board* (WRVCB), in the Crocodile catchment, have submitted WUA proposals that were rejected by DWAF on the grounds of insufficient participation and representation of emerging farmers and disadvantaged communities. The EVIB insists that emerging farmers could not be included because none exists in the area, but is now working on a new proposal for a 16-sector WUA: "total coverage that leaves nobody out", and a one-sector-one-vote arrangement will be applied. The EVIB voices concern over funding, however: larger users may have to pay more and thus feel they have more right to dominate, (EVIB-1). The WRVCB insists there are no disadvantaged communities in the area, and no townships that draw water from the dams they operate. The WRVCB and DWAF are at an impasse over this issue. There are municipality (Mbombela) representatives on the WRVCB because water is supplied to White River town. However, despite dominating the upper catchment, commercial forestry companies "don't participate" in discussions on the transformation and establishment of a WUA (WRVCB-1), and there is a lot of friction, especially in drought periods, between IBs in the area and the forestry companies.

The *Crocodile Main Irrigation Board* (CMIB), in the Lower Crocodile (Nkomazi) currently has no emerging farmer members and the meetings are held in Afrikaans. CMIB submitted a proposal and had meetings with DWAF but then "pulled back" their proposal after they gained a better understanding of the Act and its intentions. The CMIB now believes that the process of transforming IBs into WUAs is flawed because it expects IBs to go out to all the sectors to make them part of the process. The CMIB believes it is unfair to ask IBs to transform and to manage the process. If the IBs led the WUA establishment, other sectors/stakeholders would view it as "just a name change – still the same people running the show" (CMIB-1). On the other hand the CMIB sees transformation to the WUA resulting in a loss of control over water use in its area. Under the 1956 Act the IB had powers and responsibilities delegated to it under the GWCA, which it sees as being diminished because WUA is a "completely different animal. It is an association of sectors or groups that have common interests". The key objection is that members are free to be associated to the WUA or not (CMIB-1).

The *Komati Irrigation Board* (KIB) and *Lomati Irrigation Board* (LIB) are also in a Government Water Control Area, where it is compulsory for irrigators to be members of an IB. As the Nkomazi is the site of the NIEP development scheme the two IBs have the highest proportion of emerging farmer members in the Inkomati WMA. Half the LIB is made

up of emerging sugar farmers who receive a transport allowance to attend meetings and are exempt from capital repayments for equipment. The vice-chairman of the KIB is a black farmer and the meetings are held in English and SiSwati. Waalwijn (2004, pers. comm.) observes that, up to 2001, important issues were mostly discussed 'before or after the meeting, in Afrikaans', but the KIB Chairman is adamant that emerging farmers are not merely spectators at the meetings, rather "they take part fully" (KIB-1). Similarly the former Chairman of the LIB suggests emerging farmers have "as much to say as anyone else" though he admits that they are at a disadvantage: "technically it is very difficult for them to understand" (LIB-1).

Both the KIB and LIB submitted proposals, two in the case of LIB (1999 and 2000). In this situation emerging farmer representation is not at issue, but the proposals were rejected by DWAF because it was felt that the consultation process had not achieved adequate integration of non-farming interests. The KIB maintains it was difficult to get other sectors to attend transformation meetings: representatives of vegetable farmers did not attend "because they are using water and not paying for it" (KIB-1); the Nkomazi Municipality was "not interested" (LIB-1). For their part, the Municipality suggests that relations with the IBs have been less than harmonious because they feel that commercial farmers take too much water. Municipal representatives felt they "did not have much time[6] to comment on the IB proposal" (MM-1). The LIB believes that WUAs are "the right idea" but feels that the 1998 Act "has shortcomings" because the functions of IBs do not match that of a WUA. Again, a voluntary basis for WUA membership is seen as a problem (LIB-1).

DWAF, particularly the Mpumalanga office, is aware of the concerns that IBs have over transforming into WUAs, and following a meeting with IB representatives in May 2003, Mpumalanga Water Resources Management Directorate concluded that the IBs have "really valid concerns", that they are not resisting transforming into WUA, but are "uncomfortable over what is expected of them" and that it is "too easy [for DWAF Pretoria] to say they are holding onto the past" (DWAF/M-2). DWAF has come under considerable pressure from IBs and Agri SA (commercial farmers' union) to reconsider the transformation issue, and has established a National Steering Committee to rekindle the WUA process. The Committee is considering the possibility of keeping IBs in their current form, but as members, along with other users such as municipalities, of an umbrella WUA organisation. Under the proposal the IBs, rather than transforming and leading the process, would have slightly less institutional responsibility than currently, but they would continue to manage the extraction and flows

and to prosecute infringements. Mpumalanga Water Resources Management Directorate, who sat on the advisory committee, believe it is the only model that will work, and if DWAF pursues the transformation route the IBs will "run away", leading to a loss of continuity and expertise. With this proposal the IBs"won't feel they are losing power nor will they have the responsibility of all the users". This proposal will not require a new Act, in fact the "Act has already been breached over the 6 months transformation issue". The Chief Engineer believes that DWAF will try to find a way of amending the 1998 Act or write a new policy; this is the role of the Steering Committee (DWAF/M-2). The Mpumalanga office has proposed only five WUAs for the whole Inkomati WMA to achieve economies of scale and reduce fragmentation (DWAF/M1). Discussions with the WRVCB suggest that IBs would largely support the proposal of becoming part of a WUA, but it was not clear that they would support the suggestion of only having five WUAs. Since the completion of fieldwork for this study, DWAF has undertaken two rounds of negotiations with the irrigation boards, and reached agreement in principle on consolidation of the 27 existing IBs into "6 to 8 multi-sectoral WUAs based on geographical positions, similar climate and crops and to get the benefit of scale for more effective IWRM." (DWAF Mpumalanga note to authors, 20-10-04). However, more detailed clarification is needed as to which other sectors would take on the responsibility for leading the WUA process if the IBs do not, and how these proposals will resolve issue of voluntary membership, and potential difficulties in enforcing the payment of the Water Resource Management Charge, both major areas of concern to the IBs.

Lack of Transparent and Reliable Figures on Water Use

It is important to note that there is a high level of uncertainty over the exact amount of water used by the irrigation sector, and variations between estimates was noted by Woodhouse and Hassan (1999, p.11). DWAF's 2004 Internal Strategic Perspective document stresses that a lack of confidence over the exact quantity of water used in the WMA, and by irrigation in particular, is still an issue requiring immediate attention. Although the IBs supply information about how much water their members are using, DWAF suggests the numbers are "conflicting" and there are "inconsistencies" (DWAF/P-4). Until quantitative uncertainties over the resource have been clarified, te reliability of the water balance figures and models produced by DWAF has to be questioned. This uncertainty over figures is likely to take several years to resolve because DWAF has to verify the registration of water use exercise. This exercise should provide a set of more transparent and reliable figures on water use by different consumers, necessary for the CMA to pursue a reallocation of water licences to achieve a more equitable distribution of access to the resource.

The Role of KOBWA in the CMA

The international treaties to which the water in the Inkomati WMA are subject pose further questions for the operation of a CMA. In the view of KOBWA's Water Manager, KOBWA sits outside South Africa's water management organisational structures. According to the Water Manager the Inkomati CMA "cannot do anything in the [Komati] catchment without Joint Water Commission or KOBWA approval", so there is no way KOBWA can be subject to the CMA. There is within KOBWA some disagreement over the future role of KOBWA in the Inkomati CMA, so the Water Manager's view that KOBWA "cannot and would not sit on the CMA" is not necessarily shared by other senior managers (KOBWA-1).

The Chief Engineer for Water Use Planning for the East of South Africa recognises that KOBWA is governed by an agreement that does not recognise the CMA. This is an issue that DWAF's Institutional Oversight Directorate will need to explore. KOBWA is currently bound by a treaty, but the position could be reviewed. Before a renegotiation of the treaty, the Inkomati CMA would need to be clear about the role of KOBWA (DWAF/P-4). This would mean that KOBWA would not be involved with the CMA from the start and this might cause problems.

Commercial Farmers – Taxation Without Representation?

Irrigation Boards, representing the interests of the commercial farming sector, felt that representation was a problem from the beginning of the CMA consultation process. Amongst the IBs contacted, there is a strong feeling that commercial farming interests have been excluded from the CMA process: despite lengthy consultation, it was not a truly participatory process (KIB-1, SVIB-1). The IBs felt that DWAF forced through the proposal without "people on board" (WRVCB-1), it was "bulldozed through" (LIB-1). Commercial farmers, seemingly in a powerful negotiating position, being the largest water users with the best knowledge of the resource situation feel that they are inadequately represented and thus do not see the CMA process as having legitimacy.

The source of money to maintain the CMA operations, after an initial one-off allocation from central government, will be the Water Resource Management Charge (WRMC). As the largest water user, commercial farmers have potentially considerable financial leverage over the CMA process. As a protest against what they see as "Taxation without representation" (WRVCB-1), most of the IBs contacted were withholding payment of the charge. DWAF acknowledges that lack of clarity on tariffs, 'chaotic' management of the billing process, and

lack of capacity to deliver services to the standard expected provide reasons for unwillingness to pay the charge. The IBs, however, also identify factors that emphasise principle rather than inability to pay. The BHIB felt the charge was introduced suddenly with zero communication, and does not take into account varying situations with IBs. Some are committed to hefty loan repayments: others point out that they are being asked to pay again for functions they already perform, such as dam maintenance, so that the WRMC is "double taxation". The Sabie Valley Irrigation Board is one of the few boards that is paying but feels it is not getting value for money. (SVIB-AK). There is evidence of cooperation among the IBs in the Nkomazi, presenting a united front to DWAF, and IBs have the potential to derail the CMA operations financially. If the CMA cannot be made financially viable, then its operations and functions will be severely limited. The stance of the IBs presents a dilemma for DWAF, who may be forced to reach a compromise or the CMA may have to look for alternative funding arrangements. It is also clearly undesirable to alienate such a large, powerful and technically experienced user from the CMA process.

IMPLICATIONS FOR REGULATION AND COMPETITION

This paper has reported an empirical study of progress in implementing the 1998 National Water Act. While the empirical detail is of interest as an analysis of processes of reform in South Africa, it is also useful as a means to assess the validity of more widely advocated models of water resource management. As outlined in section 1, the regulation of water resource management (1998 National Water Act) is consistent with the internationally agreed ICWE Dublin Principles, and it is therefore an opportune moment to evaluate the ICWE principles as a basis for designing regulation of water use. In particular:

- Are there obstacles to implementing these guiding principles in South Africa that suggest they are based on inappropriate 'universal' assumptions about human behaviour in managing shared environmental resources?
- In what ways do the international guiding principles contradict or contribute to South Africa's development agenda, in particular with respect to equity and efficiency in the use of water?

In relation to the first of these questions, the study of the Inkomati CMA serves to underline that where water use is highly developed and water is already a scarce resource, 'integrated catchment management' confronts a reality where river basins rarely exist in hydrological or political isolation, often being highly interconnected with significant transfers of water

between them (the transfer out of the Komati into the Olifants for Eskom), and crossing regional and national boundaries (the Komati and Crocodile rivers). For the Inkomati WMA in South Africa integrated catchment management must not only confront these 'dis-integrating' factors, but also the fact that 'integration' of the different elements of the WMA only takes place in Mozambique, at the confluence of the Komati (Incomati) and the Sabie. In practice, barring inter-catchment transfers, there is little hydrological connection within the Inkomati WMA between the Sabie-Sand, and the Crocodile or Komati catchments. Indeed, locally-led discussion of the CMA initially favoured three separate CMAs, one for each catchment (Woodhouse and Hassan, 1999), the decision to include all three within a single WMA being taken at a national level and guided by DWAF's administrative need to restrict the number of catchment management units (WMAs) and the demands for technical staff to support them. The recent agreement between DWAF and the irrigation boards to subdivide the WMA into a small number of WUAs may offer a way to meet both administrative and hydrological agendas. It is important, therefore, to acknowledge that potential for integrated catchment management in a hydrological sense will be conditioned by the boundaries of the water management area which are likely to be made as much on political or administrative criteria as they are on hydrological ones.

Similarly, the ICWE emphasis on decentralised management needs to be qualified in the light of the South African CMA process. In particular, it is important to recognise that established patterns of water use are already based on local management systems, albeit ones that have historically favoured only a minority of the population. It is clear that for existing local water management agencies, such as the Irrigation Boards, the reform of water management is perceived as taking power from local to central level. This is because, while South Africa is pursuing a water resource strategy that incorporates the principle of devolved, locally managed institutions (CMAs), these must implement political and environmental agendas that reflect the values of the wider South African society (insofar as these are manifest in government policy). Is South Africa able to reconcile these principles so that the CMAs represent the interests of all stakeholders and are they able to manage the resource in an integrated fashion as the 1998 Act intends? DWAF's role as 'honest broker' indicates their fear that subsidiarity will not lead to redistribution in the Inkomati because of the presence of powerful 'controlling interests' (commercial farming, industry and forestry). If this is the case, then the lowest possible level at which water management can be achieved will not necessarily be the most appropriate level, if water management is to achieve South African society's redistributive goals. In this sense the South African water

reforms also exemplify the World Bank's (2003, p.vi) observation, that: "Managing water resources involves a dialectic between integration and subsidiarity".

Managing this tension between central political agendas and local power structures then becomes a key feature of participatory approaches advocated both by ICWE and the CMA envisaged by the South African water legislation. The ICWE principles assume that stakeholders are willing and able to participate in the management of the resource, whereas South African society is marked by a legacy of gross discrimination and inequality, not least in terms of access to water. The case studies in the Inkomati demonstrate quite clearly the importance of this legacy in terms of asymmetries of knowledge and expertise about quantities of water supply and demand. Where these asymmetries are least, as between commercial and environmental stakeholders in the case of Ngodwana, there appears more effective pressure for existing water use to change. Where asymmetries are stronger, as between black farmers and communities and commercial farmers in Nkomazi and – most strongly of all – for black communities in Nsikasi, there appears least prospect of change in established, inequitable, water use.

The CMA process in the Inkomati WMA suggests that, for participatory approaches to generate change, an 'honest broker' role must achieve a reduction in these asymmetries of knowledge about the water resource among stakeholders. This is not to understate the importance – not least in the aftermath of apartheid – of legitimating stakeholders' claims by simply making them 'visible' through invitations to meetings. However, the arguments over water availability and water use in Nkomazi makes clear that lack of a transparent and verifiable estimate of the amount of the water resource is a serious obstacle to effective participation as it is the source of much of the asymmetry in power between different stakeholders. In this respect the water use verification exercise being undertaken by DWAF with the aid of digital imaging and positioning technologies is a vital step in changing the terms of negotiation. However, the Nkomazi also demonstrates the limitations of state capacity to effect redistribution. While DWAF can provide expertise in assessing water use for irrigation, it appears that managerial expertise needed to use water efficiently in agriculture resides almost exclusively in the commercial sector. In the light of this finding it would seem the role of extension officers from the DoA needs to be re-thought, with greater emphasis perhaps being given to a role as legal advisors, helping rural communities understand their rights, rather than as technical advisors on farm management.

To be effective, a strategy of stakeholder participation must address these realities. Manzungu (2002), argues[7] that " approaches that try to underplay or neutralise differences amongst stakeholders through the pursuit of consensus and emphasis of communication for example, serve no strategic interests to disadvantaged groups/people". He advocates that weak stakeholder groups need to act strategically by either forming alliances or by withdrawing from the participation process, thereby delegitimising it. Manzungu suggests that laying such store on consensus, participation and communication "illustrates a deep theoretical poverty" and believes that it takes no account of the subtleties of the power dynamics that are present in managing a precious natural resource (Manzungu, 2002, p.927). While we would agree that a first step is for stakeholders to recognise the inherently conflictual nature of access to a shared but scarce resource, this study suggests that a majority of stakeholders in the Inkomati WMA have already made this step. It is also important to note that this recognition needs to extend to understanding the different constituencies within black communities, where the strongly patriarchal nature of society could seriously hinder participation by women in water management. We question Manzungu's assumption that disadvantaged groups possess the necessary sophistication required to act strategically, and, given that 'withdrawal from the participation process' is as much an option for commercial interests as it is for disadvantaged groups, emphasis needs to be placed on identifying alliances and incentive structures that support redistribution of access to water to disadvantaged groups without sacrificing efficiency in water use.

In terms of power, there are parallels between the CMA and negotiations that occur at the international level over shared river basins. Turton's (2001a/b) 'Hydropolitical Security Complex', developed for the international context considers the water-sharing negotiations between more powerful states, termed 'pivotal', who have high water needs, a sophisticated engineering and human capacity[8] and – importantly – the ability to quantify the resource (access to information on the resource), and weaker, less developed states ('impacted' states in Turton's terminology). Turton argues that in the Southern African context South Africa is a 'pivotal' state, able to negotiate more favourable terms in bi-lateral water agreements with 'impacted' Mozambique, its less developed neighbour. It can be argued that at a local WMA level in South Africa, white commercial farmers and the irrigation boards they control, with their in-depth knowledge of the resource (quantitatively) and sophisticated technical farming capacity are the equivalent of a pivotal state in Turton's model, with emerging black farmers equivalent to the weaker negotiating state in the international context. However, in Turton's model weaker states can use political leverage

to compensate for technical disadvantages and secure a more advantageous negotiation position. Just as the post-apartheid South African government is eager to demonstrate a break with its previous aggressive stance towards neighbouring states, so commercial white farmers may wish to shed their image as 'sugar barons' and be seen to support a fairer South Africa. This provides weaker groups, such as emerging farmers, with opportunities to exert political pressure that, together with the formation of strategic alliances with other stakeholders, can generate greater likelihood of cooperation on a redistributive allocation of the resource than would an adversarial and competitive negotiation strategy.

Among potential alliances, the environmental lobby appears to have potential as a counterweight to commercial interests. It proved to be very effective in challenging powerful water users such as Sappi Kraft, because of a high level of human capital and knowledge and networking. However, although AWARD and the Save the Sand Project are working to reconcile the needs of black communities and ecology, it cannot be assumed that environmentalists will always find common cause with disadvantaged communities, as indicated by the often conflictual relations over water rights between the KNP and communities in Nsikasi (Woodhouse, 1995).

While TSB provides an example where industry sees an advantage in furthering black farmers' access to irrigation, the broader engagement of historically white-dominated commercial farming with 'emerging' black farmers is questionable, and the evolving negotiations between DWAF and the IBs over the WUAs is a testament to the significance of the white farming lobby in local water management arrangements. It must be acknowledged that this research was conducted at a time of irrigation restrictions, following a prolonged drought, when farmers' concerns over water access were acute. Nevertheless, it was clear commercial farmers were deeply unhappy about the CMA and its implications, and, as outlined, the financial viability of the CMA will be brought into question unless the commercial farming sector pays the WRMC. The involvement of the sector is also important because of the technical expertise it possesses. DWAF needs to reconsider the incentives that the CMA may offer to the commercial farming sector. Decentralisation is not a selling point, since many IBs see the CMA process as a centralisation of power. The most important incentive is arguably increasing commercial farmers' security, since, following verification and licensing, the CMA could legitimise commercial farmers' water use in the eyes of other users, replacing the 'existing lawful use' under the terms of the 1998 Act that allows continuity of past water use but also is a source of suspicion about commercial farmers in

the eyes of DWAF and other users. It seems possible, therefore, that a redistribution in water could be traded off against greater legitimacy and security of water use for commercial farmers. Finally, the issue of the voluntary nature of WUA needs to be clarified because, at the time of this study, it is of great concern to the IBs. Defining who has access to a common property resource is one of Ostrom's (1990) eight design principles for the management of common pool resources (resource and user-group are well defined), which suggests the IBs concerns are well-founded. This is an aspect of WUAs that is not defined in the 1998 Act, and, although DWAF appears to have reached agreement with IBs on becoming members of a multi-sectoral WUA, rather than leading the process, it is not yet clear which other sector has the resources to lead the process. It is likely that if membership of a WUA were to be made compulsory for all water users, IBs would feel more inclined to champion the process.

The final ICWE principle is that water is an economic good, and the 1998 Act stipulates that all water use should pay a water management charge. The experience of the Inkomati CMA suggests that the largest users of water are thereby transformed into the principal funders of the CMA, with the implication that, despite formal equality of representation, different stakeholders' or sectors' influence over the running of the CMA may be in proportion to the funding they contribute. This possibility is increased by the difficulties being experienced in collecting water charges from other users, particularly those in urban and peri-urban areas. The non-payment of utility bills is a legacy of political protests during the apartheid era, but avoidance of paying for water has often been cited in this study as the reason stakeholders do not participate in WUAs. Once again, the possibility that some stakeholders will opt out of water management institutions is likely to undermine them, and suggests the need for a clearer statement that both water charges and membership of the WUA are mandatory than is set out in the 1998 Act.

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Notes

[1] http://europa.eu.int/comm/environment/water/water-framework/index_en.html
[2]http://lnweb18.worldbank.org/ESSD/ardext.nsf/18ByDocName/TheWorldBankWaterResourceSectorStrategyentiredocument255MB/$FILE/WaterStrategy-FullDocument.pdf
[3] One at Malelane (1965) and a second, newer mill at Komatipoort (1997).
[4] The Stakeholder Matrix (Table 1) indicates the close relationship between TSB and IBs in the Nkomazi area.
[5] Sappi believes it needs to install the latest technology and equipment in the washing, bleaching and drying plants and processes so as to increase production (by 69percent) and efficiency, (Golder Associates, 2003:1).
[6] Faysse (2004:8) reported that the municipality and the Mpumalanga Parks Board were given less than three weeks to comment on the proposals.
[7] With respect to the stakeholder representation in catchment management in South Africa and Zimbabwe.
[8] Ability to tame, manage and develop the water resource in question.