



IMPLEMENTING THE
SADC REGIONAL STRATEGIC
ACTION PLAN FOR INTEGRATED
WATER RESOURCE MANAGEMENT (1999-2004):
Lessons & Best practice



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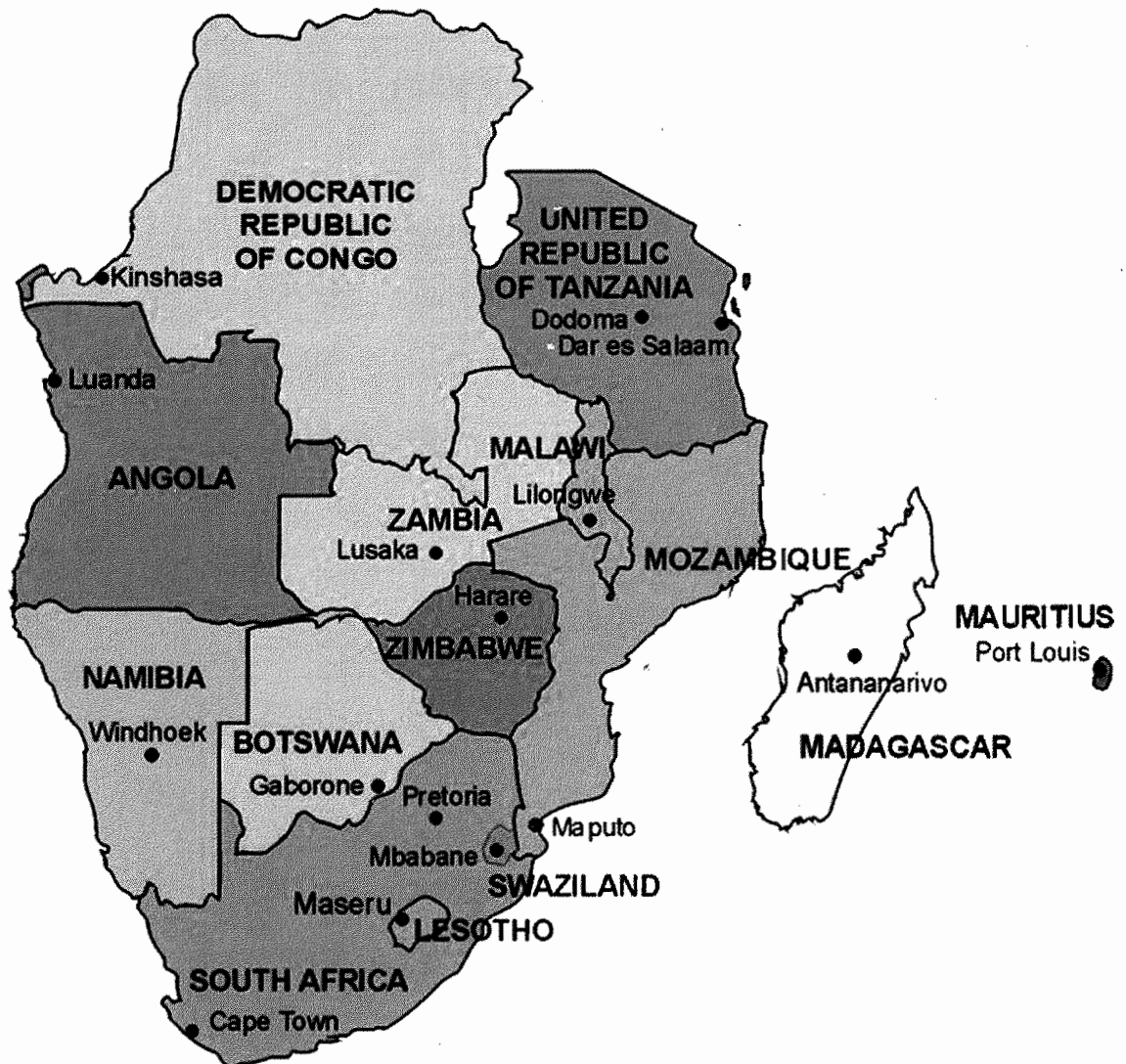
IMPLEMENTING THE SADC REGIONAL STRATEGIC ACTION PLAN FOR INTEGRATED WATER RESOURCE MANAGEMENT (1999-2004): LESSONS AND BEST PRACTICE

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A SADC Water Division technical report of the experiences, lessons and outcomes of the Regional Strategic Action Plan to guide the future development of the SADC water sector.

The Regional Strategic Action Plan (RSAP) for Integrated Water Resource Management (1999-2004) is an extensive programme of the Water Division of the Southern African Development Community. The RSAP has received generous funding from the organisations listed in Appendix 1. The publication of this report was funded by Inwent and Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).

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A technical report by the Southern African Development Community (SADC) and development partners GTZ and Inwent.

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MESSAGE FROM THE EXECUTIVE SECRETARY OF THE SOUTHERN AFRICAN DEVELOPMENT COMMUNITY



Dr Prega Ramsamy

It gives me great pleasure to write this message at the front of a volume that presents the real progress achieved by one of the active units in the Secretariat.

In international cooperation, progress depends on building consensus among many role-players. While this is essential, it is a time-consuming process and success is built on many small advances. This is particularly so when we must share and manage a critical resource like water. It is only when several years' work is drawn together in a publication such as this that one realises how much progress has actually been made.

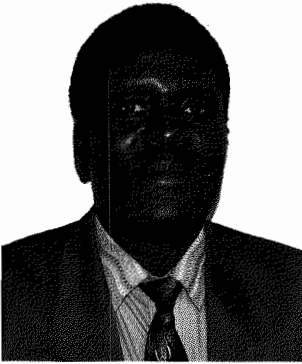
This publication is also satisfying from another perspective, and that is its determination to document and learn from the experiences and lessons of the Water Sector in implementing the Regional Strategic Action Plan for Integrated Water Resource Management.

I believe that this volume will become an essential reference for all the stakeholders in the region and beyond. I invite you to join us in the cooperative spirit demonstrated in this volume, as we build on the successes and tackle the next phase of our assault on poverty in the region.

A handwritten signature in black ink, appearing to read 'Prega Ramsamy', written in a cursive style.

Dr Prega Ramsamy
Executive Secretary

PREFACE



Remigious Makumbe

As is shown in the introduction of this publication, the river systems and political boundaries in the Southern African Development Community (SADC) are notable for their lack of alignment.

Most of the rivers are shared by more than one state, and the Zambezi has no less than 11 riparian States. Compounding the complexity are cruel climatic conditions, with great variability in spatial and temporal terms, and that frequently bring floods and droughts. Moreover, in the socio-economic sphere, the region is characterised by widespread poverty and great differences in the levels of development and access to the factors of production. It is therefore apparent that international cooperation in water resource management is an imperative.

At the centre of regional cooperation are the structures of the Southern African Development Community and, particularly for water resources, the Water Division in the Directorate: Infrastructure and Services. They operate in the context of the Treaty that established SADC, the Regional Indicative Strategic Development Plan and the Protocol on Shared Watercourses, and are secure in the knowledge that all these policy instruments point to the high priority that water has in SADC's programme. The guidance of the Water Resources Technical Committee, drawn as it is from all Member States, is invaluable. The strategy that they follow is the Regional Strategic Action Plan for Integrated Water Resource Management in the SADC Region (1999-2004). Theirs is the task to get the Member States to work together towards the ideals expressed in the international agreements. And if they manage this, their other task of sourcing, coordinating and directing the support of the international community becomes easier. SADC has been fortunate to have a wide range of cooperating partners, which have contributed the wisdom and skills of their officials and made the implementation of the RSAP possible through their financial support. These contributions are acknowledged in Appendix 2.

This publication chronicles the implementation of the RSAP by reporting on some of the outcomes, lessons and best practices that have been obtained the hard way, at the sharp end of international development cooperation. It is intended to inform, to record and to showcase the efforts of the many individuals who work towards the sustainable development of water resources. Such an endeavour is unfortunately unable to report every effort, or even cover all of the topics in what is an ongoing programme, but it does demonstrate that regional water resources management is effective and constantly improving.

To provide the content, the leaders of selected projects were asked to write a short piece about their experiences, and the lessons and best practices. Technical editors were appointed to achieve some consistency in purpose and content. In addition, the contributions have been arranged in themes that reflect the structure of the RSAP. In order to introduce the reader to each topic, the editors have written a short introduction for each theme that places it within the broader context. We at SADC are grateful that these experts saw fit to respond to the call. We consequently recognise the author of each chapter in its title section, and give them additional credit in the biographical notes at the front of the publication. The project to compile the publication was guided by the members of the SADC Water Resources Technical Committee (recognised in Appendix 2), and directed from the SADC Water Division in Gaborone. Phera Ramoeli (divisional manager) and Thomas Chiramba (project manager), ably assisted by Luis de Almeida, Kenneth Msibi and Obonetse Masedi, worked tirelessly to get all the bits that go into such a publication together.

I am grateful to Thomas Schild of GTZ, Niels Ipsen of the UNEP Collaborating Centre on Water and Environment, Bjoern Foerde of UNDP and Thomas Peterman of INWENT, each of whom had the foresight to recommend to their respective organisations that this publication was worthy of financial support. In a region of scarce human resources, we must learn from what we do if we are to develop at a rate that will uplift the region, and the people in it. This booklet shows that a lot is happening. We hope that you will find the story and the lessons useful, and even inspirational.

A handwritten signature in black ink, appearing to read 'Remigious Makumbe'. The signature is fluid and cursive, written over a light background.

Remigious Makumbe
Director: Infrastructure and Services SADC

TABLE OF CONTENTS

Message from the Executive Secretary of SADC	iv
Preface by the Director: Infrastructure and Services	v
Table of contents	vi
List of acronyms	viii
PART A: INTRODUCTION	1
Chapter 1 - Background to the RSAP	3
<i>By Brian Hollingworth and Thomas Chiramba</i>	
Chapter 2 - Mid-term Review of the implementation of the SADC Regional Strategic Action Plan on Integrated Water Resources Development and Management (RSAP-IWRM)	7
<i>By Geraldine Schoeman</i>	
Chapter 3 - Using water as a catalyst for wealth creation in rural areas: A case study from Swaziland	12
<i>By Doctor Lukhele</i>	
PART B: THE PROTOCOL	17
Chapter 4 - Review of progress made with implementing the SADC Protocol on Shared Watercourses	19
<i>By Brian Hollingworth</i>	
Chapter 5 - The signing of the Zambezi Watercourse (ZAMCOM) Agreement	23
<i>By Jefter K. Sakupwanyana</i>	
Chapter 6 - The establishment of river basin secretariats in southern Africa: Lessons from ORASECOM	28
<i>By Tim Hart and Dr Uwe Cusnick</i>	
Chapter 7 - Establishing the Basin-wide Forum for OKACOM: Strengthening dialogue between the basin commission and stakeholders	33
<i>By Montshiwa Monty Montshiwa</i>	
PART C: POLICY AND STRATEGY	39
Chapter 8 - Review of national water policies and strategies and the regional guidelines for harmonisation of legal and regulatory frameworks	41
<i>By Dr Peter B. Robinson</i>	
Chapter 9 - SADC Regional Water Policy	45
<i>By Guy Pegram and Inyambo Nyumbu</i>	
PART D: CAPACITY BUILDING AND INSTITUTIONAL DEVELOPMENT	51
Chapter 10 - Levelling the playing field: the SADC framework for human resources in the water sector	53
<i>By Joseph M. Lisindi and Zibo Makosha</i>	
Chapter 11 - Training for regional integration and development: the contribution of WaterNet	57
<i>By Lewis Jonker</i>	
Chapter 12 - The challenge of knowledge generation for IWRM: the case of implementing WARFSA and the Regional Consultancy Fund	62
<i>By Ngoni Mudege and the late Jerry Ndamba</i>	
Chapter 13 - Institutional reforms in the SADC water sector to meet the challenges of IWRM: The example of Zimbabwe	66
<i>By Mutandwa N. Mutede</i>	
Chapter 14 - Collaboration beyond the governmental level and promoting broad participation: The case of the FFA	71
<i>By Ruhiza Jean Boroto, Andrew Takawira and Ruth Beukman</i>	

TABLE OF CONTENTS *continued...*

PART E: INFORMATION	77
Chapter 15 - SADC-HYCOS: establishing the basis for joint management of water resources <i>By Stéfan van Biljon</i>	79
Chapter 16 - Groundwater dependence and the strategic use of groundwater resources in drought-prone areas of SADC <i>By J.L. Farr, R. Gumirehete, J. Davies and N.S. Robins</i>	84
PART F: INFRASTRUCTURE	93
Chapter 17 - Joint water infrastructure development and management for economic prosperity: The example of KOBWA <i>By Robin Clanahan</i>	95
Chapter 18 - The scramble for the Congo River <i>By Dudley Biggs</i>	101
Chapter 19 - The Lesotho Highlands Water Project <i>By Liphapang E. Potloane and Victoria M. Qheku</i>	103
PART G: PRIORITIES	109
Chapter 20 - The role of regional water resource management in addressing food security challenges in southern Africa <i>By Emmanuel Manzungu</i>	111
Chapter 21 - The establishment of regional flood and drought management arrangements: Lessons learnt and challenges <i>By Kwabena O. Asante and James P. Verdin</i>	116
Chapter 22 - Progress towards meeting the MDGs on water and sanitation <i>By Ian Pearson, Ruth Beukman and Alex Simalabwi</i>	121
PART H: CONCLUSION	127
Biographical notes on authors	130
Appendix 1: List of cooperating partners	134
Appendix 2: List of Water Resources Technical Committee	134
Appendix 3: List of Projects in the RSAP	135

LIST OF ACRONYMS

ACRONYM	MEANING		
		RSAP2	Second Phase of the RSAP
		RSWIDP	Regional Strategic Water Infrastructure Development Programme
CONFUSA	Consultancy Fund for Southern Africa	SADC	Southern African Development Community
CWPs	Country water partnerships	SADCC	Southern African Development Coordination Conference (now SADC)
Danida	Danish International Development Aid	SADC-HYCOS	SADC Hydrological Cycle Observation System
DFID	UK Department for International Development	SADC-RRSU	SADC Regional Remote Sensing Unit
DNA	Direccao National de Agua of Mozambique	SARDC	Southern African Research and Documentation Centre
DRC	Democratic Republic of Congo	Sida	Swedish International Development Aid
DWAF	Department of Water Affairs and Forestry of South Africa	SKPE	Swaziland Komati Project Enterprise
EIA	Environmental Impact Assessment	SWADE	Swaziland Water and Agricultural Development Enterprise
ERP	Every River Has Its People Project	UNCED	United Nations Conference on Environment and Development
FAO	Food and Agriculture Organization of the United Nations	UNDP	United Nations Development Programme
FEWS NET	Famine Early Warning System Network	UNEP	United Nations Environment Programme
FFA	Framework for Action	USGS	US Geological Survey
FRIEND	Flow Regimes from International Experimental and Network Data	USGS-EROS	US Geological Survey's National Center for Earth Resources Observation and Science
GEMS	Global Environmental Monitoring System	WARFSA	Water Research Fund of Southern Africa
GeoSFM	Geospatial Streamflow Model	WD	Water Division, Directorate of Infrastructure and Services, SADC
GWP-SA	Global Water Partnership – Southern Africa	WDACs	Water development advisory councils
HYCOS	Hydrological Cycle Observation Systems	WFP	World Food Programme
IAHS	International Association of Hydrological Science	WHO	World Health Organization
INGC	National Disaster Management Institute of Mozambique	WHYCOS	World Hydrological Cycle Observing System
IUCN-ROSA	World Conservation Union - Regional Office for Southern Africa	WMO	World Meteorological Organization
IWMI	International Water Management Institute	WREM	??
IWRM	Integrated Water Resource Management	WRTC	Water Resources Technical Committee
JWCs	Joint water commissions	WSCU	Water Sector Coordination Unit (replaced by the WD during the restructuring of SADC)
LEOC	Local Entrepreneurs Opportunities Committee	ZACPLAN	Zambezi Action Plan
LHDA	Lesotho Highlands Development Authority	ZACPRO	Zambezi Action Project
LHWP	Lesotho Highlands Water Project	ZAMCOM	Zambezi Watercourse Commission
LUSIP	Lower Usuthu Smallholder Irrigation Project	ZRA	Zambezi River Authority
MDGs	Millennium Development Goals		
NEPAD	New Partnership for Africa's Development		
OKACOM	Permanent Okavango River Basin Commission		
OLG	Okavango Liaison Group		
ORASECOM	Orange-Senqu River Basin Commission		
ORB	Okavango River Basin		
RBOs	River basin organisations		
RISDP	Regional Indicative Strategic Development Plan		
RSAP-IWRM	Regional Strategic Action Plan for Integrated Water Resource Management in the SADC region		

PART A

INTRODUCTION



PART A

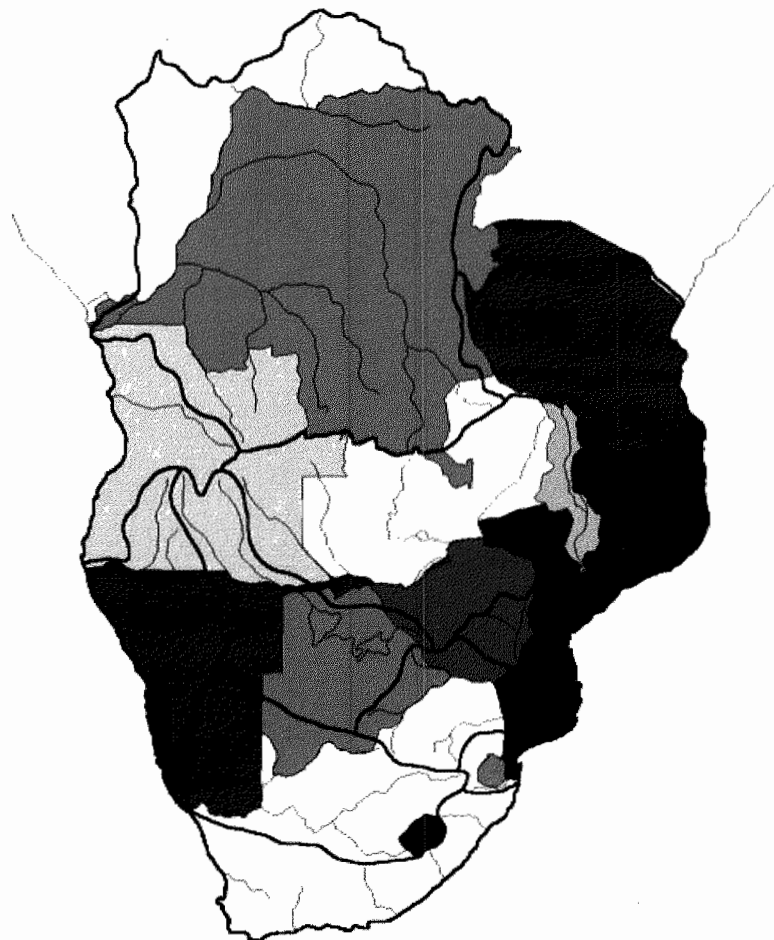
INTRODUCTION

The RSAP is the principal executable document that guides water resource management cooperation in the SADC region. In this introductory section, firstly, Brian Hollingworth traces the *history of the RSAP* from a Council of Water Ministers' decision in 1996, through its formulation and presentation to the international community at a UNDP-sponsored round table conference in 1998 and on to its implementation, which is continuing.

Secondly, Geraldine Schoeman reports on the *findings of the Mid-term Review (MTR)*. The findings of the MTR are overwhelmingly positive about what has been achieved but, inevitably in a multi-year programme, proposes changes to structure and priorities that are necessary if the RSAP is to continue to be relevant up to the finalisation of all the projects. It will remain, for the next few years, a dynamic

plan that plots the course of regional cooperation in the sector.

Thirdly, Doctor Lukhele presents the story of the Swaziland Komati Project Enterprise (SKPE). This contribution forms part of the introduction as he relates how the *principle objective of SADC, namely poverty eradication*, is being achieved at grassroots level as the benefits of increased water from the construction of Maguga Dam become available. Maguga Dam is an excellent example of water resource infrastructure, made possible by cooperation between Member States as envisaged in the SADC Treaty. Lukhele's contribution is linked to that of Clanahan, which appears later in the publication, and describes the institutional arrangements for Maguga and Driekoppies dams.



Map of SADC Basins

CHAPTER 1

BACKGROUND TO THE RSAP

By Brian Hollingworth

Consultant (*brianwater@telkomsa.net*) and

Thomas Chiramba

RSAP Programme Manager

Water in the SADC region¹

The SADC region is characterised by extremes in climate and hydrological response; from the Namib Desert to the rain forests of the Congo River. The political boundaries ignore river basins so that most of the rivers of the region are shared by several basin States. Table 1 indicates the shared rivers in the SADC region, and the States that share them.

Illustrative of the extremes and river sizes are:

- The Congo River, with a mean annual runoff that is 13 times that of the Zambezi River;
- The Zambezi River, which in turn has a mean annual runoff greater than all the other SADC rivers combined; and
- The mean annual runoff per unit area, which varies from 0.013 Mm³/a/km² on the Limpopo River to 0.109 Mm³/a/km² on the Maputo River to 0.331 Mm³/a/km² on the Congo River.

It has become common international practice to determine, for each state, the availability of freshwater resources on a per capita basis, and to rank these internationally. While the concept is relatively crude as it misses such important factors as variability and distribution, the comparisons are nevertheless illustrative. If the availability of fresh water per capita drops below 1 600m³ per annum, the state is said to suffer water stress, while less than 1 000m³ per annum means water scarcity. Most SADC States, particularly Lesotho, Malawi, South Africa, Tanzania, Zambia and Zimbabwe, find themselves at the less favourable end of this international benchmarking (Table 2), emphasising the importance of water resource management in the sub-region.

A useful global comparative statistic is the extent to which each state utilises their resources through annual freshwater withdrawals. Table 2 indicates that South Africa has far and away the highest level of utilisation in the SADC region. In fact, it is reaching the limits of what can be economically and sustainably exploited. Most SADC States, however, only exploit a small percentage of the water available to them, and most of this is for irrigation.

The access of the SADC region's 216 million people to potable water and sanitation varies considerably from state to state. Several of the States will not achieve the Millennium Development Goals (MDGs) unless they radically reform their

service delivery mechanisms. While service provision is generally local issue, the SADC Programme envisages that there are many areas where the States that are struggling to meet the MDGs can be supported through regional cooperation. A number of the river systems in SADC are particularly environmentally sensitive. Notable are the Okavango Delta, the Zambezi wetlands and the desert systems. In each instance, the need for international cooperation in Integrated Water Resource Management (IWRM) is heightened.²

The Southern African Development Community

On 17 August 1992, the southern African Member States came together to form the Southern African Development Community. The ten founder members were Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia and Zimbabwe. Mauritius, the Democratic Republic of Congo, Seychelles and South Africa later joined through accession to the Treaty. Madagascar became a member in 2005 while Seychelles withdrew. The goal of SADC is the integration of the regional economy and the achievement of the objectives of poverty alleviation, food security and industrial development. The Secretariat of SADC is established in Gaborone, Botswana.



The SADC Treaty is a general document that expresses the purpose of the parties and the manner in which the SADC States will work together for the common purpose and good. In order to give practical significance to the intention of the parties, the Treaty envisages its extension in the form of sectoral-specific 'protocols'.

At the time of the establishment of the water sector in 1996, SADC worked on the basis that a Member State was assigned to coordinate each of the sectors. Hence the government of Lesotho set up, financed and managed the Water Sector

¹ Adapted from Review of Progress with the Implementation of the SADC Water Protocol. SADC 2004.

² Hirji R. et al (eds) *Defining and Mainstreaming Environmental Sustainability in Water Resources Management in Southern Africa*. SADC, IUCN, SARDC, World Bank. 2002.

Coordination Unit (WSCU) that was, in addition to its routine duties, charged with implementing the Regional Strategic Action Plan (RSAP) (see below). Shortly after the commencement of the WSCU, the United Nations Development Programme (UNDP) agreed to finance the appointment of a project manager to support the WSCU with the RSAP. In 2002, SADC decided to centralise all functions to the office in Gaborone. and the SADC Water Division (WD) in the Directorate: Infrastructure and Services, was formed. Continuity was achieved when some staff from WSCU were seconded to the Water Division. Inevitably, there was a period of uncertainty as new institutional structures were set up and officials relocated and settled into new offices simultaneously with several other SADC units. That there was not more disruption of the RSAP bears testament to the dedication of the officials and their commitment to progress in very difficult circumstances.

The Protocol

The embryonic water sector was fortunate to start with the experiences of the Zambezi River Basin States that had spent some years in negotiations towards a Zambezi Agreement. Building on this base, and taking into account the Helsinki Principles, the SADC Water Protocol on Shared Watercourse Systems was signed on 28 August 1995 and, following the ratification processes of the member countries, came into force in 1998. However, international developments in the field were proceeding apace. In 1997, the General Assembly passed the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses. Although the 1995 Protocol had not been ratified at the time, the SADC States nevertheless decided to start negotiations that could lead to the amendment of the Protocol to align it fully with the UN Convention. The Revised Protocol on Shared Watercourses was signed in 2000 and, after ratification, came into force on 22 September 2003.

The Revised Protocol States ³:

'The overall objective of this Protocol is to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation.'

The Regional Indicative Strategic Development Plan (RISDP)

Prior to 2003, the SADC Programme was made up of sectoral projects and programmes. In that year, the RISDP became the central policy instrument that provides strategic direction on how the SADC States will achieve the long-term goals set in the SADC Treaty. As the title suggests, the RISDP is indicative in nature but it does provide a clear view of SADC's approved economic and social policies, and it sets targets and timeframes for achieving the goals, including several in the water sector.

The RISDP emphasises cooperation in infrastructure support for regional integration and poverty eradication. It sets the strategies for achieving this goal, which for water are: 'establishing and strengthening shared watercourse systems; and promoting the development of water infrastructure'. The adoption of the RISDP encouraged all of the sectors to examine their programmes and to test alignment. Coincidentally, the RSAP (see below) underwent a mid-term review and the proposals that emerged refocused the RSAP to support the RISDP fully.

The Regional Strategic Action Plan for Integrated Water Resource Management (1999-2004) (RSAP-IWRM)

In 1996, the Council of Water Ministers decided that a regional strategy for the newly-formed water sector was needed. In August of that year, the technical officials outlined what the content of such a strategy might be, but concluded that there was insufficient readily available data at national level to support such a regional strategic process. Consequently, each state was asked to prepare a national situation report. SADC's development partners financed several of these studies and the UNDP office in Maseru provided leadership and logistical, financial and technical support. At the same time an international conference was held in Maseru in 1997 to lay the foundations for the management of shared river basins.⁴

A group of technical consultants was appointed to draw up a draft strategy based on the information and priorities taken from the national situation reports. This was subject to peer review by regional experts and the Water Resources Technical Committee. Finally, a summary document was prepared. It stated that USD123million would be required for all the projects proposed for implementation during 1999 to 2004.

In December 1998, UNDP convened a round table conference in Geneva of all the cooperating partners, at which SADC presented the plan. It was well received, and SADC was congratulated on the initiative. There was consensus that the proposals in the plan should be further elaborated, and there was an immediate start on the intensive process of preparing project documents and making them suitable for funding by the multi- and bilateral agencies.



³ Article 2.

⁴ Savenije HHG and van der Zaag (eds) *The management of shared river basins - experiences from SADC and EU*. Netherlands Development Assistance. May 1998.

In April 1999, a workshop of experts drawn from the region was convened in Maseru to add substance to each of the proposals. This process resulted in the so-called 'project concept notes'. At the same time, the UNDP convened the first Water Strategy Reference Group (WSRG) meeting. The WSRG has, throughout the implementation of the RSAP, provided advice to SADC, and has been a forum for the cooperating partners to coordinate their support efforts. Once the project concept notes had been discussed and agreed to in the SADC structures, the cooperating parties worked with SADC to implement the projects proposed in the RSAP. Initially progress was slow, but momentum grew as the participants drew confidence from the initial successes until, by 2001, there were many initiatives underway.

The content of the RSAP-IWRM (1999-2004)

The RSAP sets the scene by briefly setting out the situation of water resources in the region. It then analyses the issues that affect development in the sector under the headings:

- Water demand and water security;
- Poverty and water;
- Food security and water; and
- Industrial development and water.

From the issues in the sector, it outlines seven key strategic objectives, namely to:

- Improve the legal and regulatory framework at the national and regional levels;
- Improve national and transboundary river basin management, planning and coordination;
- Strengthen linkages between macro-economic, social and environmental policies;
- Improve information acquisition, management and dissemination;
- Support awareness building, education and training;
- Promote public participation; and
- Invest in infrastructure.

In order to achieve these seven strategic priorities, the RSAP finally defined a programme of 44 projects of which 31 (see Appendix) were regarded as the highest priority. As the programme progressed, the details of the projects were elaborated, modified, combined and extended as they moved towards implementation, but the underlying rationale was kept intact.

In this publication, the report on the mid-term review again proposes changes in priority, detail and nuance. In flexibility lies strength - as the remarkable progress towards creating the environment for the sustainable development of the regional water resources progresses.

THE GLOBAL DIMENSION

Since the inception of the SADC water sector, there have been a number of international milestones as the global community strives for equity and sustainability in water resource management. Worthy of mention are the United Nations Convention on Non-navigational Uses of International Watercourses, the Millennium Summit, the 2nd and 3rd World Water Forums, the World Summit on Sustainable Development and the World Water Vision. In each of these, the SADC Water Sector has participated as contributor and as beneficiary of many ideas that have shaped the formulation of the RSAP and, later, the design of projects that fall under its umbrella.

CONCLUSION

Perhaps the most important contribution the RSAP has made was to put into practice the high ideals of the common good, as expressed in the SADC Treaty and the Water Protocol, by demonstrating that there could be tangible outcomes to regional cooperation.

This publication reports the outcomes from several of the RSAP projects that have been completed. As the refocused and realigned RSAP's implementation continues new priorities, proposals and challenges constantly arise and are indicative of a dynamic sector. Hopefully the lessons and best practice, which this publication focuses on, will guide all future work in the sector.

TABLE 1: SADC shared continental river basins

River basin	Basin area (km ²)	River length (km)	Natural mean annual runoff (mm ³ /a) at the mouth of the river	Natural runoff per area (mm ³ /a/km ²)	Basin States
Buzi	31 000	250	2 500	0.081	Mozambique, Zimbabwe
Cunene	106 500	1 050	5 500	0.052	Angola, Zimbabwe
Cuvelai	100 000	430	Ephemeral		Angola, Namibia
Incombati	50 000	480	3 500	0.070	Mozambique, South Africa, Swaziland
Limpopo	415 000	1 750	5 500	0.013	Botswana, Mozambique, South Africa, Zimbabwe
Maputo	32 000	380	3 500	0.109	Mozambique, South Africa, Swaziland
Nile	2 800 000	6 700	8 600	0.031	DRC, Tanzania and non-SADC States
Okavango	570 000	1 100	11 000	0.019	Angola, Botswana, Namibia, Zimbabwe
Orange	850 000	2 300	11 500	0.014	Botswana, Lesotho, Namibia, South Africa
Pungué	32 500	300	3 000	0.092	Mozambique, Zimbabwe
Rovuma	155 500	800	15 000	0.096	Malawi, Mozambique, Tanzania
Save	92 500	740	7 000	0.076	Mozambique, Zimbabwe
Umbeluzi	5 500	200	600	0.109	Mozambique, Swaziland
Zaire	3 800 000	4 700	1 260 000	0.331	Angola, DRC, Zambia and non-SADC States
Zambezi	1 400 000	2 650	94 000	0.067	Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe

Source: Pallet J. (ed) *Sharing water in Southern Africa*. Desert Research Foundation of Namibia 1997.

TABLE 2: Water availability in the SADC Member States

Country	Total annual renewable fresh water available by country (km ³)	1990			2025 (UN Medium Population Projection)	
		Population (thousands)	Per capita water availability (m ³)	International rank (1=driest)	Population (thousands)	Per capita water availability (m ³)
Angola	158.00	9194	17185	100+	26619	5936
Botswana	18.00	1276	14107	100+	2980	6040
DRC	1019.00	37436	27220	100+	104639	9738
Lesotho	4.00	1792	2232	39	4172	959
Madagascar						
Malawi	9.00	9367	961	19	22348	403
Mauritius	2.20	1057	2081	35	1481	1485
Mozambique	58.00	14187	4088	65	35139	1651
Namibia	9.00	1349	6672	81	3049	2952
South Africa	50.00	37066	1349	26	70951	705
Swaziland	6.96	744	9355	90	1647	4226
Tanzania	76.00	25600	2969	49	62894	1208
Zambia	96.00	8150	11779	97	19130	5018
Zimbabwe	23.00	9903	2323	40	19631	1172

Source: Engelman R. and LeRoy P. *Sustaining Water: Population and the Future of Renewable Water Supplies (Update)*. Population Action International. Washington, January 1995.

CHAPTER 2

MID-TERM REVIEW OF THE IMPLEMENTATION OF THE SADC REGIONAL STRATEGIC ACTION PLAN ON INTEGRATED WATER RESOURCES DEVELOPMENT AND MANAGEMENT (RSAP-IWRM)

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ABSTRACT

The aims of the Mid-term Review (MTR), undertaken during 2004, included reconfirming and readjusting the priorities set within the RSAP-IWRM, and providing strategic guidance to secure accelerated and focused implementation of the Plan to achieve its strategic objectives. The Review found that the RSAP-IWRM had been seminal in defining and promoting the RISDP of the SADC Secretariat, and had made significant progress towards achieving its objectives and aims. Success had been dependent on the contributions of the SADC Water Division, Member States and cooperating partners. Particular areas of progress included the adoption - and signing by all SADC Member States - of the original and amended Protocol on Shared Watercourse Systems, promulgation of a Regional Water Policy for southern Africa and harmonisation of the legal and regulatory framework for water management. In addition, the management of programme implementation had spawned cutting-edge procedures that can be represented as 'best practice' for replication elsewhere. The significant achievements of the RSAP-IWRM had, however, been impeded by institutional capacity constraints (both within SADC as well as Member States), insufficient communication (particularly following the SADC restructuring), inconsistent funding and role diffusion. Recommendations included consolidating existing projects into Capacity Building, Governance and Water Resources Development Planning clusters.

INTRODUCTION

The Mid-term Review (MTR) of the RSAP-IWRM was undertaken during 2004, some five years into a programme of activities directed towards greater integration of water resource development and management throughout the southern African community. It was thus carried out at a time when some of the strategic objectives of the Plan had been achieved, while others were still at the formative stage. Notwithstanding this, the Review was deemed warranted at that stage, as it was considered that sufficient progress in implementation had been made. In addition, international developments within the water sector and the global development thrust, as well as internal developments in SADC, had made it expedient to review the implementation of the programme.

The aims of the Review were:

- To reconfirm and, where necessary, readjust the priorities set within the RSAP-IWRM;

- To articulate, learn from and build on the processes that have been initiated to date;
- To assess critically and report on the progress that has been made and the impacts achieved; and
- To provide strategic guidance to secure accelerated and focused implementation of the Plan, while ensuring achievement of the strategic objectives of the Plan.

The methodology followed in the execution of the Review included the following activities:

- Extensive document and literature reviews, including the analysis of project reports, proceedings of meetings and workshops, and policy- and strategy-related documents;
- Interviews with key members of the SADC Secretariat, including the members of the Water Division, as well as representatives from donor organisations, Member States and consultant groups, to obtain an insight into the perceptions that stakeholders have of the performance of the programme, including successes and failures, and opinions as to the future direction that the programme should take; and
- Preparation of iterative drafts of the Review Report, restructured to take into account the comments and opinions expressed by stakeholders.

The four-person review team visited most of the capitals of the SADC Member States to interview over 100 key roleplayers and other stakeholders, representing 13 of the 14 countries of southern Africa.

BACKGROUND TO THE RSAP-IWRM

The underlying objective of the RSAP-IWRM is to achieve the 'sustainable planning and management of water resources that contribute to the SADC's overall objective of an integrated regional economy on the basis of balance, equity and mutual benefit for all Member States'.

As such, the RSAP-IWRM aims to:

- Promote appropriate, sustainable management and development of water resources;
- Promote inter-state dialogue for the management of transboundary watercourses; and
- Implement joint initiatives on shared water resources.

The RSAP-IWRM was originally the responsibility of the Water Sector Coordinating Unit (WSCU), which was set up to monitor the implementation of the Shared Watercourse Protocol. Member States were involved in the RSAP through the SADC Sectoral Committee of Ministers Responsible for Water, the Water Resources Technical Committee (WRTC) and its technical sub-committees, and the RSAP Focal Persons Forums.

With the restructuring of the SADC Secretariat agreed in March 2001, the WSCU moved to Gaborone, Botswana. It was reconstituted as the Water Division, and was assigned responsibility both for the Protocol and for the RSAP-IWRM. Since April 2003, the Water Division has been located within the new Directorate of Infrastructure and Services. The Sectoral Committee of Ministers was also dissolved, as part of the restructuring process.

The Regional Indicative Strategic Development Plan (RISDP), which was introduced in March 2003, has become the defining document for southern African regional economic development. It is a cross-sectoral plan, and emphasises the multifaceted role of water in poverty reduction and development (through improving water security for the poor, improving food security, provision of energy, securing good health, etc). The RISDP now incorporates the RSAP programme and project objectives, and sets water sector targets.

The RISDP, as a regional poverty reduction strategy, is complemented by strategies at national level. SADC Member States have adopted Poverty Reduction Strategy Papers (PRSPs) as part of their in-country policies and procedures to address poverty. These PRSPs contain commitments regarding the achievement of the Millennium Development Goals (MDGs).



KEY FINDINGS OF THE REVIEW

Particular areas of progress

The MTR confirmed that the RSAP-IWRM is a 'unique experiment in international cooperation directed at achieving an integrated approach to water use development and management crossing borders and river basin boundaries – it has no parallel on this scale anywhere else in the world'. Within this context, the MTR found that the RSAP-IWRM has made significant progress towards achieving its objectives and aims, and that it has been seminal in defining and promoting the RISDP of the SADC Secretariat.

The following serve as particular areas of progress achieved in the implementation of the RSAP-IWRM:

- A regional water policy for southern Africa has been promulgated;
- Harmonisation has been achieved among Member States of the legal and regulatory framework for water management;
- The Revised Protocol on Shared Watercourses in SADC, which codifies the regional IWRM policy, has been adopted and signed by all SADC Member States, and came into force in September 2003 through a ratification process;
- The HYCOS programme has been rolled out to Member States to provide a unified mechanism for information sharing; and
- A programme for training and capacity building in IWRM has been established, centred on WaterNet.

Best practice procedures

The management of programme implementation has spawned a number of cutting-edge procedures that can be represented as 'best practice' for replication elsewhere.

These include:

- Procedures to facilitate the setting up, between Member States, of a number of transboundary river basin organisations (RBOs). The RSAP-IWRM promotes the truism that the protection and management of international watercourses will be best accomplished within the regional framework, organised at river basin level. For this reason, river basin management is deemed to provide an extremely important planning, management and institutional framework for IWRM within SADC. These processes have resulted in instructive lessons on the management of transboundary initiatives. In addition, they have provided useful lessons on the secondment and mentorship of experts from Member States, as well as on processes in the establishment of national and basin-wide fora that are basin driven and well embedded in the basin-wide institutional development processes. In the order of 70% of Member States have legislation in place for the development of RBOs, and have initiated the commensurate decentralisation or devolution of responsibility for water management. Considerable progress has, as well, been made in the promotion of institutional capacity at this level.
- The development of regional policy and legislation and information-sharing systems, as well as standards for water and sanitation provision. The regional policy and legislation initiative extends to promoting harmonisation of water laws and policies of Member States. Initiatives to develop information-sharing systems have included the EU-funded Advanced Hydrological and Environmental Monitoring Network (SADC-HYCOS), forming part of the worldwide WHYCOS. The objective of the project is to provide an improved and efficient system for hydrometeorological data collection, processing and dissemination. While the SADC Water Division recognises that the attainment of MDG-related water and sanitation delivery targets can only be achieved through national programmes, it has a

supportive role to play in, amongst other things, the formulation of norms and standards, developing appropriate indicators for reporting and the regional monitoring of progress against targets.

- Successful negotiations for mobilising funds for projects supported by multiple cooperating partners. The RSAP-IWRM project cycle can be regarded as a delivery 'pipeline' that includes planning at regional level, the development of project proposals, mobilising donor funding and implementation. In addition to the procurement of significant funds for regional activities, the SADC Water Division has played a crucial role in coordinating development plans between Member States on the one hand, and potential donor agencies on the other. This has been a major task.
- Development of sound procurement and implementation procedures, including contracts, memoranda of understandings (MoUs), selection of implementing agencies (IAs) and the development of project monitoring and evaluation strategies. Selection of implementing agents is based on criteria developed by SADC. Important parameters include competence, credibility, sustainability, equity (accessibility) and familiarity. Other essential requirements of an IA are that it should have a legal standing either at national, regional or international level, demonstrate project management capabilities (with sound financial and managerial skills) as well as enjoy wide acceptability to participating countries, cooperating partners and stakeholders.

Participating institutions

The success of the RSAP-IWRM thus far has been dependent on the contributions from three specific sets of roleplayers. These are:

- **The Water Division:**

The Water Division is staffed by a complement of highly qualified, very well motivated and dedicated officers. Staff members have shown themselves to be highly adaptable in all respects, despite limited security of tenure, rapid change and diffuse implementation strategies.

- **Cooperating partners:**

The RSAP-IWRM has, to a large extent, been funded by international donors (cooperating partners). Such funding is the definitive factor in ensuring the success of projects. Cooperating partners have also played a seminal role in guiding the implementation of the RSAP-IWRM. Organisations such as the UNDP have made an immensely valuable contribution to the success of the RSAP-IWRM by providing leadership, coordination and professional input.

- **Member States:**

Key insight and commitment has been shown in understanding the long-term benefits of supporting the vision of regional competence, as well as involvement in active steps to support the implementation of regional IWRM.

Constraints and challenges

Despite the significant achievements of the RSAP-IWRM, the MTR found that its progress has been impeded by a number of constraints.

These are briefly outlined below:

Institutional arrangements

Although the restructuring of the SADC Secretariat appears to hold potential for the successful streamlining of the implementation of the RSAP-IWRM across sectors, it does hold a number of significant negative consequences that will need to be addressed effectively. There is a danger that the integration of the Water Division into the much larger, multi-sectoral Directorate will dissipate its unique focus on water. Furthermore, since the restructuring process was premised on the assumption that the Water Division should be a 'lean and efficient' structure, it is virtually certain that this will limit its administrative capability to coordinate and implement all the RSAP projects effectively.



Water use development planning

A negative spin-off of the adoption of the Shared Watercourse Protocol is that individual Member States are effectively constrained from developing their own water resources – even from watercourses wholly within their own borders – without the agreement of other riparians. This has the potential to delay national economic development programmes. No regional master plan for integrated water use, development and management is currently in existence to prevent such delays and ensure agreement on water sharing.



Member State capacity

The long-term success of the RSAP-IWRM is dependent on the ability of Member States to guide the implementation process, and to participate in processes that will, maximally, ensure the integration of individual and collective regional competence. However, the MTR identified a deficiency of capacity at Member State level for the implementation of RSAP-IWRM projects. In addition, the development of an enabling environment for capacity building within SADC was also identified as a key challenge.



Communication and information flow

Insufficient communication at various system levels was identified as an important constraint. This deficiency is partly an unintended consequence of the restructuring process. Due to the abolition of the Sectoral Ministers and the lack of activity of the sub-committees, lines of communication have broken down within Member States, as well as between Member States and the SADC WD, and have not been replaced by anything better.

Administration of the Water Division

Confusion exists as to the appropriate role of the Water Division. At times, its function is seen as that of managing projects. At other times, it is expected to procure implementing agents (IAs) and to act as the facilitator/coordinator. The Division also suffers from inadequate personnel in relation to the tasks to be undertaken, and from an absence of security of tenure for core personnel.

Funding

Inconsistent funding and the need to source funding on a project-by-project basis have hampered implementation of the RSAP-IWRM. Because funding is influenced by the agendas and priorities set by the international donor community, the success of projects in attracting funding has been mixed: some are oversubscribed, while others received little more than seed money.

RECOMMENDATIONS OF THE MTR

Institutional arrangements

The MTR recommended that the RSAP-IWRM be consolidated by aggregating its existing projects into three specific issue clusters:

- A **Capacity-Building Cluster**, aimed at creating the necessary enabling environment for the development of human and institutional capacity;
- A **Governance Cluster** to develop the necessary level of participation for legitimising cooperative management of shared transboundary water resources, and to develop and implement policy that supports IWRM while, at the same time, linking this to the achievement of the Millennium Development Goals and poverty eradication; and
- A **Water Resource Development Planning Cluster**, aimed at addressing issues such as the development of a regional master plan for integrated water use, development and management.

It was also recommended that the Secretariat should focus more on Capacity Building and Governance issues, while specific tasks related to Water Resource Development Planning might be devolved to appropriate and adequately prepared implementing agencies.

A further recommendation was that the core business activity of the SADC Secretariat, centred in the Water Division in support of the establishment and support of river basin organisations (RBOs), should be recognised as a separate entity from activity under the RSAP. This recommendation is based on the fact that the establishment of RBOs is key to the implementation of regional IWRM, and that the driver for this activity is the Protocol itself (coupled with resultant commitments made by Member States to implement its provisions). According to the Protocol, the Water Division's duties and responsibilities are to provide technical support to this process, rather than to act as its driver.

These recommended institutional arrangements are graphically depicted in the figure below.

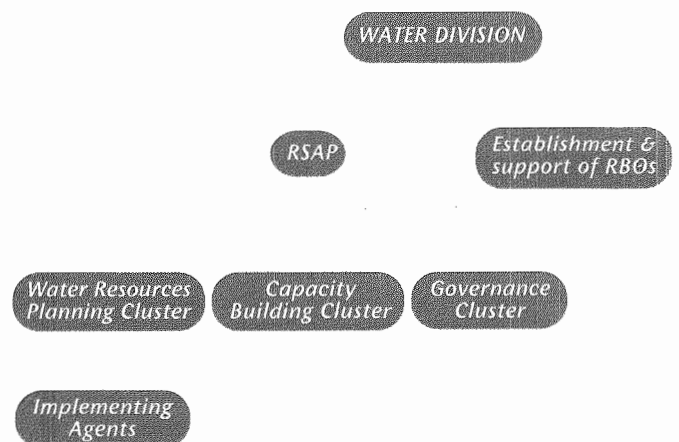


Figure 1. Recommended institutional arrangements for RSAP-IWRM project clusters.

Water use development planning

In order to prevent adherence to the Protocol on Shared Watercourses from inducing a 'stalemate' in the development of water resources, the original RSAP goal of creating the enabling environment for infrastructure development should be extended and redefined to incorporate integrated water use planning. An integrated water use, development and management master plan should be developed for the whole region. Such a master plan would include the establishment of mechanisms for reaching agreement on water sharing, and for assessing water quantity, quality and needs (including those of the natural environment).

Member State capacity

The following capacity building and mentoring interventions are recommended:

- The development of a sector support system and information-clearing house for dissemination of 'best practice' instruments and practices;
- Collaboration between Member States to ensure a process of mentoring and capacity development; and
- Rotation of selected mid-career professionals through identified centres of excellence.



Communication and information flow

It is recommended that the SADC Water Division develop a sound communications strategy to ensure that stakeholders are better informed of progress, and to foster a higher level of commitment by the Member States' governments.

Administration of the Water Division

It is believed imperative that the Water Division be staffed with an adequate number of well-qualified personnel, and that they are provided with security of tenure. The Division also requires clear lines of responsibility and reporting.

Funding

The SADC Secretariat and Water Division should explore, with cooperating partners, the measures and conditions necessary to establish a common fund for the implementation of the whole RSAP as a single programme, rather than the existing piecemeal approach.

CONCLUSION

The successes of the RSAP-IWRM include its contributions towards:

- The capacity of focal persons to engage in the challenges posed by Integrated Water Resources Management;
- Strengthening inter-country cooperation;
- The development of institutional infrastructure for regional and sub-regional integration; and
- The considerable enhancement of policy development processes at country level.

However, a number of future challenges remain.

These include:

- Consolidating the restructuring process and addressing its negative consequences;
- Ensuring coherent alignment of the RSAP-IWRM with the RISDP;
- Building capacity within SADC as well as Member States;
- Promoting further institutional development of the Water Division, and the realignment and integration of the water portfolio into the Directorate: Infrastructure Support; and
- Ensuring effective communication within SADC, and between SADC and Member States.

It is key that the realisation is fostered that the long-term sustainability of the programme is dependent on the continued commitment of all roleplayers, including cooperating partners, and the implementation of goal-directed and measurable activities to ensure progress. The recommendations of the MTR have been incorporated into the Regional Strategic Action Plan – Phase Two (2005-2010) and its Programme Implementation Manual.

CHAPTER 3

USING WATER AS A CATALYST FOR WEALTH CREATION IN RURAL AREAS: A CASE STUDY FROM SWAZILAND

By Doctor Lukhele

CEO, SWADE

BACKGROUND

The Maguga Dam

The Maguga Dam is a joint venture project between the governments of South Africa and Swaziland, with an estimated cost of ZAR1.2 billion (US\$200 million). The dam is situated in the Komati River, a sub-basin of the larger Incomati River basin, which is an international watercourse shared by Mozambique, South Africa and Swaziland. The project forms part of a basin development programme between South Africa and Swaziland, agreed through a water-sharing and utilisation Treaty signed in 1992. The dam has about 302 million cubic metres (Mm³) of useable storage. In terms of the Treaty, the additional water available from the Maguga Dam is to be shared approximately on a 60:40 basis, which is in line with the cost-sharing formula. The water will be used to increase the assurance of supply to existing water users, and for the development of additional irrigation in the two countries. Swaziland's share of new water for irrigation from the dam is 83Mm³, enough to develop about 6 000ha of sugarcane and other crops. An additional 4Mm³ is allocated for primary water use.



In line with the requirements of international conventions that have since been included in the SADC Protocol on Shared

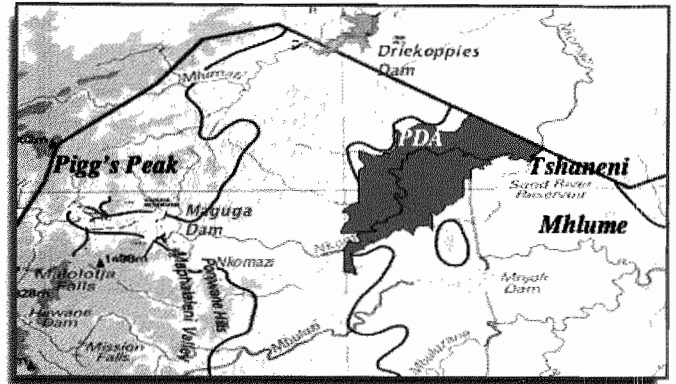


Figure 1.
KDDP Locality Map.

Watercourse Systems, Mozambique, although not party to this joint project between South Africa and Swaziland, was consulted and granted concurrence for the project to go ahead. The Treaty, subsequently signed by South Africa and Swaziland, recognises Mozambique's rights to share in the waters of the Komati river system.

The primary objective of the member countries in pursuing the project was poverty alleviation. The parties realised that the availability of water for irrigation would enable the communities to combine their land and labour to produce food crops, and would also allow them to venture into commercial farming, thereby bringing rural communities into the mainstream of the economy. The Komati Downstream Development Project translates into action the intentions of the governments as expressed in the Treaty. While most of these preparations preceded the SADC Protocol, the RSAP and the RISDP, there is strong resonance between the project and these three regional policy instruments.

The Komati Downstream Development Project (KDDP)

The KDDP covers an area of approximately 27 000ha in the northern part of Swaziland, along the banks of the Komati River and stretching some 60km from Madlangempisi, on the west, to the border with South Africa, in the east.

Over 1 800 families, with an estimated population of around 22 000, will participate directly in the project. The total irrigable area under the command of water from the Maguga Dam is approximately 6 000ha. The communities are developing the land through the formation of farmers' associations, which are registered either as companies or cooperatives. Implementation started in 2000 and completion is projected to be in 2007.

By June 2005, a total of 30 farmers' associations had been formed and trained to different levels, depending on when they had formed. Fifteen have already started farm

development, with a combined total area of about 2 400ha out of the planned 6 000ha. Those growing sugarcane are realising yields slightly above industry average, with the sucrose content averaging about 13.5%. Table 1 shows typical businesses that farmers' associations in the project area are managing, following empowerment through the Swaziland Water and Agricultural Development Enterprise (SWADE) mentoring process.



TABLE 1: TYPICAL COMMERCIALY VIABLE FARMING UNITS

Units – 30 in number		
Size	66ha	450ha
Turnover	R1.0 million	R9.0 million
No of shares	From 1ha to 3ha per shareholder	
Business type	Cooperative, private or public company	

SWADE MANDATE, MISSION AND OBJECTIVES

SWADE (formerly SKPE) is a government parastatal company with a mandate to plan and implement large water projects in Swaziland. In pursuit of its mandate, SWADE has set as its mission:

‘To empower rural communities in designated areas to attain an improved quality of life and be able to sustain it’.

SWADE operates under a Board of Directors, with full autonomy related to the implementation of the projects within the overall strategic objectives set by government. The company is 100% owned by government, and receives subvention in the form of grants from the state that enable it to carry out its mandate. This arrangement has greatly facilitated decision-making and contributed significantly to the rapidity of project implementation. SWADE is able to develop its own operating systems and methodologies, which have a private sector-oriented culture of focusing on delivery against set targets and deadlines.

The objectives pursued by SWADE flow from the Swaziland National Development Strategy (NDS), which articulates, among its key objectives:

- (1) increased participation of smallholder farmer organisations in commercial irrigated

- agriculture, and
- (2) enhancing private sector development through the development of small and medium enterprises, as major areas of focus.

In these two projects, the primary foci for SWADE is to facilitate the development of farming enterprises by assisting communities to organise themselves into viable business entities engaging in commercial irrigated agriculture, and also to promote a broad front area development, riding on the back of the commercial agricultural activities made possible by the availability of the water.

This paper describes the approach adopted by SWADE in the implementation of the Komati Downstream Development Project, where small-scale farmers are being developed into commercial farmers and, in the process, creating wealth for the whole community.

SWADE has mobilised a team of young professionals to provide a full suite of community empowerment support. As the implementation of the project progresses, the skills base and understanding of the key issues involved in upgrading community skills has greatly increased, along with that of SWADE as an institution. This reserve of skills will put Swaziland in good stead in the implementation of similar projects in future. Indeed, the Lower Usuthu project is already benefiting from this development.

LINKAGES WITH RSAP STRATEGIC OBJECTIVES

The Komati Project case study has demonstrated very strong links with the RSAP, particularly the three objectives, namely:

- To provide a framework for sustainable, effective and efficient planning and management of shared river basins at regional and related national levels. The project has created a platform for cooperation in the planning and efficient management of other river basins of common interests, not only between South Africa and Swaziland but also including Mozambique, as demonstrated by the conclusion of the IncoMaputo Interim Water Sharing Agreement.
- To develop, promote and facilitate best practices regarding effective participation by various individual and institutional stakeholders in water resource development and management, including women, youth and other disadvantaged groups. While the implementation of the project has been running concurrently with the development of the RSAP, it is evident that, through collaboration and information sharing, best practice approaches can be promoted between Member States.
- To build and strengthen human and institutional capacity for the sustainable management of water resources at local, national and regional levels.

BEST PRACTICES IN THE SWADE DEVELOPMENT PROCESS

It's all about people

SWADE realised that the success of the project was dependent more on building the capacity of people to take full advantage of opportunities of the agricultural businesses, than on the development of the infrastructure and crops. This approach is premised on the notion that people have aspirations and dreams that can drive them to improve their livelihoods, once they have been capacitated to do so.

Production systems on Swazi Nation Land (SNL), which is communal land, are not geared for business operations. They only support a subsistence type of livelihood. In order to facilitate a transformation to a business-focused system, SWADE developed a three-stage process that has been dubbed the ACA process: '**Attitude, Competence, Application**'.



The SWADE approach.

The first step of ACA emphasises the importance of cultivating, amongst members of the community, the attitude necessary to build belief in self and appreciation of the power of cooperation with others. Having the right attitude towards development is essential for one to be able to plan, develop and manage a successful business, before the business planning process even begins. In rural settings, people are used to going about their business as individual homestead units. They accept crop failure as a normal occurrence and welcome a good harvest as a fortune, and do not take it as something that can be achieved through a good management effort. For such people, acquiring the right attitude - particularly the need to cooperate with others in order to change their situation to one they can manage - is a very important first step.

In the attitude training, communities are also empowered with conflict resolution skills and mechanisms among themselves. An understanding of the role of the Traditional Authority in the affairs of the business and, equally important, an understanding by the Traditional

Authority of their role in the business, is also addressed to ensure that the social order is not disrupted. Other issues covered at this stage include the sanctity of the association's constitution, provisions in the constitution to cater for the vulnerable members of the association (such as the elderly and the young ones who may still be attending school), as well as procedures for the payment of dividends.

The attitude training is then followed by skills training, which focuses on building competence among the communities to undertake the business of their choice. This training imparts a variety of skills that are necessary for a successful business operation. Study tours are undertaken to similar projects to enhance learning by observation. The process is carried out until farmers are totally familiar with the needs of their business, so that they get to own the business plan and be able to use it in farm operations later on.

The third part of the process involves the application of what has been learned during the competence acquisition stage. The farmers are assisted by a team of agricultural experts who provide close contact mentorship, initially on a daily basis and then gradually reducing the frequency as the farmers gain confidence and are able to work on their own. When a new activity in the cycle of crop establishment commences, close supervision is again provided to ensure a proper start that quickly builds confidence among the farmers.

The ACA process takes the farmers through the stages of securing land rights from the chief, securing markets (eg sugar quota), securing finance from financial institutions, planting, irrigation scheduling, weeding, the management of farm budgets, and liaison with the financier, millers, etc. As the farmers' understanding increases, the need for further attitudinal and skills training also increases. The process goes on in that fashion, progressively involving increasingly complex issues as they relate to the growing business.

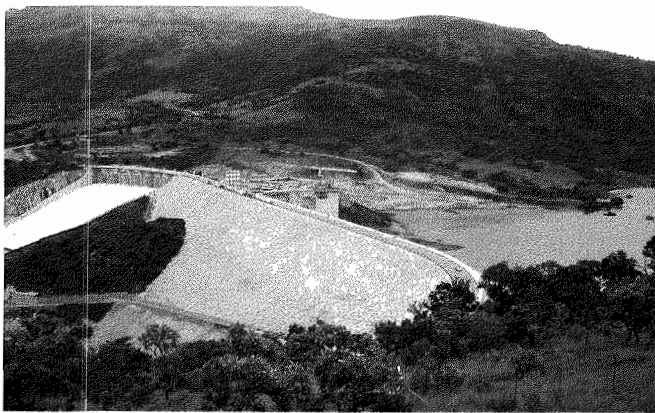
A development worth noting is that the project has greatly facilitated the security of access to land for women, as they now participate as equal partners with men in the associations. Their keen interest in development issues makes women an ingredient for success in the associations.

Other support

SWADE also provides a network of support systems through other teams including Engineering Farm Services, which prepares conceptual farm designs based on soil surveys and other topographical conditions associated with each farmers' association's land. The Engineering team assists the farmers with the tendering processes for farm development works, and also provides mentoring on farm equipment operation and maintenance. The Environment Department helps the farmers develop environmental management plans, and also monitors the environmental impacts of the development on the land, the people, homesteads and livestock.

Environmentally sensitive areas are assessed and factored into the farmers' business plans. All the project information is captured in the GIS-based Komati Information Management System, which has been designed to capture spatial and non-spatial data related to each farmers' association and community in the project area. This system produces maps, which help the communities to communicate and relate to their development. It is also used for socio-economic environmental monitoring as the development progresses.

The KDDP also includes a water and sanitation programme, which seeks to connect practically all the homesteads in the project area to a clean water supply and to provide effective sanitation. SWADE has adopted a water supply system that links the homestead water with water for use in home gardens. It is believed that this will improve the sustainability of the systems, as each homestead will have an added vested interest in the continued functioning of the water supply systems. The potable water system is based on slow sand filter purification at each homestead.



Spin-off businesses

At full development, the project is expected to yield in excess of ZAR100 million (USD15 million) per annum from the sale of crops, mainly sugarcane. The communities are being mobilised to exploit spin-off business opportunities (for example, the haulage of the sugarcane to the mill, agricultural inputs etc), as well as other opportunities that have become viable because of increased income levels and the improved attitudes of the communities. These opportunities include poultry, dairy production, feedlots, bee-keeping and vegetable production, among others. SWADE assembles small teams to work with the interested members of the community to develop all the necessary linkages for that particular business to get started.

The emphasis on other businesses opportunities is intended to leave as many families as possible within the project area involved in one type of business or the other, when the project is completed.

Although, at present, there have been no specific initiatives targeting the youth, the implementation of the

project has started addressing issues relating to the youth. Some of those worth mentioning are employment opportunities, where some youth are employed as clerical staff in the farmers' associations, due to their level of literacy relative to general membership. Others get employment as general labourers in the farm development activities. Some have also benefited from general empowerment training courses offered to farmers' association members, including business skills and HIV/Aids awareness and prevention. Increased sporting activities are another spin-off benefit that comes with the various teams implementing the project.

CONCLUSION

The availability of water has transformed a whole area from being one of the poorest areas in the country, facing the threat of desertification, to one with great prospects for the future. Employment opportunities have been created. Incomes are rising, food security is being enhanced and the quality of life in general is set to improve. Within the project area, it is anticipated that the Millennium Development Goals would have been substantially achieved by 2010.

The project has also significantly empowered women, who now have secure access to land through their membership in farmers' associations - where they also have an equal voice, by virtue of their membership. Youth issues are also beginning to be addressed. Out of all these, the single most important lesson is that the success of the project to date, and continued success in the future, is dependent on the extent to which the people can be empowered to take charge. This can only be achieved through continuous and holistic capacity-building support, and not through a once-off intervention.

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PART B

THE PROTOCOL



PART B

THE PROTOCOL

The Revised Protocol on Shared Watercourses in the SADC Region (Protocol) is the central international water law instrument that is binding on the SADC Member States.

Much of what is in the Regional Strategic Action Plan is to give effect to the commitment the States made to cooperate in the field of water resources. It is therefore fitting that the RSAP includes a project directed at the implementation of the Protocol.

What implementing the Protocol actually means is addressed by Brian Hollingworth in the first report of this section, where he reports on a review project. The analytical framework identified that progress on the implementation of the Protocol could be assessed on facts, such as how many river basin institutions had been established; on actions, such as whether specific things had been performed; and finally on behaviours, which are much less defined but perhaps most accurately reflect the commitment to cooperate. The study collects a list of treaties that have been entered into, and the river basin organisations that have been formed, and the reader will be surprised at how many there are. Secondly, the study collates the views and opinions of important players in the region as to how the implementation is proceeding. The general outcome is favourable, but there are several areas where progress is less satisfying.

Jeffer Sakupwanja then takes the report to the river basin level, and describes how one of the basin agreements required by the Protocol was finalised. The agreement establishing the Zambezi Basin Commission (ZAMCOM) is one of the great achievements of practical diplomacy in the SADC region. Negotiations started even before those for the Protocol, and indeed informed the Protocol in many ways. But if the Protocol is at political and conceptual levels, the ZAMCOM agreement takes the matter far closer to the practical, on-the-ground aspects of cooperation. These lessons should be in the mind of every negotiator charged with setting up international agreements.

Most of the agreements that the SADC members entered into at river basin level were flexible about the institutional arrangements for managing their cooperation. International executive organisations were established at project level (ZRA and KOBWA), but generally the institutional form was a rotational meeting of commissioners in the Member State without any executive arm. The RSAP recognised the potential benefits of a permanent secretariat, and listed a project directed at this. Tim Hart and Uwe Cusnick examine

the issues in establishing a river basin secretariat, using the example of ORASECOM. The status of an international organisation in the legal system of some of the SADC States presents challenges. Aside from this, the level of authority of the

organisation and its funding are the principle issues addressed in the paper.

Finally in this part, the reader is taken to, arguably, the most important prescription in best practice in IWRM, namely the participation of stakeholders whose livelihoods are impacted on by the management of the resources. For a number of reasons, the communities of the Okavango River Basin have been vocal about the management of this internationally important resource. Monty Montshiwa presents an account of the mobilisation and organisation of the communities by an alliance of the many NGOs in the area. He demonstrates unequivocally that the 'grassroots' do want a say, that they can organise and fulfil a constructive advocacy role and that they can meet and work with OKACOM at international management level. If the conclusion of the ZAMCOM agreement exemplifies the ideals of international diplomacy, then the Okavango communities do the same at grassroots. Both augur well for the avoidance of conflict over water resources.

CHAPTER 4

REVIEW OF PROGRESS MADE WITH IMPLEMENTING THE SADC PROTOCOL ON SHARED WATERCOURSES

By Brian Hollingworth

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ABSTRACT

Since 1995, SADC has been implementing what is now the Revised Protocol on Shared Watercourses. The Protocol has as its objective 'to foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation'. This 2003 study reviewed the progress that has been made with implementing the Protocol. The general finding is that the participants in the study are satisfied with the progress that has been made. The study records 42 international agreements that regulate interstate water matters in the region, half of which have been entered into since 1990. Seventeen international water management institutions of various forms have been established. For the future, six strategic thrusts are recommended, including popularising the Protocol and further development and capacity-building of river basin organisations.



INTRODUCTION

SADC is structured by a 1992 Treaty. Its goals are the integration of the regional economy and the achievement of the objectives of poverty alleviation, food security and industrial development. To achieve these goals, the SADC Treaty is supplemented by sectoral protocols. The SADC Protocol on Shared Watercourse Systems was signed in 1995 and ratified in September 1998. This was a particularly dynamic time in international concepts about transboundary water resource management spearheaded by the advent, in 1997, of the United Nations Convention on the Non-navigational Uses of International Watercourses. In SADC, a review was initiated and the Revised Protocol on Shared Watercourses in SADC was signed in 2000 and entered into force on 22 September 2003. The Protocol has as its overall objective 'to foster closer cooperation for judicious, sustainable and coordinated management,

protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation'. In September 1998, SADC published its Regional Strategic Action Plan for Integrated Water Resources Management in the SADC Countries (RSAP). One of the RSAP projects was the Implementation Programme for the SADC Protocol on Shared Watercourse Systems. The 2003 study, reported on here, had as its objective an analysis of the progress made with implementing the Protocol, on which an improved strategy could be based.

STUDY METHODOLOGY

Scope

The research used desktop study, literature review, 20 stakeholder interviews, a 40-participant stakeholder workshop and response sheets. This was considered as sufficiently representative for the outcomes to guide SADC and its Member States in its further strategy and policy development. The topic was considered to be very inter-state and legal-technical in nature and consequently, selected participants were largely active players in intergovernmental water relations. It was apparent, from the views of the NGOs that did take part, that the Protocol and its provisions were virtually unknown at community level.

Analytical framework

A specific analytical framework was developed to accommodate the variety of outputs identified in relation to implementing the Protocol. Firstly, there were *facts* as to which inter-state water cooperation agreements had been entered into, and which river basin institutions had been set up. Secondly, the analytical framework identified several non-specific statements in the Protocol about the *behaviours* that are expected of the parties. Examples of these are 'Harmonise water uses' (Article 3.1) and 'Remain consistent with sustainable development' (Article 3.1). Thirdly, the analytical framework identified that the Protocol requires parties to initiate *actions* in certain circumstances. Examples of these are 'Pursue and establish cooperation on projects' (Article 3.5) and 'Exchange information and data' (Articles 3.6 and 4.1). Finally, some *miscellaneous issues* were investigated. Examples of these are the awareness of the Protocol and a monitoring and evaluation mechanism.

RESEARCH OUTCOMES

International agreements

By international comparison, southern Africa has a large number of treaties or agreements that deal with international water management. The study identified 40 international agreements that relate closely to international rivers or river basins. Of these, half have been concluded since 1990.

River basin institutions

Article 5.3 of the Protocol requires States to establish 'appropriate institutions such as watercourse commissions, water authorities or boards as may be determined'. The study grouped existing institutions as follows:

- Institutions with an executive capacity, such as the Zambezi River Authority;
- Commissions, such as the Okavango Basin Commission and the Orange-Senqu Basin Commission, that are advisory to the governments; and
- Committees that are styled similarly to the Joint Permanent Technical Committee and are of a less formal inter-state character, and focus on technical issues.
- The stage of development and nature of the institutions varied greatly. Further work would be required to determine their effectiveness and key success factors.

Actions

The respondents all made statements to the effect that the States all *pursued and established cooperation on projects* (Article 3.5 of the Protocol). A large majority noted that their States were doing well on this dimension, although a lot fewer felt the same applied to SADC in general. The number of agreements that had been entered into in the spirit of the Protocol bore testimony to this.

There was a general willingness by States to *exchange information and data* (Articles 3.6 and 4.1), and this was indeed one of the common threads in a number of the agreements. It was suggested that SADC create a data and information 'clearing house'. This would go some way to countering the differences in the extent and quality of the data sets held by each state.

There have been no *recent instances of a planned measure that had not been notified* (Article 3.10) to the co-basin States. There appears to be some difference of views as to when notification is due and also, from a technical-legal perspective, what constitutes a notification.

Participants generally believed that there were adequate measures in place to *prevent, reduce and control pollution and environmental degradation* [Article 4.2(b)]. All States have requirements for environmental impact assessments for new projects. Most States have introduced measures to *prevent the introduction and spread of alien species* [Article 4(2)(b)]. On the other hand, most participants felt that their state and SADC as a whole was doing

poorly on these actions. The question of the capacity of agencies to apply the measures was frequently questioned, and capacity-building initiatives were called for. It was suggested that SADC regional standards be established for environmental impact assessment and for waste discharges and river water quality.

All States where interviews were conducted have a *permit or authorisation system for water uses other than domestic and specifically for waste discharge into waters* [Article 4.4(b)]. The systems to prevent non-permitted activities and to enforce permit conditions were described as weak and ineffectual, but nearly half of the participants felt that, on this issue, their States were doing well rather than satisfactorily.

Behaviours

The Protocol requires the States to exhibit certain, what the research has regarded as, 'behaviours'. These are less definable and tangible than the more positive actions dealt with in the previous section. The research methodology used a scoring system.

Participants scored their States and SADC *favourably* on the dimensions:

- 'Observe the objectives of regional integration' (Article 3.1);
- 'Respect international water law' [Article 3.3 and 4.3(c)]; and
- 'Plan measures in conformity with a set procedure' (Article 3.9).

Participants scored their States and all SADC *unfavourably* on the dimensions:

- 'Utilise water courses in an equitable and sustainable manner' [Article 3.7(a)];
- 'Prevent the causing of harm or mitigate the effects' [Article 3.10(a) and 4.4]; and
- 'Protect and preserve ecosystems and the aquatic environment' [Article 4.2(a) and 4.2(d)].
- It was noted that the behaviour of States during dry periods deteriorated, and some were not meeting agreed levels of releases.

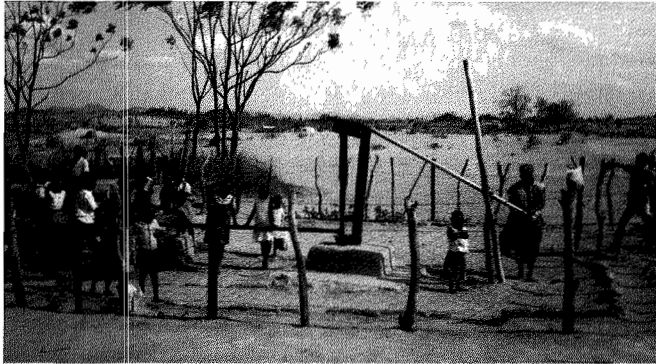
Views and opinions on general matters

Beyond the inner circle of government officials who deal regularly with the Protocol, *awareness* of the Protocol is believed to be very low or non-existent, particularly in rural communities. It was, however, noted that while individuals or communities may not be aware of the Protocol, it was increasingly appreciated that water was a resource that had to be shared with other communities and States. One interesting question is whether the Protocol needed to be '*popularised*'.

Overall view

A large majority of participants took the view that the Protocol plays an important role in IWRM in their country

and the region. Some were more sceptical about its real impact. There was mostly satisfaction that the objectives of the Protocol are being met, except for the third objective dealing with the harmonisation of legislation, policy etc, where the achievement is reflected as 'minimal'. There was broad consensus that the region was in a learning phase with the Protocol.



LESSONS AND FUTURE PERSPECTIVE

General views

A majority held the view that the implementation of the Protocol is primarily through the *river basin institutions*. To this end, these institutions needed strengthening. The view was expressed that the current set-up, where commissioners are drawn from government officials and the institution has no executive capacity, was necessarily reactive in nature. An executive office could transform this to a proactive approach. There was also a general call for *capacity building* – the *sustainable funding* of all the types of institutions was considered to be the key to progress. There was general agreement that a *monitoring and evaluation* system with peer assist elements should be established. This would include a number of elements such as scientific and public participation. The latter was regarded by the NGO groups as a serious deficiency in the Protocol. None of the interviewees or workshop participants saw the *potential for conflict* over regional water issues, although it was also said that the Protocol had not been tested 'under fire'.

Specific recommendations

As the study progressed, the participants were afforded the opportunity to reflect on the future strategy of SADC in the water sector. The consensus around the proposals was collated into six 'strategic thrusts', each with implementation actions as follows.

Strategic thrust No 1:

Popularising the Protocol

The research found that the Revised Protocol was not well known outside the circle of government officials that dealt with it regularly. On the other hand, there was recognition that its provisions affected many persons.

Action 1.1.

The SADC Water Division, assisted by the river basin institutions and with the participation of stakeholders, should develop a plan for popularising the Revised Protocol.

Action 1.2.

The SADC Water Division should develop a programme (eg of annual or biannual workshops or seminars) to explore and increase understanding of the Revised Protocol amongst the SADC Water Division, national government and river basin institution officials who deal with the Revised Protocol regularly.

Strategic thrust No 2:

Establishment of a monitoring and evaluation function

The research shows that there is wide support for a monitoring and evaluation function to report on the implementation of the Revised Protocol in the widest sense. The SADC Water Division is mandated by the Revised Protocol to request relevant information from the river basin institutions, but far more than information gathering is envisaged. This may, however, be incongruent with the role of the SADC Secretariat reflected in its 2003 restructuring. Due to capacity constraints, a staged approach will be necessary.

Action 2.1.

The SADC Water Division should, in a participatory process, progressively develop a set of key indicators related to the implementation of the Revised Protocol.

Action 2.2.

The river basin institutions, in consultation with the SADC Water Division, should develop a reporting Revised Protocol for river basin institutions.

Action 2.3.

The SADC Water Division should establish an annual reporting mechanism that will inform all interest groups.

Strategic thrust No 3:

Development of river basin organisations

The research established that the river basin organisations were expected to play a far greater role, particularly at the interface with stakeholders, than had hitherto been the case. Their role in outreach programmes to stakeholders was emphasised.

Action 3.1.

The river basin organisations should develop generic guidelines on how they should carry out the responsibilities assigned to them as a consequence of the Revised Protocol.

Strategic thrust No 4:

Consolidate data sets into the SADC Secretariat

The research shows that there are technological and capacity barriers to having data and information that the States agree on, and which can foster cooperation through mutual understanding and trust.

Action 4.1.

The SADC Water Division should develop common data protocols so that all water resource data in the SADC region is available to all stakeholders, through the SADC Secretariat or other information hubs.

Action 4.2.

The Water Division should facilitate an increase in the role that SADC-HYCOS and the FRIEND programmes play in providing commonly agreed data.

Strategic thrust No 5:

Clarify the legal status of river basin organisations

The research found that there were concerns about the legal status of some of the river basin organisations in some of the countries. This related, inter alia, to contracting capacity and the rules of some of the potential cooperating partners.

Action 5.1.

The SADC Water Division should obtain legal opinion on the issue, and if it is a problem, how it can be resolved.

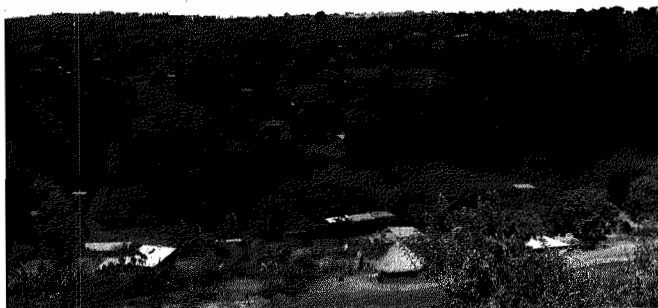
Strategic thrust No 6:

Build capacity in the States' ability to enforce their regulatory systems

The research found that although the States had regulatory systems in matters such as environmental management, water use authorisation and waste management, their capacity to enforce the measures was poor. This capacity was essential for harmonious joint management.

Action 6.1.

The SADC Water Division should facilitate international assistance in building capacity around regulatory enforcement as one of the building blocks of transboundary river basin management.



a phase where more tangible outcomes will have to be achieved.

The research outcomes show that the main focus of the Protocol to create river basin institutions has proceeded well and is continuing to gain momentum. The form that these institutions take varies, and there is debate and studies about the merits of permanent secretariats.

The Protocol introduced specific objectives and a list of requirements that this research categorised into 'behaviours' and 'actions'. The research outcomes show that progress with most aspects is regarded by key stakeholders as satisfactory. The more favourable dimensions are the willingness to cooperate on projects, the respect of the parties for international water law and the exchange of information. The less favourable dimensions are those around environmental management, where the capacity to apply, monitor and enforce what are regarded as good regulatory measures, is poor.

The proposals for accelerating the implementation of the Protocol, which were made by the participants in the research, have been distilled into six strategic thrusts, namely: popularising the Protocol, establishing a monitoring and evaluation function, developing river basin institutions, consolidating data sets into the SADC Secretariat, clarifying the legal status of river basin institutions, and building capacity in the States' ability to enforce their regulatory systems.

Clearly, these strategic thrusts will require political commitment, consensus building among the river basin institutions that should become the main instruments of implementation and considerable support from the international community. The SADC Water Division has a key role in leading and facilitating the initiatives.

CONCLUSION

The researchers were routinely reminded that, prior to 1990, the principles and spirit now embodied in the SADC Treaty and Water Protocol, were not adhered to. There is a legacy of disregard by upstream States of the needs of downstream States that has not yet been fully addressed, notwithstanding the present positive cooperative climate.

The implementation of the Protocols was recognised as a long process rather than an event. The number of agreements, commissions and other river basin institutions that have been established bears testament to the governments' commitment to the cooperative ideals expressed in the SADC Treaty and Protocol. The process is in transition to

CHAPTER 5

THE SIGNING OF THE ZAMBEZI WATERCOURSE (ZAMCOM) AGREEMENT

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ABSTRACT

The Zambezi River is shared by Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. The potential of the shared water resources of the Zambezi River Basin to contribute significantly to the economic development of southern Africa is recognised within and outside the region. Conscious of this fact, the riparian States of the Basin agreed that the water resources of the Basin could only be managed effectively, efficiently, equitably and sustainably by embracing integrated water resource management with the entire Basin as the geographic unit of management. In this regard, the riparian States agreed to establish the Zambezi Watercourse Commission (ZAMCOM). The Agreement was formally signed on 13 July 2004.

The key lessons learnt from the ZAMCOM negotiation process is that the management of shared transboundary waters is fundamentally a political activity, that the riparians must have a shared vision and that cooperation cannot be forced. Ownership and leadership of the process must rest with the riparian States, and mechanisms should be put in place to build mutual trust and confidence amongst the riparians.

INTRODUCTION

The importance with which water is regarded in the southern Africa region, and the challenges the water sector of the region faces in managing the water resources, explain the concrete steps that have been taken towards implementing integrated water resource management (IWRM) at the national and regional levels. IWRM is seen by many in the region as a means of ensuring access to water for the most basic needs of the people. The Millennium Development Goals (MDGs) and targets, which the southern Africa region is committed to achieving, call for an improvement in access to sustainable water supply and sanitation, food security and energy security. The situation in the region is, however, still one where about 40% of the urban population, and 50% of the rural population, still lack access to safe and reliable drinking water (Chenje and Johnson, 1996). Against this background - of lack of access to a reliable water supply by some communities in the region - it is important to remember that the national boundaries of all southern Africa countries seldom follow even a portion of the 'natural' boundary of river catchments. As a result, there are 15 major transboundary rivers that are shared by countries of the region, with each country sharing one or more river basins. This peculiarity in shared transboundary water resources has presented itself as an

opportunity in the southern Africa region, for interventions that will ensure the realisation of the region's Vision for Water, Life and the Environment in the 21st Century (GWP, 2000), which is encapsulated in the statement:

'Equitable and sustainable utilisation of water for social and environmental justice, regional integration and economic benefit for present and future generations.'

THE CASE OF THE ZAMBEZI RIVER BASIN

The current reality within the Zambezi River Basin is one of increasing populations, despite the impacts of the HIV/Aids pandemic (Chenje, 2000). This is accompanied by rapidly increasing urban water demands and mounting environmental concerns, with demands for water in some parts of the Basin fast approaching the limits of exploitation of local resources (ZRA, 1998). This means that demands for additional supplies of freshwater will need to be met through long-distance transfers of ever-larger quantities of water from regions that have ample supplies.

Conscious of some of these challenges in water resource management within the Zambezi River Basin, the riparian States realised that the shared water resources of the Basin could only be managed effectively, efficiently, equitably and sustainably by embracing integrated water resource management, with the entire Basin as the geographic unit of management.

In 1987, the then Southern African Development Coordination Conference (SADCC), which is now the Southern Africa Development Community (SADC), adopted the Zambezi River Action Plan (ZACPLAN) for inclusion into its programmes. The overall goal of ZACPLAN is to achieve environmentally sound planning and management of water and related resources in the Zambezi River Basin.



ZACPLAN consists of a series of 19 projects, which are intended to support the integrated development and management of the transboundary water resources of the Basin.

In 1991 SADC, on behalf of the riparian States of the Zambezi River Basin, requested the Nordic countries to support ZACPLAN. The Zambezi River Action Plan Project 6 (ZACPRO 6) was identified as a core project of ZACPLAN. For ease of implementation, the ZACPRO 6 Project was split into two phases, Phase I and Phase II. Phase I of the Project involved the development of a hydrometeorological database, and the production of seven Sector Studies covering water consumption and effluent discharge within the Zambezi River Basin. The overall objective of ZACPRO 6, Phase II is to improve water availability and protection against floods, droughts, water resources pollution and environmental degradation in the Zambezi River Basin. The immediate objective is to assist and facilitate the efforts of the

Zambezi riparian States to create and develop an enabling institutional environment for the achievement of the overall objective. This intervention has close linkages with the RSAP-IWRM (SADC, 1998), as shown in Table 1. (Below)

The SADC Water Division, within the framework of ZACPLAN and through an instruction of the former SADC Committee of Ministers of Water (Zanzibar, June 1999), facilitated the negotiation process amongst Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe for the establishment of the Zambezi Watercourse Commission (ZAMCOM). The negotiation process was initiated in the early nineties and culminated in the signing of the ZAMCOM Agreement on 13 July 2004 at Kasane, Botswana, by seven of the eight riparian countries - namely Angola, Botswana, Malawi, Mozambique, Namibia, Tanzania and Zimbabwe. Zambia requested more time before appending its signature to the Agreement, to allow for the completion of national stakeholder consultations.

TABLE 1: LINKAGES OF THE ZAMBEZI PROCESS WITH THE RSAP-IWRM

Project No.	Project title	Main objective	Activities supporting the Zambezi process
AAA14	Assessment of Surface Water Resources	To produce and make accessible a SADC-wide surface water resources assessment in a manner that builds capacity in implementing institutions, promotes confidence in assessment products amongst Member States and ensures that the assessment supports the equitable sharing of water within international river basins and operational water resources management.	Capacity building; mutual trust/confidence building; management tools.
AAA8	Support for the Implementation of the Revised SADC Protocol on Shared Watercourses.	To develop closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of the water resources of shared watercourses, and to advance the economic integration agenda of the SADC region.	Capacity building; mutual trust/confidence building; poverty alleviation.
AAA3	Capacity Building for Joint Integrated River Basin Management.	To attain sustainable, integrated planning and management of water resources through the improvement of capacity to develop and implement joint river basin management initiatives.	Capacity building.
AAA20	Awareness Creation on Water Issues.	To strengthen and broaden regional awareness of IWRM concepts and principles at all levels to facilitate their practice in the region, contributing to equitable and sustainable utilisation of water, land and related resources. Awareness creation; capacity building; stakeholder participation.	Awareness creation; capacity building; stakeholder participation.
AAA24	Consultation and Participation of Stakeholders in Water Resources Management.	To promote the deliberate and sustainable participation of stakeholders in policy and strategy formulation and implementation, of matters relating to water resources development and management at local, intermediate, national and regional levels.	Stakeholder participation; capacity building.

THE ZAMCOM PROCESS: LESSONS LEARNT

The ZAMCOM negotiation process has generated a lot of information and experience worth noting. This is presented below:

The need for political commitment and guidance at the highest possible level

The ministers responsible for water in the Zambezi riparian States took a keen interest in the ZAMCOM negotiation process. Very often, when the negotiations seemed to be stalling, the ministers would urge the technocrats to see that the negotiation process was concluded and the ZAMCOM Agreement signed. This political commitment and guidance at the highest possible level, required for cooperation in the management of the water resources of the Zambezi River Basin, has been possible because all the eight riparian countries are members of the Southern Africa Development Community (SADC). The SADC Treaty is the central document that outlines the vision, overall objectives and institutional framework of the Community. It provides for Member States to conclude a series of protocols that elaborate the objectives, scope and institutional mechanisms for cooperation and integration in the region. This is seen in the broader objectives of SADC as contributing towards secure livelihoods, stronger economies and sustainable ecological systems. The efforts of regional and international NGOs like IUCN-ROSA, GWP-SA and IWSD and the cooperating partners, which are supporting the water sector of the region towards cultivating the political critical mass in favour of cooperation in managing international rivers, are also recognised.



The riparians must have a shared vision

The eight riparian countries of the Zambezi River Basin share the vision that a higher and sustainable socio-economic development for all will be achieved in the region through the equitable and sustainable utilisation of the common Zambezi River Basin water resources. This is in line with the Southern Africa Vision for Water, Life and the Environment in the 21st Century. As a result, cooperative solutions have been relatively easy to achieve, as the riparian States see the Zambezi process as offering great potential benefits that would be distributed equitably among them.

The rollout of the Framework for Action (FFA) for the shared Vision has gained considerable momentum. The FFA process will assist each country in ascertaining where it stands, with regard to translating the Vision into reality by 2025.

A legal framework should be in place

The ZAMCOM negotiations were expedited by the existence of the Revised SADC Protocol on Shared Watercourses, which was adopted by SADC in August 2000 (SADC, 2000). The Protocol's overall objective is to foster closer cooperation for the judicious, sustainable and coordinated management, protection and utilisation of shared watercourses, and advance SADC's agenda of regional integration and poverty alleviation. It seeks, among other things, to:

- Facilitate the conclusion of shared watercourse agreements and the establishment of watercourse institutions for the management of shared transboundary watercourses;
- Advance the sustainable, equitable and reasonable utilisation of the shared watercourses;
- Promote a coordinated and integrated environmentally sound development and management of shared watercourses; and
- Ensure the harmonisation and monitoring of legislation and policies for the planning, development, conservation and protection of shared watercourses, and equitable allocation of resources.

Ownership and leadership of the process must rest with the riparian States

A key guiding principle of the ZACPRO 6, Phase II Project is active stakeholder participation during and after project implementation. Such an approach inculcates the spirit of ownership amongst the stakeholders, and the commitment that comes with it. The national steering committees (NSCs) that are being established in each of the riparian countries are the most important instrument in operationalising this tenet of stakeholder participation. Although initially these NSCs are being established to facilitate direct Project implementation, it is expected that they will play a more permanent role in the coordination of national water resource management. Thus, the main responsibilities of the NSCs are to provide national input on decisions and issues dealt with by the Project, and to be an avenue for disseminating the Project vision, activities and outputs to stakeholder institutions and interest groups in the home country.

This strategy of involving actors in the process should be consolidated and sustained, as it brings about the necessary commitment.

There is need for mutual trust and confidence-building processes amongst the riparians

The ZACPRO 6, Phase II Project recognises that building mutual trust and confidence amongst the riparian countries contributes significantly to the successful establishment of ZAMCOM. This is being achieved, and should be consolidated through the seconding of national staff to the Project, technical cooperation, study tours, meetings and workshops.

Disasters with international impact improve transboundary cooperation

Hydrological extreme events like floods and drought provide an opportunity to broaden transboundary cooperation. The media in such situations (as was the case in the devastating floods of 2000 and 2001) excites a profound influence in defining issues, exposing them, outlining possible solutions and suggesting, in a subtle way, how politicians could shape the outcome.

Cooperation cannot be forced

This needs no further elaboration. In the Zambezi River Basin, we are dealing with eight sovereign States that cannot be forced to cooperate in the management of the water resources of the Basin. Only voluntary decisions of the riparian States create the appropriate conditions for sustained international cooperation.

In the ZAMCOM negotiation process, compromise was viewed as an unfavourable outcome because it is designed to create an equal distribution of unhappiness about a decision. This inspires disinvestments from the process, because some or all of the negotiating parties would have developed the perception that they have been asked to give up the most, and would then seek to undermine its implementation. The negotiation approach that was adopted was one that sought consensus. With a consensus solution, a sense of ownership results, with a resulting willingness to cooperate in implementation. The cooperative nature of consensual processes builds and improves relationships because they are not confrontational. It should, however, be underscored that building relations proved to be both complex and time consuming. Therefore, the consensual process may have seemed very inefficient in the short-term, where the establishment of ZAMCOM was a key benchmark. However, the relationships developed from the foundation and sustainability of all future cooperation, resulting in a higher overall efficiency of the participatory management process. Thus, although compromises may be faster to work out than consensus solutions, the conflict they create often lingers to sabotage future processes and decisions.

Adopt a process rather than a project management approach

The situation in the Zambezi process is one where the expected outputs are not always objectively measurable. Given the differences in development, access to information and actual water resources within their boundaries, stakeholders do not always have the same expectation as to what the outcome of the project would be. Nevertheless, all these stakeholders are involved in the same process. This has the effect of exerting non-controllable external influences on the process, which impact on deliverables.

There is also no hierarchical relationship between the major actors, so that solutions have to be found in networks of actors.

A process, rather than a project management approach, therefore had to be adopted in the Zambezi process.

Key elements of the process management approach that need noting are:

- The requirements for inputs into the process can change in time, sometimes abruptly.
- The process manager needs to have easy access to resources that are needed to facilitate the development of the process.
- The focus of the process manager should be on understanding the context of the project, and to anticipate and possibly influence the external processes.
- The process manager is not responsible for the content of the process. The actors in the development process are responsible for the content and the outcome of the process, in terms of the results.
- Actors' key interests should be protected.
- Both the process and its management should be transparent.



FUTURE PERSPECTIVES

Institutional development of ZAMCOM

It is clear from the Zambezi experience that processes of transboundary water resources management take time both to establish and to function, not least because of the challenge in understanding the complexities of the development. While it may be easier for national-level technocrats to perceive a benefit stream at national level from cooperation, civil society may have a different view of, and access to, such benefits. Thus, in developing the institution ZAMCOM, it should be regarded as 'managed conversation', where people belonging to the institution will talk to each other all day long about what they must do and how they will do it. They will also talk to a variety of stakeholders that can be other institutions, civil society or individuals. If the right people are involved and if these conversations are transparent, honest, inclusive, constructive and positive, a solid foundation for the coordination of activities and outputs in the Zambezi River Basin will be laid. If, however, key stakeholders are left out, and if the conversation is constrained and does not disclose all information and reveal true preferences, then an uncoordinated approach is assured. There is, therefore, a need for ZAMCOM to develop a systematic approach to capacity building in the development of its communication capacity.

Common monitoring infrastructure contributes to mutual trust

Some of the activities under the secondment programme of the ZACPRO 6, Phase II Project have been the preparation of national inventories of the available hydrometeorological data and data collection systems in the Zambezi River Basin, as well as the design of a conceptual hydrological network for the basin. As a sign of mutual trust, Botswana and Namibia, for example, due to the non-availability for secondment of national staff (hydrologists), invited national staff from other riparian countries that were already seconded to the Project to carry out the task of establishing the inventory of hydrological data in their respective countries. The seconded staff were given full logistical support and access to data and information. A critical recommendation that has come from the secondment programme is that there is a need for a pre-seasonal meeting for hydrologists, where data and information on the state of the regional and individual country situation reports can be presented. This can be extended to other disciplines like water quality.



There is need for a paradigm shift from sharing water to sharing benefits

Sub-article 3(7)(a), which lists one of the general principles of the Revised Protocol on Shared Watercourses (SADC, 2000), is perhaps the Protocol's most important provision. It states that 'Watercourse States shall in their respective territories utilise a shared watercourse in an equitable and reasonable manner...'. This item sets forth what many regard as the cornerstone of the law of shared watercourses - namely, the principle that a watercourse state should use an international watercourse in a manner that is equitable vis-à-vis other States sharing the watercourse. The need for a paradigm shift from equitably sharing water to equitably sharing benefits is now generally recognised by the key stakeholders in the Zambezi River Basin. Shifting focus from sharing water to sharing the benefits derived from its use provides far greater flexibility, even though it is perhaps the most difficult and sensitive challenge in cooperative management of the shared basin. The local impact, mediated through national processes, has to be a key driver of decision-making on benefit sharing and cooperation.

A concerted public awareness campaign is, however, required to meaningfully realise this paradigm shift.

Coordination

It cannot be over-emphasised that financial and human resources are the most important resources in the development programmes of the Zambezi River Basin and, indeed, of the whole southern Africa region. Both are, however, limited in the Basin, as the secondment programme has shown. It therefore follows that if they are not judiciously applied, there will neither be effectiveness nor efficiency in the implementation of water management and development programmes to improve the livelihoods of communities in the Basin. Effective coordination allows for the application of a critical mass of resources to realising development goals, thereby eliminating the duplication of effort and institutional rivalry, which only produce negative energy. In an uncoordinated development process, most stakeholders either cannot or do not contribute as much as they should to the process because they do not understand the process, or do not agree with it or feel the need to support it, such that their efforts are directed elsewhere. A key strategy in improving coordination of development processes is to get all stakeholder energy focused on the same objectives through the NSC structures. This multiplies the impact of their efforts, and gives the process more value for money. On the other hand, it should be recognised that coordination consumes time, energy and resources and measures for it, therefore, should be pursued in such a manner that they do not cause counterproductive effects, such as increased costs of delivering benefits to communities. These are some of the challenges that lie ahead for ZAMCOM.

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CHAPTER 6

THE ESTABLISHMENT OF RIVER BASIN SECRETARIATS IN SOUTHERN AFRICA: LESSONS FROM ORASECOM

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ABSTRACT

The SADC Water Sector has long supported the establishment and development of cross-boundary River basin organisations (RBOs). The key legal instrument is the SADC Protocol on Shared Watercourse Systems, and the SADC Water Division has promoted and facilitated support to RBOs through the Regional Strategic Action Plan. This paper outlines elements of an investigation undertaken for the Orange-Senqu River Basin Commission (ORASECOM). The investigation addressed the feasibility of a secretariat to serve ORASECOM, and perspectives and lessons relevant to SADC and other southern African RBOs are presented.

INTRODUCTION

The Orange-Senqu River Basin Commission (ORASECOM) Agreement was signed in Windhoek in November 2000. The Member States are Botswana, Lesotho, Namibia and South Africa. The original Protocol is the formal legal reference in the ORASECOM Agreement, but ORASECOM agreed to work to the Revised Protocol in 2002. Shortly after the signing of the ORASECOM Agreement, a regional workshop was held to develop a detailed project outline for cooperation between the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) and SADC. This consultation addressed the Orange-Senqu basin as a focal area for cooperation, and consolidated support to ORASECOM in the framework of the SADC Regional Strategic Action Plan (RSAP). The project document was formally adopted by ORASECOM.

Among initiatives identified in the project document was a feasibility study for the establishment of an ORASECOM secretariat. The study was undertaken in 2003, and ORASECOM took a decision to proceed with implementation in 2004. In deciding to establish a river basin secretariat, ORASECOM is a pioneer in the southern African context. This paper reviews the international experience and legal framework that informed recommendations regarding a secretariat, and it lays out options available to ORASECOM and southern African river basin organisations (RBOs) against this background. It draws lessons for SADC and RBOs. The paper is based on the secretariat feasibility study undertaken by the authors, and draws from legal opinion attached to the study, prepared by Advocate SFI Ueitele. The study was undertaken for ORASECOM, and was commissioned and funded by GTZ. At the time of writing, ORASECOM was

taking steps to establish its secretariat, so debates and conclusions in this context are not expanded in this paper. The interpretation of options and lessons is that of the authors.

KEY ISSUES ADDRESSED

International case studies

Recent years have seen significant progress in the establishment of legal instruments and institutions to secure the management and wise use of international water. International water law has been codified, and RBOs have been established in many key international river basins. ORASECOM and other southern African RBOs are unique organisations with specific political, economic, human development and water resource management contexts. Lessons drawn from practice elsewhere have to be carefully evaluated, with due consideration for differences in mandate, scope of work, funding and resources and Member State priorities and capacity.



Three examples of existing RBO practice were examined as background to the ORASECOM secretariat feasibility study:

- The International Commission for the Protection of the Rhine River;
- The International Commission for the Protection of the Danube River; and
- The Mekong River Commission.

The findings relevant to the establishment and operation of secretariat functions were the following:

- Details of RBO structures vary, but all three cases have elements in common. These include a high-level representative structure (a commission or council), a coordinating or steering group, a secretariat, and structures and instruments to facilitate expert and public involvement and participation.

- The three RBOs share common core objectives, centred on the principle of cooperation for fair and sustainable water resource management. They have, however, adopted different priorities: the Rhine and Danube RBOs focus quite narrowly on water quality and resource protection, while the Mekong Commission devotes attention to the broader issues of sustainable water use, and the role of water in development.
- The three secretariats differ in size and organisation. The Rhine and Danube secretariats are small. For the Rhine, the secretariat is largely administrative. It has two professional staff and eight translators. The Danube secretariat has six staff, including technical expertise around pollution control, water quality management and information management. By contrast, the Mekong secretariat numbers more than 100 people. The structure reflects strong links with water institutions in the Member States, all of which second technical staff to the secretariat.
- Secretariat and RBO operational costs are borne by the Member States, with differing levels of donor support. Donors make a significant contribution, in the case of the Mekong. In the Rhine Commission, Member States contribute in proportion to national economic resources. For the other two RBOs, Member States pay equal shares.

The examples show how selected international RBOs have positioned themselves, and how they have structured secretariat support in this context. From this experience, issues to be considered by southern African RBOs are: the appropriate size of the secretariat (in response to scope and complexity of commission work, and relationships with Member States), the level of technical capacity required in the secretariat (if any), and the sources and relative size of contributions to secretariat costs. Here, decisions need to be made regarding the role of donors, and the fair distribution of costs among Member States.

Legal options

Typically, southern African RBOs are established in terms of agreements between the Member States. Important legal questions to be addressed by RBOs in this context are:

- Does the agreement mandate the establishment of a secretariat?
- What are the options for the establishment of the secretariat as a legal entity, and what are the constraints and benefits associated with these options?
- Does the agreement mandate levies on Member States and the use of other funding sources to cover secretariat costs?
- What steps need to be taken to align the agreement with the secretariat establishment process?

Establishment mandate

The ORASECOM Agreement does not make specific reference to a secretariat. The Agreement specifies the objectives of the Commission, however, and provides that it should 'make decisions necessary to implement

the Agreement'. Legal opinion suggests that this clause impliedly empowers the Commission to set up a secretariat, if such is required to execute the objectives and work of the Commission. Since most southern African RBOs are likely to consider secretariat establishment as they grow, it may be useful for these organisations to examine their own agreements to see whether this action is specifically or indirectly mandated. New RBOs might make explicit reference to a secretariat function in their founding agreements.

Legal entity options

ORASECOM is a private institution between some SADC Member States. The Agreement provides that it should have international status and international legal personality. In addition, the Commission may have access to immunity and privileges accorded to organs of SADC, because it has its roots in the SADC Treaty via the Shared Watercourse Protocol. The nature and extent of immunities and privileges remain to be tested in practice.

Other southern African RBOs probably have similar legal status. Within the wider legal framework, however, RBOs will have to decide among options to entrench their secretariats as legal entities. Amongst the options is the constitution of secretariats as SADC organs, or as entities (including a spread of non-profit legal forms) in host countries where they are located.

The former option would see secretariat functions governed by international law and specific 'internal law', whilst the latter would operate under relevant national laws. The latter option may be simpler from an administrative point of view, but it might be politically loaded if Member States have sensitivities regarding overemphasis of the role and influence of one country. The former option will entrench the international character of the secretariat, but it may also bring reporting requirements outside the RBO itself.

At time of writing, ORASECOM was exploring legal entity options for its secretariat. Its evaluation and decision will be of great interest to other RBOs in the region.

Secretariat funding sources

RBOs around the world fund their secretariat and other support functions in a variety of ways. Among the cases outlined in this report, the dominant sources of funding are member levies and contributions by donors. The current ORASECOM Agreement provides for sharing of human and in-kind resources under limited operational conditions.



It is, however, unclear on mechanisms to fund the secretariat, and it does not provide a financial or regulatory framework within which to manage funding streams.

In the ORASECOM case, the Agreement may have to be amended to make provision for the funding of the permanent secretariat. Other RBOs may wish to be proactive in reviewing their own agreements, and to put the necessary legal provisions in place.

LESSONS AND INSTITUTIONAL IMPLICATIONS

Institutional options

The establishment of a secretariat has important implications for the effectiveness and efficiency of the RBO embarking on this action. It is likely that most RBOs will require a secretariat at some point in their evolution, and especially when they begin undertaking or managing basin-wide projects. ORASECOM has reached the point where a secretariat is necessary, hence the recent decision to proceed with establishment.

There are risks and costs associated with setting up a secretariat. The costs are related to the establishment of an office, and to ongoing operations. For RBOs in developing regions, there is likely to be concern among Member States that secretariat activities might be unaffordable and unsustainable. The main risk is that of establishing a structure that does not match the requirements or workload of the RBO, thereby failing to use limited resources optimally.

The key institutional questions for RBOs in this context are:

- What is the right size for the secretariat, and what skills and capacities should it include?
- Is a phased establishment process appropriate, and what steps should be followed?
- Are there advantages or disadvantages to sharing secretariat facilities with other RBOs?
- What is the most advantageous staffing arrangement (seconded, employed or contracted staff)?
- What funding sources are available, and what is the correct balance?
- How will the secretariat relate to the Commission?
- How will the secretariat relate to other RBO structures, and to SADC?
- What are the issues to consider when selecting a location for the secretariat?

Size and composition

RBO secretariats vary widely in size and composition. Organisations establishing secretariat functions should look at the issue from the perspectives of affordability, broader institutional context and work to be done. Affordability will, of course, determine the upper limit in terms of size and levels of expertise (and hence cost) involved.

The broader institutional context has a bearing on secretariat size and

composition in a number of ways. For example, project management might be outsourced or undertaken by secretariat staff. Member States may wish to second staff to the secretariat to help, or to gain experience.

The scope and nature of the work to be done should also be a determinant of size and composition. In general, a commission that retains an advisory and oversight role will require a small secretariat with appropriate high-level expertise. A commission undertaking more complex activities, such as basin planning, monitoring and the mobilisation and management of WRM projects, may need more people with a wider range of expertise.

The following are secretariat scenarios against the background of considerations presented above:

- A secretariat with purely administrative functions and responsibilities (as in the case of the Rhine Commission). This might comprise as few as two staff (head and secretary), or the core staff and some logistical support.
- A secretariat with administrative and technical functions. This might also be small, with one or two technical experts and core administrative staff. It could become much bigger where technical functions move from a strategic and oversight level to responsibility for particular functional areas and projects (for example, a development expert, a quality expert, an information expert etc).
- A secretariat with the above functions, but which also includes place for secondees from Member States (as in the case of the Mekong), and for project managers and project support staff. The secondees may serve a technical support function, but they might also be involved to build Member State capacity in the international water environment.

ORASECOM has looked at options ranging from a small body of secondees (two – a coordinator and a secretary) to a contracted secretariat combining management, administrative, technical and financial functions (four people). The latter is the most likely selection.

Phased establishment

Phased establishment is an option for young RBOs seeking to balance secretariat costs and operational effectiveness in the context of a growing organisation. The ORASECOM secretariat feasibility study presented the following as a possible phasing scenario:

• Orientation period (1-3 years):

A secretariat comprising a seconded coordinator and secretary, with the continuation of the existing technical and legal task teams. Project implementing and steering structures to be set up according to project requirements.

• Growth period (2-4 years):

A secretariat comprising a contracted executive secretary and administrative assistant (one-year renewable contracts), with one secondee from each Member State.

Other elements of the secretariat were seen to be task teams appropriate to commission activities, and project

implementing and steering structures.

- **Consolidation period (4+ years):**

Executive secretary and administrative assistant on longer-term contracts, with the addition of one or more technical experts on one-year renewable contracts.

Other arrangements as per growth period.

In practice, ORASECOM will skip the proposed orientation arrangement, moving relatively quickly to an arrangement with elements of the growth and consolidation scenarios.

Secretariat sharing

The possibility of a 'super secretariat', serving several southern African RBOs, has been mooted in some circles. In reviewing this option for ORASECOM, the secretariat feasibility study concluded that the benefits of a dedicated secretariat (including closeness to Member States and beneficiaries) outweighed those of the super secretariat. It was felt, however, that a mechanism for regional lesson learning and sharing, possibly facilitated by the SADC WD, would be worthy of consideration.



Staffing arrangements

Within the legal and institutional considerations discussed above, RBOs will have to assess various staffing options. The options include:

- Seconding secretariat staff from Member States and other river basin institutions;
- Employing staff individually - a variety of contracting options can be deployed here; and
- Contracting an organisation to provide secretariat services.

The first option is relatively low cost (although impacting the seconding organisations financially and in terms of capacity), and it avoids many legal hurdles regarding employment. The second and third options will cost more than the first, but they offer the opportunity to build focused and sustainable capacity. Legal opinion for ORASECOM came to the conclusion that the employment option might permit staff to access diplomatic privileges, whilst the outsourced option would not. Overall, the secretariat feasibility study concluded that the employment option was preferable for RBO consolidation, with secondment an option for short-term needs.

Funding sources

Two areas of decision-making face RBOs looking at ways to fund their secretariat functions:

- **Determining the correct balance between Member State contributions and contributions from other sources.**

The Mekong Commission makes extensive use of donor funding, in addition to Member State levies. In southern Africa, donors are keen to support RBOs and their activities, and considerable resources have already been committed through the RSAP. The dominant international principle - and that recommended for ORASECOM by the feasibility study - is that secretariat operational costs must be funded by Member States for the sake of sustainability. Project and other costs can be covered from a mix of sources.

- **The determination of a fair formula for Member State contributions.**

This formula is important, because it underpins ongoing relationships and trust among the RBO Member States. It is likely to be sensitive where there are wide regional discrepancies in development, influence and capacity. The key options for structuring the formula are: equal contributions (as in the case of the Danube and Mekong commissions), contributions relative to wealth [for example, gross domestic product (GDP), GDP per capita and gross geographic product in national portions of the basin], and contributions relative to water use and beneficiation.

ORASECOM is looking at options in the context of the above. Its decisions may well set a regional precedent for other southern African RBOs.

Secretariat relationship with the commission and other RBO structures

The role of a RBO secretariat should determine its relationship with the commission and with other RBO structures. From the international experience, and considering the options presented to ORASECOM in the secretariat feasibility study, the following issues require attention by RBOs embarking on secretariat establishment:

- The nature and organisation of links between the commission (and its secretariat) and water ministers in the Member States. The SADC Sectoral Committee of Water Ministers no longer exists, limiting to some extent the opportunities for water ministers to discuss matters of mutual interest. The feasibility study proposed consideration of an ORASECOM committee, bringing together its water ministers. If RBOs go this route, secretariats will play a key role in facilitating the activities of the committee.



- The need for a strategic or coordination group to provide high-level support and advice to the Commission. The Rhine, Danube and Mekong commissions all have steering/coordination committees. The ORASECOM secretariat feasibility study proposed the establishment of representative steering committees for cooperative projects. A key role for the secretariat was seen to be that of providing operational and monitoring support to the steering committees, and of facilitating their reporting to the Commission.
- The structure and organisation of project support. A key issue here is whether to build project management capacity into the secretariat function. The ORASECOM secretariat feasibility study envisaged project implementation units or teams attached to specific projects. These would be outsourced, and structured according to the requirements of the project, the funders and the Member States.
- The need for, and relationships with, expert bodies. The Rhine Commission has three Working Groups, and the Mekong has a number of Commission Programmes. The feasibility study left the option of task groups open for ORASECOM, depending on specific needs and requirements.
- Accessibility, including attractiveness for key staff and travel costs for commissioners and task team members; and
- Office and residential accommodation, including costs, lease conditions, support services and possible discounts for an international organisation.

At the time of writing, ORASECOM had made in-principle decisions regarding the location of its secretariat, and was looking at specific office options.

BEST PRACTICE AND IMPLICATIONS FOR SOUTHERN AFRICAN RBOs

This paper has sought to identify and discuss legal and institutional options and lessons to be considered by southern African RBOs wanting to establish secretariat functions. For the purposes of this contribution, reference has been made to the Rhine, Danube and Mekong commissions. There are many more examples, but the selected cases provide useful pointers for secretariat structure and function in different settings.

In the southern African context, ORASECOM is an important reference point for RBOs, because it is establishing a permanent and dedicated secretariat. Southern African RBOs will naturally make their own secretariat decisions, based on functions, resources and Member State priorities. There is, however, merit in learning from others pursuing similar courses of action. The purpose of this paper has been to contribute to such sharing and learning.

From a broader best practice perspective, the following points have emerged:

- The legal framework of the Protocol, and the strategic and thematic approach of the SADC RSAP, have served to galvanise multi-stakeholder support and interest around the establishment and development of international RBOs.
- The SADC Water Division has played - and can continue to play - an important facilitative and lesson-sharing role in this context.
- ORASECOM has grown into a sustainable organisation. It is a good example of organisational and institutional development in the SADC context. SADC laid some of the foundations (legal and donor support), allowing the organisation to find and develop its own identity. In many ways, ORASECOM and other regional RBOs are the future institutional backbone of water management in the SADC region.

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Location

Secretariat location is potentially a difficult issue, especially where matters of national pride, basin state trust and perceived inequities of power and influence come into play. The ORASECOM feasibility study proposed criteria for the selection of a location.

These are:

- Relative legal status and protection of secretariat staff;
- Implications of local labour law, including requirements for hiring, working conditions and dismissal/severance;
- Implications of import and customs regulations, including procedures and costs for importing IT and other equipment, and possible exemptions for an international organisation;
- Tax regime implications, including income tax levels and possible international exemptions;



CHAPTER 7

ESTABLISHING THE BASIN-WIDE FORUM FOR OKACOM: STRENGTHENING DIALOGUE BETWEEN THE BASIN COMMISSION AND STAKEHOLDERS

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ABSTRACT

The majority of large rivers in southern Africa, such as the Okavango, are shared by three or more countries and, consequently, their management presents many challenges, including state sovereignty and sometimes-challengeable governances, inconsistent laws and policies, inadequate institutional capacity, and varying levels of poverty distribution. The disparities between States resulted in disjunction in management of these watercourses and the associated resources. The SADC Protocol provides for the establishment of river basin commissions, and the Okavango River Basin (ORB) is one of those established. The Commission alone cannot manage water resources in a socio-politically, economically and ecologically sustainable manner. Consequently, the ORB has, through the Every River Has Its People project, established a community structure - the Basin-wide Forum - to aid participation by stakeholders further and, most importantly, to be custodians of the resources.



INTRODUCTION

The SADC Water Protocol on Shared Watercourse Systems and a revision were signed in 1995 and 2000 respectively, to provide a framework for cooperation on water issues. In attaining the goals of the Protocol, SADC, through its Water Division, is guided by the broad Regional Indicative Strategic Development Plan (RISDP) and the water sector-specific Regional Strategic Action Plan for Integrated Water Resource Management (RSAP-IWRM). This recognises water as a tool for poverty eradication and focuses on broader participation in the implementation of the programmes. The RISDP aims to eradicate poverty, while the RSAP-IWRM focuses on improved governance in water resource management, and capacity building of stakeholders to enable them to engage more effectively at the implementation level.

Improved governance implies

participation of all stakeholders, including grassroots or community institutions. It is in light of this that the SADC recognises the potential role that community institutions can play in encouraging increased participation by grassroots communities.

The SADC Water Division implements the RISDP and RSAP-IWRM through river basin organisations and, hence, has a commitment to establish and strengthen river basin organisations (Target 5, Water Section: Priority Intervention Areas - RISDP). Basin commissions were and continue to be established to implement the obligations to which the SADC countries committed themselves. To this end, river basin commissions exist in the Okavango River Basin (OKACOM), the Orange River and the Zambezi, to mention a few. The commissions also identify their stakeholders and may establish stakeholder institutions, as necessary, to aid the achievements of the set goals. In the case of the ORB, the Basin-wide Forum (BWF) was established to facilitate the participation of the grassroots communities in decision-making and the sound management of the Okavango.

The ORB-BWF was established through the Every River Has Its People Project (ERP), a Swedish International Development Agency-funded project. The project's main aim is to build the capacity of the Okavango Basin residents to participate in the planning, management and utilisation of their natural resources effectively. Until now, the BWF has been supported through the ERP, although mechanisms are being put in place to ensure its self-sustainability. The BWF is a community institution comprising 30 community representatives, 10 from each of the ORB riparian countries (Angola, Botswana and Namibia). The membership comprises traditional authorities, fishermen, craft makers, farmers, women and youth associations, among others. It meets at least once a year, and country level forums meet at least biannually. The purpose of the meetings is primarily to take stock of what is happening in the basin, and to share experiences.



Like in the OKACOM, each country elects a co-chairperson every year to preside at country forum meetings. The chairpersonship of the Basin-wide meetings rotates, similar to the OKACOM, and hence the BWF has an equivalent structure to the OKACOM, but at a grassroots level.

The conception of the BWF

In 1994, the ORB States (Angola, Botswana and Namibia) signed a tripartite agreement to form what is known as the Permanent Okavango River Basin Commission (OKACOM). This agreement, which was reached as a response to some perceived threats, committed the riparian States to manage the ORB, based on the principles of equity, sustainability and openness, as well as jointly to develop an integrated basin-wide management plan (OKACOM, 1994). As the region's freshwater resources suffer from erratic rainfall, persistent droughts and high evaporation rates, and come under growing development pressure, it became increasingly important to establish effective national and regional institutions and management approaches to manage the water resources collectively and holistically.

Shared river basins present specific management challenges for a number of reasons. Firstly, ecosystems transcend national boundaries and need to be managed jointly, but are usually managed differently in each country. Secondly, environmental problems such as deforestation, dispersal of alien species and water pollution know no boundaries. Thirdly, upstream activities affect the downstream health of the basin and, fourthly, activities and plans from outside the basin can significantly impact on the basin. Finally, there are multiple stakeholders, whose decisions at different levels affect environmental and developmental outcomes. As a result, it is crucial that the management and sustainable use of resources are carried out at basin-wide level, as well as at national and local levels. It is especially important that local residents, as custodians of the resources, are included in basin-wide decision-making processes, so that they are not overlooked by national and international development agendas. Previous studies had indicated that these problems were, to a great extent, a result of the lack of flow of information between the communities, as the custodians of the resources, and the technical people (Basupile and Murphy, 1997 and 1999 respectively). Murphy (1999) also asserts that the reason there is failure in sustainable management of natural resources is that government policies sideline communities (user group) in decision-making.

In light of the above, an advocacy institution, the Okavango Liaison Group (OLG) was set up. This Group's members comprise non-governmental organisations (NGOs), communities, academics, trade associations and individuals.

The Group formulated a project proposal that sought to improve the capacity of the community and community institutions, which led to the establishment of the Every River Has Its People Project.

Through the ERP, the OLG aimed to fulfil a niche in the greater OKACOM objective of developing an integrated management plan for the Okavango River Basin. Capacitating and empowering communities to take part in the decisions affecting them meant information collation and dissemination, institutional development and linkages, capacity building, regional collaboration and networking, and the preliminary implementation of an action plan to integrate improved natural resource management and livelihood considerations, among other activities. The key to the success of this project was to have a politically and socially accepted institution that would spearhead the participation of the basin community at all levels of decision-making. It was on this basis that the BWF was formed.



THE CONTEXT OF THE INTERVENTION, INCLUDING LINKAGES TO THE RSAP-IWRM AND THE RISDP

The Every River Has Its People Project (ERP) aims at building the capacity of the Okavango River Basin residents to participate effectively in the planning, management and utilisation of their natural resources, and to share experiences and lessons learned with other river basin communities and authorities.

The ERP goal is founded from principles of OKACOM, and the main precepts of the Southern Africa Vision for Water, Life and the Environment, which is 'equitable and sustainable utilisation of water for social and environmental justice, regional integration and economic benefit for present and future generations' [Regional Strategic Action Plan for Integrated Water Resource Development and Management in the SADC Countries (1999-2004)]. It is discernible that in both the ERP goal and the SADC region's water goal, there is an aspect of multiple uses of water, which can be managed by the involvement of the various stakeholders. Consequently, successful implementation of the above two goals - which also seek to find balance between the varied water resources use, and between generations and social structures - achieves the objectives of the SADC-RISDP.

It is worth highlighting that, in 1999 when a review of the SADC Water Division was undertaken, the following key issues as outlined in the RSAP were identified:

- Weak legal and regulatory framework;
- Inadequate institutional capacities of national water

- authorities and regional or river basin organisations;
- Weak policy framework for the sustainable development of national water resources;
- Poor information acquisition, management and dissemination systems;
- Low levels of awareness, education and training with respect to economic, social, environmental and political issues regarding water resource development and management;
- Lack of effective public participation by all stakeholders, particularly women and other social groups; and
- Infrastructure is inadequate and unable to meet the growing demands for service.

Of these key issues from the RSAP-IWRM, the ERP is implementing (b), (f), (d) and (e). The fundamental aim of the ERP is capacity building [addressing (e)] to ensure effective participation [addressing (f)] through collecting, collating and disseminating information [addressing (d)]. The BWF is the focus as an augmentation to the efforts of OKACOM [addressing (b)]. It can, therefore, be contended that the ERP is contributing to the implementation of the RSAP-IWRM. In other words, IWRM can be said to be promoting coordinated development and management of watercourses and water resources, land and related resources, with the aim of maximising the resulting economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems (RSAP 1999-2000). It is important, on this note, to emphasise the principal process of full involvement of the stakeholders necessary for the achievement of this dream, which is what the ERP does.

With respect to the RISDP, Chapter 6 (6.2) outlines the principles for the successful implementation of the ultimate goal of poverty eradication. Of the implementation principles, the ERP's activities are fulfilling principle 6.2.2, which States that:

'Implementation... must be based on broad participation and consultation, in order to engage as many stakeholders as possible, to create the ownership for the outputs...'

The ultimate goal of the ERP, as stated above, is to ensure the participation of stakeholders in natural resources decision-making, conservation, management and utilisation. Several priority intervention areas are covered in the goal. These are, inter alia, participation in decision-making, poverty eradication through utilisation, gender equality and development, environment and sustainable development, and human and social development. Indicators to the achievement, as outlined in the goal of the project, are 'effective participation in the planning, management and utilisation of natural resources'. The ERP has an HIV/Aids and Gender (HAG) component, and it is through this component that gender and youth issues are addressed.

How is the linkage to RSAP-IWRM and RISDP achieved?

There are several ways that the ERP interacts with the SADC Water Division. Firstly, through OKACOM (since the project is under the auspices of the OKACOM), then through the Global Water Partnership (GWP) (which is implementing IWRM for the SADC Water Division), and, finally, directly through the Basin-wide Project Advisory Committee (BPAC), in which the SADC is represented.

KEY ISSUES ADDRESSED AND THE MAJOR ACTIVITIES UNDERTAKEN

The major activities of the initiatives can be summarised under the main objectives, namely:

To increase the capacity of communities and other local stakeholders etc.

The project has developed excellent working relations with communities and stakeholders in the basin, and has conducted extensive research to determine their capacity-building needs and interests. Materials were developed to assist with this capacity building and creating a greater understanding of the ORB. Socio-ecological surveys (SES) were conducted in 1999, to establish a true picture of the basin. The SES came up with several products, among them an inventory of basin natural resources (including highlighting environmentally sensitive areas), an inventory of the varied uses of the resources and an inventory of available expertise for the sustainable management of the resources (including indigenous knowledge). Capacity building was therefore focused on filling the gaps identified from the SES (ERP, 2001).

To develop mechanisms to promote and facilitate the participation of communities and other local stakeholders in Okavango River Basin management.

The Basin-wide Forum was established as a means to ensure representation of communities across the basin in decision-making, and to aid the dual flow of information. In February 2003, the BWF and OKACOM commissioners agreed on a framework for constructive two-way interaction (ERP, 2003), a link that is critical to the sustainable management of basin natural resources. It is, therefore, through these linkages that OKACOM takes into consideration the communities' aspirations. Similarly, communities get to know the Commission's plans. Furthermore, there are several project committees, such as reference groups at a national level and the BPAC, which is a regional committee. These committees comprise technical expertise and policymakers respectively, and it is through such committees that the BWF both drives its agenda and gets feedback.

The utilisation part of the ERP goal is achieved through the establishment of community-based organisations (CBOs) where there are none in existence, and supporting those already existing. Examples of CBOs that have been assisted include craft making, community-based natural resource management organisations (such as conservancies and trusts), riverbank farmers, etc. This, in turn, contributes to the overall goal of poverty alleviation.

ANALYSIS AND DISCUSSION OF THE LESSONS LEARNT, BEST PRACTICES AND CHALLENGES

The ERP is a unique and new approach in river basin management, and has demonstrated its potential to improve river basin management through the involvement of the user group (communities). It is, therefore, a wish and a hope that other river basins can explore applicability in their own situations, for possible replication. Basin authorities and decisionmakers may also improve the management of river basins by supporting similar initiatives that recognise the role of communities. This section elaborates on the best practices and lessons learned, under a particular set of circumstances, from the implementation of the ERP. The approach advocates an overall framework that recognises the need to promote good governance for shared river basin management, through the involvement of communities. The outlined practices should be a part of a flexible and responsive process, and also be geared towards tangible products (ERP, 2003).

Legitimacy and trust

A first step in project implementation was to gain legitimacy and trust for the project by seeking approval from appropriate institutions at all levels, e.g. from basin level to traditional authorities, and from responsible authorities such as OKACOM. Aspects to achieve this include: aligning project aims and objectives with the existing objectives of basin commissions or forums; working through the existing institutions at all levels; and providing good and regular information and feedback on project activities.

Stakeholder role definition, links and consensus building

The different roles and responsibilities of stakeholders at community and technical levels were identified and recognised, and mechanisms for interactive links between stakeholders were defined. Each stakeholder must fulfil a niche in their role, consistent with their normal functions.

Open-ended and flexible process approach

The project learnt that it is necessary to design activities to be part of an open-ended process approach with broad goals and objectives, and leave the detail to be developed as the project evolves. It became apparent that it is easier for NGOs to lead flexible and responsive implementation, than for government bureaucracies. Basin projects, by their nature, are vulnerable to complications, as they transcend political boundaries, cultures, languages and religions.

Equitable involvement of basin States

Ensure good, regular communication between basin States at all levels, and ensure equitable involvement in basin activities. If circumstances in one or more basin countries make involvement difficult, identify appropriate measures to ensure all practicable communication and involvement.

Understanding community perspectives and early consensus building

Participatory techniques such as PRA and RRA were used to generate an understanding of community perspectives of resource issues, such as the health of the river, resource use, declining resources, causes of problems, existence of local resource management rules and institutions and possible solutions to problems.

Community capacity building and participation

It is imperative to develop the capacity of communities to engage with other stakeholders by expanding their knowledge, helping them to understand the views and perspectives of others and exposing them to best practices elsewhere. The implementers should not have a 'know all' attitude but be open to learning from communities. Treat the process as an information exchange and learning opportunity for all parties. Usually, communities operate at a different pace from other technical partners. Nonetheless, communities must be on board from the start, and all the way to the finish line. Communities are the primary users of resources and their full participation is primary to the basin management approach. Most importantly, appropriate mechanisms that link communities to key decision-making forums at all levels must be in place for their engagement with other stakeholders.

Information for planning and decision-making

Generate and collate information covering multiple aspects of the basin, including the natural environment, socio-economic environment, known threats and opportunities, and possible scenarios. A cross-sectoral multidisciplinary approach should be taken that brings together the different aspects and factors in an integrated analysis. Publish this information in easy-to-use format and style, and disseminate it as widely as possible for use by different stakeholders. Shared information, that everyone has confidence in, can be an important building block for joint planning.

Facilitate horizontal and vertical links in the basin

Facilitate horizontal links of information and interaction, such as from community to community or government officials to government officials, within a country and across national boundaries. Facilitate vertical links of information, interaction and/or accountability, such as from village to traditional authority to regional/district authority to national government and to basin commission.



PERSPECTIVES FOR THE FUTURE

Pertinent issues:

There are some issues raised during the surveys that require further interrogation and analysis. The capacity-building interventions must focus intently on these issues and capacitate all the relevant stakeholders to deal with them adequately, at all levels.

Use of latest research findings:

There is information now available about the Okavango derived from research that 'explains' some of the complex dynamics of the system. It includes hydrological cycles and patterns of the Okavango, species inventories and interactions, and resource trends. Although the information may not be exhaustive, ERP staff facilitates dissemination of these recent findings, and discusses them with the communities. There is also a strong move towards the inclusion of indigenous knowledge in natural resource management, which the ERP intends to explore further and uphold.

Empowerment of the Basin-wide Forum:

It is important that the Basin-wide Forum legitimately receives representation in national and district decision-making bodies. The existing agreement with OKACOM is limited to linkages with OKACOM, and not to any other decision-making forums.

Paralegal capacity building:

Where national laws and policies are viewed by the community as impeding on the wise use of resources, such as in the use of fire in resource management, or riverbank farming, the community must receive relevant capacity building to challenge the law and/or policy.



CONCLUSION

In conclusion, local community participation in natural resource management is, perhaps, currently the most paramount factor in the successful implementation of policies. Local communities, as the primary stakeholders, have to attain a level of empowerment that will allow them to participate actively in the management of their resources at all levels. This involves building awareness, appreciation, implementation and accountability skills in communities as custodians of natural resources, through an incentive-based approach from the utilisation of the same. Successful implementation of this approach achieves both socio-economic and environmental justice, through encouragement to utilise the natural resources in the basin to improve the socio-economic status as an incentive to environmental conservation.

Guiding principles in the Every River Has Its People approach are that:

- Ecosystems do not follow administrative boundaries and neither should the management, if sustainable management and utilisation of natural resources is to be achieved.
- Fully-informed stakeholders can understand each other's specific opportunities, challenges, roles and responsibilities within the basin, implying relevant and timeous contribution at all times by all stakeholders.
- Feelings of mistrust arising from misinformation, misconceptions and outright ignorance can be dispelled through dialogue. In this way, a politically sound approach to management of ecosystems of diverse biology and the subsequent use can be achieved.
- Ultimately, mutual benefit sharing mechanisms will naturally form between the riparian States and their communities, if there is common understanding.

The ERP approach ultimately achieves the SADC-RISDP and RSAP-IWRM goals. The approach aligns with the RSAP-IWRM framework. It looks into the river basin as an ecosystem in its entirety, ensures ecological integrity, is people-centred, and takes into consideration the varied and sometimes competing uses, while identifying opportunities for social upliftment.

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PART C

POLICY AND STRATEGY



PART C

POLICY AND STRATEGY

In the SADC region, the underlying legal systems reflect the colonial past of the Member States and consequently differ considerably, which in turn diversifies and complicates the law of the sector. The RSAP argued that effective regional cooperation at an institutionalised level would only be possible if the policy and legislative provisions of Member States shared objectives and were harmonised. Moreover, all would need to promote the principles of integrated water resources management. Consequently, the RSAP contained projects to address the issue, and the question of policy was prioritised.

Shortly after the acceptance of the RSAP, the international community established the Millennium Development Goals (MDGs), extending them at the World Summit on Sustainable Development. This provided another imperative for the Member States to work together towards common policy objectives.

As a first step, in this publication Peter Robinson reports on a *review of national water policies and strategies*, which was undertaken to determine the extent of divergence between the States.

A three-step process was followed:

Firstly, a detailed review of each country's policy and strategy was undertaken from an IWRM perspective.

Secondly, a synthesis report was prepared that reflected commonalities and differences.

Finally, a strategy for harmonisation was developed. A particularly interesting finding was that practical applications differed more between the Member States than did their formal policies and strategies. Clearly, direct personal interaction between sector managers is an important step in the harmonisation effort.

Inyambo Nyumbu and Guy Pegram then describe the process that formed a *regional water policy*. The consultative and participatory process that was followed is indicative of the region's willingness to work together on water resources issues. The policy was developed firstly within the framework of the SADC international legal instruments that are binding on the Member States, namely the SADC Treaty and the water Protocol. Secondly, documents that have been fashioned from regional consensus - namely the RISDP, the RSAP, the SADC Water Vision and others - were integrated. The policy follows a thematic approach and aligns closely to the principles of IWRM. The policy has subsequently been accepted by the SADC ministers of water and will therefore be an authoritative source of guidance and advice on policy matters, at both regional and national levels. Direct practical effect will be given to the policy by an upcoming regional strategy for its implementation.

CHAPTER 8

REVIEW OF NATIONAL WATER POLICIES AND STRATEGIES AND THE REGIONAL GUIDELINES FOR HARMONISATION OF LEGAL AND REGULATORY FRAMEWORKS

By Dr Peter B Robinson

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ABSTRACT

In the context of international and regional concerns about promoting integrated water resource management (IWRM) for sustainable development and poverty alleviation, SADC commissioned studies on the national water policy and strategy of each Member State. The main focus of the reviews was to identify possible areas where harmonisation would be needed to ensure fulfilment of the Revised Protocol on Shared Watercourses in SADC.

In comparing IWRM performance of different countries, it was found that the gap between implementation and policy was typically greater than differences in the articulation of national water policies. The need for harmonisation thus seems to be greater in respect of achieving compatibility in water resource management practices than in the policies themselves, with the focal point for regional harmonisation being the shared watercourse institutions. The most prominent areas identified as having a future need for greater harmonisation are effluent standards and charges, pricing policy (including charges related to abstractions and discharges) and water demand management.

CONTEXT OF WATER POLICY REVIEWS AND HARMONISATION GUIDELINES

The best practices being reported in this chapter are derived from two major SADC studies completed in 2003, plus various follow-up activities in 2004. These studies were commissioned to give effect to two policy and legislation projects (numbers 9 and 10) of the 1998 Regional Strategic Action Plan for Integrated Water Resources Development and Management in the SADC Countries (RSAP). The main reports arising from the commissioned studies are:

- *Review of existing national policies and strategies in each SADC country;*
- *Angola Water Policy Review, Botswana Water Policy Review etc. (14 reports);*
- *Review of National Water Policies Synthesis Report; and*
- *Guidelines for the Development of National Water Policies and Strategies to Support IWRM.*

The focus in the country studies was the extent to which national water policies and strategies were consistent with the Revised SADC Protocol on Shared Watercourses.

One of the principal objectives of the Synthesis Report was to identify areas where greater harmonisation of policies and strategies would be necessary in order to meet the requirements of the Protocol and,

in the Guidelines, to make recommendations on how greater harmonisation could best be achieved. The studies led to the formulation of an Initiative to support the harmonisation of national water policy, legislation and strategy for IWRM in SADC. This initiative is being supported by GTZ with an allocation of Euro 2.5 million over a four-year period.

The broad context of these studies is the high level of international and regional awareness of the crucial role of integrated water resource management (IWRM) in the alleviation of poverty, the fostering of economic development and the achievement of environmental sustainability. The Guidelines document describes some of the major international and regional milestones in this growing awareness. Events from the Global Consultation on Safe Water and Sanitation (New Delhi, 1990) to Third World Water Forum (Kyoto, 2003) are covered. African initiatives (such as the Africa Water Facility being managed by the African Development Bank) and joint programmes with donors (such as the Millennium Development Goals and NEPAD) are given particular emphasis. Within SADC, the significant initiatives taken include the signing of the Protocol, the implementation of the RSAP and the promulgation, in 2003, of the SADC Regional Indicative Strategic Development Plan (RISDP), in which the water sector has a key role to play.

KEY ISSUES ADDRESSED

Water policy and strategy reviews in each SADC country
A detailed review of the status of water policy from an IWRM perspective was carried out for each of the 14 countries that were members of SADC in 2003. Although all aspects of water policy were touched upon, the emphasis was on issues related to the SADC Protocol on Shared Watercourses. The following main topics were covered, albeit to varying degrees determined by information availability in the different countries:

- **Country context**
Water resource availability, use, stress and scarcity, quality and transboundary resource issues.



Vision-oriented approach

Starts at Regional, National or Basin level

Approaches are mutually reinforcing

Problem-oriented approach

Starts at Basin level with an issue

(common monitoring)

Figure 1:

Two mutually reinforcing approaches to harmonisation



Guidelines for harmonisation of national water policies

The objective of the Guidelines is to contribute to the development of national water policies and strategies that promote improved integrated water resource management and which, at the regional level, are compatible with each other and harmonised to facilitate the sharing of watercourses for mutual benefit.

Within the context of the SADC Protocol, there are two different approaches to achieve harmonisation (see Figure 1). The *vision-oriented approach* to harmonisation starts with the development of a common vision, moves on to a common understanding of the principles of good IWRM practice, defined common goals and objectives, and then translates these into policies, legislation and IWRM practices. By contrast, the *problem-oriented approach* starts with the definition of a particular problem (problem statement) and develops a step-wise strategy to solve the problem.

The Guidelines note that both approaches are compatible with each other and should be pursued in tandem

wherever feasible. The vision-oriented approach is evident in the work of the Water Division of the SADC Secretariat, while the problem-oriented approach tends to be initiated by the shared watercourse institutions.

LESSONS LEARNT

Most SADC countries have IWRM-grounded water policy reform processes well underway. There is a mix of attainment, in the sense that some countries that do not have formal policy statements do exhibit satisfactory implementation of IWRM principles, while other countries may have clear policy statements but lag when it comes to implementation. Overall, it can be said that the gap between existing policies and practice appears to be more significant than differences in the articulation of national water policies.

The same issue carries over to shared watercourses, where the need for harmonisation is greater with respect to achieving compatibility in water resource management practices than in the policies themselves. The most prominent areas where there is a future need for greater harmonisation are effluent standards and charges, pricing policy (including charges related to abstractions and discharges) and water demand management.

BEST PRACTICES

The Guidelines make recommendations both on the process of developing national policies and strategies and their content. Best practice in respect of the process is the full involvement and participation by all interested and affected parties in the formulation of policies and subsequent implementation, monitoring and evaluation. Best practice in various content elements of IWRM-grounded water policies is summarised in Table 1 overleaf.

TABLE 1: BEST PRACTICE IN KEY IWRM POLICY ELEMENTS

Element	Best practice
Water resources assessment	Comprehensive scope (assessment of hydrology, hydrogeology, demand, demand management, environmental impact, social aspects, risks, vulnerability and unconventional sources). Regional cooperation important (eg joint hydrological gauging on Okavango and Kwando rivers)
IWRM planning	Objective is the coordinated use of water, land and related resources to maximise economic and social welfare without compromising sustainability. River catchment appropriate domain for IWRM planning - most cross-national boundaries. Principle of mutual benefit needs to take account of asymmetric opportunities and risks.
Dams and development	Integrated planning, development and management of dams (eg through negotiating operating rules) needed to maximise diverse benefits (hydropower, tourism, flood control, irrigation, water supply). Participation of all stakeholders important in decision-making process for dam development, with empowerment of vulnerable groups.
Demand management - usage and allocative efficiency	Approx 40% of water supplied in SADC is currently wasted. Improved efficiency would mean lower short- and long-term costs and less pressure on resources, thus giving scope for improved equity and for environmental sustainability. The ultimate cost effectiveness of WDM is deferral of new sources of supply - the cheapest water in the future is the water that is wasted in the past. WDM also requires careful allocation of water between sectors to maximise socio-economic goals. This may mean reducing water allocated to cereal production in arid countries, relying on SADC as a whole achieving regional food sufficiency.
Demand management - equitable access to water	The problem for the majority of the population in southern Africa is that they use too little water, not too much. The real challenge is to alter water demand so that all have access to productive as well as domestic water. Water for poverty alleviation will make domestic water supply and sanitation programmes sustainable, as people will then have the incentive and resources to provide for their own water needs.
Participation	The participatory approach to IWRM is fundamental to its success. Fruitful interchange between water sector professionals and civic society stakeholders requires ready access to appropriate information and respect for cultural and gender issues. Projects involving women and indigenous groups in planning have been found to be implemented faster, with lower costs and much higher chances of sustainability.
Conflict resolution	Procedures for consensus-building and conflict management are best planned for in advance. Conflict resolution tools include facilitation, mediation, fact-finding, consensus-building and arbitration.
Environmental and service regulation	Best practice is to separate the environmental and service regulatory functions. Environmental regulation is needed to control allocations, abstractions, return flows and water quality. To be effective, environmental regulation should be rooted at the local level in river basin institutions representative of all users. Service provision regulation is more akin to other infrastructure regulators, where independence from the executive arm of government and professionalism are highly desirable features. This type of regulation is necessary for commercialised utilities, but essential for public-private-civil partnerships. The roles of a water service delivery regulator include the licensing of operators, water pricing, quality, service standards and ensuring rapid attainment of universal service obligations.
Economic and financial instruments	Economic instruments are intended to promote the efficient use of water, while financial instruments are needed to ensure the viability of service providers. Water pricing objectives are to achieve equity, usage efficiency, allocative efficiency and utility viability objectives simultaneously. Wastewater charges are to be designed to ensure that the 'polluter pays' principle applies. Besides tariff cross-subsidies (eg to support lifeline tariffs applicable to basic levels of consumption), explicit subsidies should be used to accelerate access to services. Once-off capital subsidies are more equitable and efficient than recurrent subsidies. In shared watercourses, pricing policy consultations should include consultation with downstream users.
Information exchange	Effective information exchange is a fundamental requirement for deepening regional cooperation. The development of common methodologies, quality controls and standards would facilitate this.

More details of best practices in IWRM policy are available in the SADC Regional Water Policy as well as the Guidelines. The latter document includes an extensive bibliography, together with addresses of water-related websites.

FUTURE PERSPECTIVES

The future challenge is for all SADC countries to have both the formal policies, laws and institutions in place and to be implementing strategies that clearly promote the attainment of IWRM and shared watercourse objectives. The main constraint identified during the course of the studies is a lack of capacity, particularly in respect of implementation burdens, such as monitoring and administration of abstractions and discharges. Decentralisation and community involvement are lauded, but have been difficult to achieve in practice.

There is thus need for further support for national policy and legislative development, and especially for capacity development at national, district and local levels. In the areas of policy harmonisation, the institutions earmarked for assistance are the shared watercourse institutions (SWIs). This is because it is the SWIs that are most likely to come to grips with the real nuts and bolts of national policies and activities that inhibit the optimisation and sharing of IWRM benefits in a reasonable and equitable way. Supporting the development of appropriate shared watercourse institutions is thus an important mechanism that will, over time, as specific issues are tackled and resolved, contribute to the harmonisation of policies and legislation.



CHAPTER 9

SADC REGIONAL WATER POLICY

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ABSTRACT

The SADC region is characterised by a large number of watercourses shared by two or more countries, yet the availability of water resources is extremely uneven across the region, and varies considerably from season to season and year to year. The challenges of provision of water supply and sanitation, food and energy security, and environmental sustainability, common to all Member States, require that water resources are developed and managed in an integrated and sustainable manner. SADC has recently developed a Regional Water Policy (RWP) to provide a comprehensive policy framework for the long-term development and management of water resources in the SADC region. The process of establishing the RWP, the role and focus of the policy, and the scope and content of the policy represent a best practice that may beneficially be adopted and adapted in similar interventions, at regional as well as national levels. These aspects are presented below.

INTRODUCTION

Given the particular characteristics of water resources in the SADC region, achievement of the Southern Africa Vision for Water, Life and the Environment, as well as the Millennium Development Goals (MDGs) and World Summit on Sustainable Development (WSSD) targets will require that water resources are developed and managed in an integrated and sustainable manner. Through the adoption of the Protocol on Shared Watercourses and the Regional Strategic Action Plan on Integrated Water Resource Management (RSAP), together with the restructuring of SADC and the formulation of the multi-sector Regional Indicative Strategic Development Plan, it became apparent that a Regional Water Policy (RWP), supported by a Regional Water Strategy, should be developed to provide a comprehensive framework for the long-term development and management of water resources in the SADC region. The development of the RWP is one of the 31 projects under the ambit of the RSAP.

This paper outlines the key elements of this RWP, and highlights key areas that may be interpreted as best practice and could be used beneficially on similar initiatives in the region, as well as at national level.

KEY ISSUES

Process of establishing the Regional Water Policy

SADC adopted a consultative and participatory process for the formulation of the RWP. The process had four distinct phases, with in-built feedback to provide for the refining of the outputs from each phase.

The phases were:

- **Inception:**
The key focus areas, approach and workplan for developing the policy were outlined.
- **Study and conceptualisation:**
Various water sector studies were executed and their outputs were synthesised with a review of other SADC sector studies, in order to identify key issues, directions and a framework for the water policy.
- **Formulation and consultation:**
An iterative policy formulation process was conducted, beginning with small regional specialist/expert sessions that established the scope of the policy. Policy elaboration was then carried out by a three-person drafting team, followed by input from broader consultative workshops and the SADC Water Resource Technical Committee.
- **SADC approval:**
Endorsement and approval by SADC Secretariat and Member States, including the Water Ministers.



A strategic decision was taken to fast-track the drafting of the policy, and to elaborate the strategy following the formal approval of the draft policy. In this manner, the strategy formulation process would be better informed by a more comprehensive policy that has benefited from extensive consultations.

Principles for the SADC Regional Water Policy

The policy framework for the RWP is drawn from the following policy pronouncements, which SADC Member States have formulated over the years:

- **SADC Declaration:**
‘Towards the Southern African Development Community’ - a vision of a shared future, a future within a regional community.
- **The Southern Africa Water Vision:**
Equitable and sustainable utilisation of water for social and environmental justice, regional integration and economic benefit for present and future generations.
- **The Revised SADC Protocol on Shared Watercourses:**
Foster closer cooperation for judicious, sustainable and coordinated management, protection and utilisation of shared watercourses and advance the SADC agenda of regional integration and poverty alleviation.
- **The Dublin Principles of integrated water resource management (IWRM):**
Water is a finite and vulnerable resource; stakeholder participation; the important role of women; and water is an economic good.

For the SADC region, the policy principles for integrated water resource management, taking into account the above policy pronouncements, are as follows:

- Water is an instrument for peace, cooperation and regional integration;
- Effective public consultation and involvement of users;
- Focus on integrated, people-centred planning;
- Efficient use of water through demand management, conservation and re-use, and the efficient use of water for agriculture;
- Recognition of the environment as a legitimate user of water;
- The protection of the environment through appropriate user charges and the enforcement of the ‘polluter pays’ principle, taking into account equity and social justice;
- Integration of water supply, sanitation and health and hygiene education programmes;
- Capacity building to ensure that managers of water, waste and sanitation have the requisite knowledge and tools;
- Ensuring that waste is safely managed close to the point of generation; and
- Preventing the export (and import) of harmful waste across national and regional boundaries.

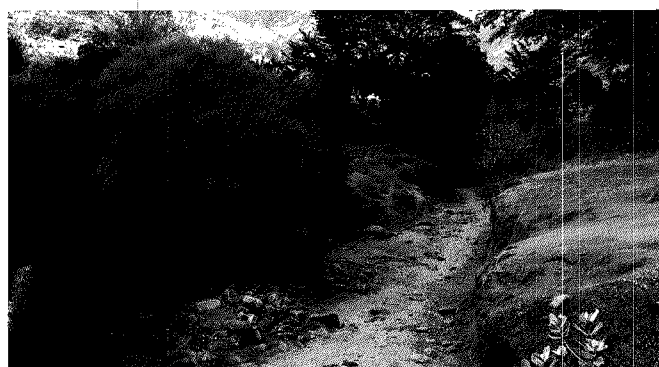


Key elements of the Regional Water Policy

Guided by the above principles, the SADC water policy was structured around nine thematic areas, which address the water resource management issues and challenges in the SADC region, or are aimed at optimising the development opportunities.

The nine thematic areas are:

- **Regional cooperation in water resource management:**
policy provisions on water for regional integration and socio-economic development; cooperation in water resource management of shared watercourses; inter-sectoral and international cooperation, and the harmonisation of national policies and legislation.
- **Water for development and poverty alleviation:**
containing policy provisions on water for basic human needs and for industrial requirements; and water for food and energy security.
- **Water for environmental sustainability:**
contains policy provisions on water and the environment, water quality management, and control of alien invasive species in watercourses.
- **Security from water-related disasters**
has policy provisions covering people’s protection from water-related disasters, and disaster prediction, and management and mitigation.
- **Water resources information and management:**
covering data and information acquisition and management, and information sharing.
- **Water resources development and management:**
policy provisions on river basin approach, integrated planning of shared watercourses, dams and dam management, water conservation and water demand management, and alternative sources of water
- **Regional water resources institutional framework:**
policy provisions covering institutional arrangements at regional and national levels, and for shared watercourse institutions.
- **Stakeholder participation and capacity building:**
has provisions focusing on participation and awareness creation, capacity building and training, gender mainstreaming, and research, technology development and transfer.
- **Financing integrated water resource management in the region:**
policy provisions covering financial sustainability, cost reduction and public-private partnerships in financing water resources development and management.



ANALYSIS

Policy formulation process

The RWP was formulated over a period of 24 months, from inception through conceptualisation, formulation, multi-stakeholder consultations to approval phase. The process progressed smoothly, steered by the SADC Water Division. Sound leadership of the process, adequate resources and an environment of trust and common purpose engendered by the SADC Protocol on Shared Watercourses were critical to the success of the policy development process.

Nine thematic water sector studies [Review of SADC Water Policies and Comparative Study with International Water Policies, Study on Priorities of other SADC Sectors Relevant to RWPS, Review and Synthesis of Policy and Strategy Documents Related to the Southern Africa Water Vision, Water Resources Availability and Water Demand Management (WDM), Framework For Action (FFA) Process to Achieve the Vision, Implementation of the Protocol, Guidelines for the Development of National Water Policies and Strategies to Support IWRM, Water Supply and Sanitation Programme for SADC, Key Dam Issues in the SADC Region, Water Conflict Monitoring and Prevention and Resolution Mechanism], provided rich background to the formulation of the RWPS.

In total, four consultative regional workshops consisting of water experts from the SADC region - including senior government officials from water departments, legal ministries and other sectors, senior researchers and academics from institutions of higher learning, and private consultants - were held during the policy formulation process. National consultative workshops were also held in five SADC countries to review the penultimate draft policy.

The consultative process at regional and national levels required a significant amount of financial resources, time (duration) and consultancy inputs, and involved inputs from a large number of national and regional professionals from a large number of fields. A water policy impacts on many sectors; hence these professional inputs are essential. IWRM demands that water policy formulation is participatory, consultative, inclusive and multi-sectoral. The experience in SADC water sector policy formulation is therefore a good practice.

Scope and content of Regional Water Policy

Within each of the thematic policy areas, there are a number of policy statements that capture best practice in the water sector, from international, continental and regional experience, as indicated by the following:

Regional cooperation in water resources management

- The role of water as a tool for regional integration and peace is clearly recognised, and mechanisms are proposed for fostering cooperation to support this process.
 - The importance of effective mechanisms for dispute resolution is recognised, particularly in terms of



cooperative approaches to managing differences.

Water for development and poverty alleviation

- Water is recognised as an economic good, but also in terms of its social importance for livelihoods and poverty eradication.
- The concepts of shared economic benefit and comparative advantage are highlighted for consideration in water allocation between countries.
- The priority of water supply for domestic purposes and its allocation before any other use is recognised, together with allocations for productive use of water by the poor.
- The need to link sanitation planning and delivery with water supply, public awareness and hygiene education is highlighted.
- The importance of water as key element of food security at household and community level is recognised with measures to promote effective use of water in this way.
- The concept of regional food security as a means of promoting regional integration and cooperation is highlighted, considering the implications for national sovereignty and security.

Water for environmental sustainability

- The importance of the aquatic environment as the resource base upon which all other users depend is recognised, together with the need to ensure that adequate water is made available for sustainable functioning of aquatic ecosystems.
- The importance of consistency in water quality management and standards between Member States is highlighted, particularly for shared watercourses.

Security from water-related disasters

- The need for coordinated water-related disaster planning and management between countries sharing transboundary watercourses is recognised, particularly for floods and droughts, together with a commitment to protecting human life, property and the environment from water-related disasters.

Water resources information and management

- The importance of appropriate information as the basis of building effective cooperation and integration for water resource management is recognised, including the need for compatibility and the sharing of databases, information systems and assessment approaches.

Water resources development and management

- The river basin approach, particularly for shared watercourses, is recognised, together with the cross-cutting nature of water and the concepts and approaches for integrated water resource management as the basis for decision-making.
- The need to promote joint planning, development and operation of water resources infrastructure is recognised as an important vehicle for cooperation, integration and efficiency in water resource management.
- The importance of a participatory approach to infrastructure development is recognised, particularly for affected communities, together with appropriate compensation and beneficiation related to the project.
- The need to explore opportunities for water conservation and demand management in making water available through integrated planning is recognised, considering that most people in the region currently do not use adequate levels of water.

Regional water resources institutional framework

- The need for regional institutional coordination to be the responsibility of a regional institution (namely the SADC Secretariat) is specified, together with the required functions for this role.
- The imperative to establish an institution to advise and coordinate the sustainable development and equitable utilisation of the water resources in each of the 15 shared watercourses is specified.
- The rationale for the institutional decentralisation of water management within countries is highlighted, together with the need for these institutions to be compatible with regional institutional arrangements.

Stakeholder participation and capacity building

- The need for water resource development and management to be based on a participatory approach is endorsed, supported by the requirement for adequate capacity building and empowerment of stakeholders.
- The role of women and youth in water resources is recognised, together with the requirement for gender mainstreaming in SADC institutions.



- The importance of institutional capacity and the need to build this at political, technical and stakeholder levels is highlighted.
- The need to share capacity between institutions in the region is highlighted, supported by regional integration and the design of effective education programmes.
- The importance of demand-driven research and technology development at regional level is highlighted, supported by the sharing of technology and research between countries.

Financing integrated water resource management in the region

- The importance of financial sustainability is recognised, supported by appropriate allocation of funds and/or recovery of costs, considering the requirements of the poor.
- The need to develop partnerships with national and international institutions is recognised, particularly in terms of leverage capacity, resources and funds for water sector management in the region.

Further detail on these issues is provided in the RWP, but it is apparent from the range and detail of these issues that they incorporate the current best practice from around the world, while translating these for the specific conditions within the SADC region.

From the above, it is clear that the SADC region is internationally at the forefront of thinking and approaches to regional cooperation and effective water sector.

BEST PRACTICES

In general, the best practices involve (1) the process of establishing the Regional Water Policy; (2) the role and focus of the policy; and (3) the scope and content of the policy. These aspects are discussed below:

1. Process

- Policy formulation at regional level is particularly process-intensive, and requires concerted leadership (as provided by SADC Water Division) and good facilitation, so as to enhance trust and cooperation.
- Consultation requires adequate time and financial resources; any perceived constraints in these areas may destroy confidence and trust.
- A consultative, participatory and inclusive process enhances ownership and acceptability of the policy.

2. Role and focus of the Regional Water Policy

- The RWP focuses on cooperative management of shared watercourses within the region, primarily through the Protocol on Shared Watercourses, to promote regional integration and poverty eradication within SADC. This focus is also relevant at national level; the importance of water resource management as an engine for socio-economic development requires emphasis in national

development plans.

- Harmonisation of national water sector management policies between Member States is essential, in order to facilitate integration and the achievement of endorsed targets.
- The consultation process, involving a diverse range of stakeholders at national and regional levels, clearly established the consensus that the role of the RWP is to provide a guidance tool for policymakers at regional and national level, aimed at:
 - informing and giving guidance to the SADC Secretariat in coordinating the development of the water sector in the SADC region;
 - informing and giving guidance to shared watercourse institutions and Member States in the management of shared watercourses;
 - giving guidance for harmonising national water policies and the management of water resources in Member States; and
 - giving guidance for implementing water resources activities by all stakeholders.

3. Scope and content

- Scope and content of the regional water policy is better informed by multi-sectoral and multi-institutional inputs from a broad range of stakeholders. A fairly comprehensive policy document has resulted from participation of so many professionals.
- Regional experts provided consultancy inputs in the development of the policy, and are available for the further development of the strategy.
- The scope of the water policy reflects the broad principles of cooperation in SADC, anchored by the SADC Treaty, the SADC Protocol on Shared Watercourses and the Southern Africa Water Vision.



CONCLUSIONS

The SADC Regional Water Policy is a home-grown product; SADC Member States have given themselves a policy to guide the development and management of water resources throughout the region.

The involvement of a large number of stakeholders from all relevant sectors and institutions, at national and regional levels, has enhanced the acceptance of the policy and should strongly improve the prospects for its implementation, since those who have been involved in policy development will be the ones to implement it at regional and national levels.

The Regional Water Policy is founded on the principles of regional cooperation and economic integration espoused by the SADC Treaty and the SADC Water Protocol, and incorporates principles of IWRM widely accepted, internationally, as sound water resource management practices.

An important vehicle for implementing the policy is the existence of well-functioning river basin organisations – established particularly on shared watercourses, operating under sound legislation, with systems for planning and stakeholder involvement, and embracing the IWRM principles.

The process followed in developing the RWP (consultative, participatory and inclusive) and the objective analyses of issues relevant to water resource management (through the thematic studies preceding policy formulation) have given SADC a comprehensive policy document. This practice could be used beneficially in the development of other policies, whether at SADC or national level.

PART D

CONSTRUCTIONAL DEVELOPMENT



PART D

INSTITUTIONAL DEVELOPMENT

The RSAP found that realising the benefits of cooperation were limited by the lack of comprehensive, integrated, basin-wide approaches to the development, planning and management processes. The key to resolving this dilemma lay in human and institutional development in a common paradigm for the region.

Joseph Lisindi and Zibo Makosha introduce the topic of *human resource development* at regional level. The study identifies a litany of deficiencies in the key elements needed for effective integrated water resource management. These include a shortage of technical and professional staff, inadequate data, information and management systems and disparities in the human and financial resources of Member States that inhibit the sharing of knowledge. Lisindi and Makosha propose a framework for SADC human resources development that will serve to guide capacity-building initiatives in the region. As part of the capacity-building drive, the framework identifies the need for interventions that include training programmes, experiential learning programmes and workshops as well as coordination, monitoring and evaluation mechanisms. Innovation in training is highlighted.

Ngoni Mudege then addresses the establishment of the *Water Research Fund of Southern Africa (WARFSA)* and the *Consultancy Fund for Southern Africa (CONFUSA)*. These interventions are intended to strengthen the capacity of national and regional water institutions for water resource planning, development and management and to enhance the regional knowledge base on water resources through improved information management, research and technology development. WARFSA's management system for the award of research grants is via periodic calls for proposals and selection by an independent research board, which is supported by a system of referees and a fund-managing agency. In this way, WARFSA offers accessible and flexible financial support to smaller research projects, largely on a competitive basis. With other publicity, this has been successful in mobilising interest amongst the regional research community to engage in applied multi-disciplinary IWRM research. Similarly, CONFUSA was set up in order to address constraints in understanding IWRM principles and, through action learning, to contribute to the long-term goal of implementing IWRM projects.

Mutandwa Mutede describes the *Zimbabwean experience* of the water sector reform that was necessary to implement integrated water resource management. As one of the pioneers of this reform, Zimbabwe predated most of the regional activity in this field.

The reforms comprised legal, institutional, financial and administrative changes, and

capacity building of major stakeholder institutions. The main objectives of the reforms were to improve:

- Equity in access to water;
- The management of the resource;
- Environmental protection; and
- The administration of the Water Act.

The rationale for introducing six levels in the institutional arrangements is fascinating as a model for achieving the IWRM ideal of devolving decision-making about resources to the lowest practical level. That the proposed reforms were piloted in different ways in two catchments adds considerably to the value of this case study.

Finally, Ruth Beukman, Andrew Takawira and Jean Boroto describe the development of the *Framework for Action (FFA)* to achieve the Southern Africa Vision for Water, Life and Environment as an example of collaboration at regional level. This project addresses both the institutional development and awareness objectives in the RSAP. The authors demonstrate that, following the IWRM principle of participatory approaches, a wide range of stakeholders can be mobilised to make an effective contribution to the enhancement of regional water resource management. The project was guided by the Global Water Partnership - Southern Africa, which provided a multi-sectoral platform through which all interested stakeholders participated in the processes at country and regional levels. The process has confirmed and contributed to the development of the strategic priorities that SADC had identified through the RSAP and the RISDP. It has further enriched the formulation of the Regional Water Policy and Strategy.

CHAPTER 10

LEVELLING THE PLAYING FIELD: THE SADC FRAMEWORK FOR HUMAN RESOURCES IN THE WATER SECTOR

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CONTEXT OF THE INTERVENTION

The Southern African Development Community (SADC) recognises in its Regional Indicative Strategic Action Plan that water resources are key to the well-being of the inhabitants, and the future development of the region. The SADC Water Division has therefore sought to identify the major elements of the water sector that need to be addressed in pursuance of SADC's vision and overall goals.

While it is recognised that individual member countries have the responsibility for developing the infrastructure that is required for the harnessing and distribution of water, it is essential that appropriate planning for the utilisation and apportionment of the resource be achieved at regional level. This requires that the practitioners in the water industry are well trained, such that they are able to address issues relating to the identification and quantification of the available water resources adequately and competently, as well as being able to plan and manage accessibility to water, within the constraints of water scarcity and the unfavourable geographic distribution of the water resources.



One of the priority projects identified in the SADC Regional Strategic Action Plan (RSAP) was Project 22 – Human Resources Development Programme. Its objective was to develop a programme that can optimise sustainable development and maintain the required water resources planning and management capacity. A framework for SADC human resources development has been prepared under this project, which will serve to guide capacity-building initiatives in the region. The framework identifies the need for a coordination, monitoring and evaluation mechanism as well as for a number of other interventions that are part of the capacity-building drive. These cover training programmes, experiential learning programmes and workshops.

KEY ISSUES ADDRESSED AND MAJOR ACTIVITIES UNDERTAKEN

The study adopted a fully participative, consultative and interactive approach in order to describe the key issues of human resource development. The techniques used in the study included a literature review, selected interviews, focus groups, workshops and a questionnaire.

The issues identified and addressed were:

- **Skills deficiency:**

This covered the shortage of skills at management, professional and technician levels of the water resources institutions.

- **Management and information systems:**

The availability and adequacy of an information base for HRD in the region was explored. This included information sharing on the skills available and the HRD activities taking place in the region, as well as any existing network arrangements.

- **Regional interventions and protocols:**

An assessment of capacity and skills in dealing with regional interventions and protocols such as inter-basin transfers, international water protocols was done, and a commission was conducted.

- **Service delivery:**

Competencies required for the provision of appropriate levels of service were assessed. These covered aspects such as the ability to identify and/or develop appropriate skills in water supply technology, financing and asset management.

- **Stakeholder participation:**

Integrated water resource management (IWRM) involves both vertical and horizontal competencies and skills, because it calls for multidisciplinary interactions.

The study assessed the availability and adequacy of the required skills.



ANALYSIS OF LESSONS LEARNT

Firstly, the study revealed a number of general weaknesses and deficiencies in competencies and skills, namely:

- The shortage of professional staff, mainly due to budgetary constraints;
- The shortage of technical staff for collecting accurate and reliable data;
- An inadequate information base for integrated water resource development;
- Inadequate or non-existent systems for information sharing and management;
- The lack of capacity, skills and confidence to deal with issues relating to inter-basin water transfers involving shared water sources;
- The lack of skills required (financial and asset management) for the selection of appropriate water supply technologies; and
- The lack of skills required by the operators of water supply schemes to ensure community participation at all stages.

Secondly, the study identified the human resource development requirements in each of the policy, managerial, professional and technical areas that are needed to deal effectively with the identified issues in integrated water resource development issues namely, the legal and regulatory framework, information management and dissemination, awareness building and public participation (see Table 1).

Thirdly, the study identified the competency and skills required in the 'special focus areas' of river basin commissions, catchment management, environment, water conservation and demand management and waste water and sanitation (see Table 2).

BEST PRACTICES AND CHALLENGES

The key instruments for capacity building involve a process that encompasses education and training with problem-solving workshops and real life simulations, technical assistance and networking partnership arrangements to pool expertise. This may involve:

- Education and training programmes to acquire new insights, skills and attitudes;
- Effective and innovative education and training techniques such as workshops, experiential learning and mentorship programmes;
- The transfer of novel skills and attitudes to complement the more traditional technical education;
- Networking, to facilitate pooling of expertise at local and regional level to address various complex issues; or
- Twinning arrangements between organisations, inside and outside the region, that provide for technology and knowledge transfer and creating access to current knowledge and information.

Training interventions alone will not necessarily be followed by a commensurate change in the performance of the water sector. There are also some structural and institutional deficiencies that, if not addressed, could nullify all results of the proposed training and development programmes. Thus the call is for an holistic and multidimensional approach to improving the performance of the water sector.

On the basis of the study outcome, the consultants have identified the need for both training and non-training capacity-building interventions. These include employee training, employee development, experiential learning, organisational development and the improvement of organisational systems and practices.

LEVELLING THE PLAYING FIELD

SADC member countries are at different levels of human resource development. This calls for a targeted development intervention that will facilitate the easy transfer of knowledge and skills among SADC Member States. The HRD framework has identified experiential learning as the most appropriate intervention strategy for this. Experiential learning has a greater chance for high impact as it is competency based, and differs from academic training in that it builds horizontal skills as opposed to vertical knowledge.

PERSPECTIVES FOR THE FUTURE

The SADC water sector capacity-building framework has identified interventions that are targeted at different levels of the water sector operations, and modularised in accordance with need levels. Some of the envisaged programmes may also form modules of already existing post-graduate programmes in the SADC region, such as programmes under the WaterNet project.

There is an urgent need for the development and establishment of a coordination, monitoring and evaluation mechanism to align all the capacity-building initiatives within the SADC water sector.

REFERENCE

SADC (March 2004) RSAP-IWRM Projects 17 AND 22, Human Resources Development Programme for the SADC Water Sector, Final Project Document.

TABLE 1: HRD REQUIREMENTS FOR MAJOR IWRM ISSUES

	Policy level	Management level	Professional level	Technicians
Legal and regulatory framework	Policy analysis Legal interpretation skills Negotiation skills Water law Environmental laws Formulation of legal and regulatory framework Conflict management Leadership skills Financial management Communication skills	Legal interpretation skills Water law and protocols Environmental law Formulation of legal and regulatory framework Conflict resolution Communication skills Financial management Leadership skills Negotiation skills Cultural diversity	Prosecution skills Water law Negotiation skills Environmental law Monitoring and evaluation Disaster management Water resources and management Project management Financial management Cultural diversity Communication skills Conflict resolution	Legal interpretation and water law Basic water and environmental management Public relations Data management Communication skills
Information management and dissemination	Disaster management Data integration Decision-making Planning	Data analysis Information management and decision-making IT skills Data network planning Communication skills Financial management	Data collection and analysis Information management IT skills Satellite imagery and aerial photo interpretation GIS skills Data processing Communication skills Project management Public relations	Data collection skills Basic IT Public relations Communication skills Data processing
Awareness building	Communication skills Public relations Negotiation skills Diplomacy Project management Financial management	Project management Financial management Conflict resolution Communication skills Cultural awareness Public relations	Policy analysis, interpretation and implementation Needs analysis Gender mainstreaming Cultural awareness Communication skills Public relations Facilitation skills	Communication skills Presentation skills Facilitation skills Public relations
Public participation	Communication skills Conflict resolution Cultural awareness Public relations Facilitation skills	Communication skills Conflict resolution Public relations Needs assessment Gender mainstreaming Cultural awareness Facilitation skills	Communication skills Conflict resolution Facilitation skills Needs assessment Gender mainstreaming	Cultural awareness Presentation skills Public relations Communication skills

TABLE 2: COMPETENCIES AND SKILLS REQUIRED IN SPECIAL FOCUS AREAS

River basin commissions	Catchment management	Environment	Water conservation & demand management	Waste water & sanitation
Interdisciplinary skills	Participatory management skills	Cultural sensitivity	Public relations	Marketing skills
Negotiation skills	Needs analysis skills	Communication skills	Social sensitivity	Presentation skills
Transboundary water laws	Conflict resolution	Participatory skills	Presentation skills	Coordination skills
Communication skills	Research methods	Presentation skills	Communication skills	Communication skills
Public relations skills	Communication skills	Environmental management	Development planning skills	Social sensitivity
Participatory management skills	Public relations skills	Environmental laws	Land use and water management skills	Participatory skills
Conflict resolution	Environmental management	Ecology and hydrological cycle	Project management skills	
Presentation skills	Social sensitivity	Understanding of upstream/downstream interactions	Conflict resolution	
Cultural sensitivity	Presentation skills	Problem-solving skills	Knowledge of conservation legislation	
Strategic networking with other organisations	Management skills	Public relations skills	Water supply and demand management	
Harmonised regulations	Financial management	Negotiation skills	Water economics	
Transboundary water management	Facilitation skills	Conservation skills	Leakage detection and control	
Environmental expertise	Negotiation skills	Environment and impact assessment skills	Water pricing	
Diplomacy	Project management	Reclamation and land management skills	Crop water requirement skills	
Institution building	Diplomacy	Climate observation skills		
	Institution building			
	Water demand management			

CHAPTER 11

TRAINING FOR REGIONAL INTEGRATION AND DEVELOPMENT: THE CONTRIBUTION OF WATERNET

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ABSTRACT

WaterNet, a network of tertiary education institutions in southern Africa, was established in 2000 as part of the initiatives within the Regional Strategic Action Plan. WaterNet has four objectives, namely to raise awareness with regard to the regional scale of Integrated Water Resource Management (IWRM) among institutes and people active in this field; to stimulate regional cooperation in the field of education in IWRM by developing a modular Master Degree Programme to which several institutes in the region contribute; to increase the accessibility to training and education in IWRM for participants from the southern Africa region; and to stimulate, regionalise and strengthen research in the field of IWRM in the southern Africa region by offering opportunities to perform joint research. The overall aim of WaterNet is to develop both human and institutional capacity to enable the efficient, equitable and sustainable management of water in southern Africa.

INTRODUCTION

The SADC Vision is best reflected by the formulation in the Regional Indicative Strategic Development Plan (RISDP), which States:

'The SADC Vision is one of a common future, a future in a regional community that will ensure economic well-being, improvement of the standards of living and quality of life, freedom and social justice and peace and security for the peoples of southern Africa'

(The RISDP, 2003).

The SADC mission statement also provides guidance to institutions within SADC on how to align their programmes to the achievement of the SADC common agenda. The SADC mission statement is:

'To promote sustainable and equitable economic growth and socio-economic development through efficient productive systems, deeper cooperation and integration, good governance, and durable peace and security, so that the region emerges as a competitive and effective player in international relations and the world economy'

(The RISDP, 2003).

Chapter 3 section 3.3.5.1 of the RISDP gives the overall goal for the water sector as 'the attainment of sustainable, integrated planning, development, utilisation and management of water resources that contribute to the overall SADC objective of an integrated regional economy on the basis of balance, equity and

mutual benefits of all Member States'. This goal was to be pursued by the Water Division by developing a Regional Strategic Action Plan (RSAP) that identified seven key priorities to enhance the region's approach to water management. These priorities are:

- Improving the legal and regulatory framework;
- Institutional strengthening;
- Sustainable development policies;
- Information acquisition, management and dissemination;
- Awareness building, education and training;
- Public participation; and
- Infrastructure development.

It is, particularly, in addressing the priorities of information acquisition and knowledge creation (research), awareness building, education and training that WaterNet has been making a significant contribution.

The Regional Strategic Action Plan for Integrated Water Resource Development and Management in the SADC Countries (SADC Water Sector Coordinating Unit, 1998) describes the main objective of Project Concept Note 23 (PCN 23) as: 'strengthening water training institutions as a result of a functioning network of training institutions and a group of water professionals capable of clearly articulating IWRM issues. The outcome will be a strong regional capability to effectively address sustainable and equitable use of water resources'.

MAJOR ACTIVITIES UNDERTAKEN

Forging the network

The WaterNet concept was triggered in May 1997 by the SADC-EU conference on the Management of Shared River Basins in Maseru, Lesotho, where ministers of water of southern Africa and Europe emphasised the need to 'level the playing field' between riparian countries, and to develop capacity-building programmes in order to achieve this goal. The University of Zimbabwe, the Institute of Sanitation Development and IHE Delft then jointly developed the concept of pooling the expertise among universities in the region, which would allow for the establishment of a broad and multidisciplinary programme with specialisations tailored to a wide spectrum of postgraduate students.

A regional network in southern Africa would enhance access to education, training and promote research into IWRM. This concept became the WaterNet Project, which was taken up into the RSAP as well as being endorsed by the Global Water Partnership.

After extensive consultations in the region, 18 institutions founded WaterNet in March 2000 in Victoria Falls, Zimbabwe.

WaterNet is a network of higher education institutions active in water education and research. WaterNet is governed through its constitution, adopted by the member institutions. The members meet once a year at the annual general meeting (AGM). There, work plans and budgets for activities for the following year are approved, and representatives elected to the Steering Committee (SC). The SC appoints the manager, who heads the Secretariat. This democratic and transparent governing structure has been put in place in the initial year of WaterNet, and is now a well-functioning governance structure.

The total membership consists of 43 institutions. These include engineering departments, agriculture departments, geography departments, social sciences departments and research institutes. Member institutions are all from SADC countries, excluding Angola and Lesotho, and including institutions from Kenya and Uganda. A full membership list is included as Annex 1.

To increase the accessibility to training and education in IWRM for participants from the southern Africa region

This objective is being pursued in a number of ways. One is to offer an English language course for water managers from Angola, Democratic Republic of Congo and Mozambique. The aim of the course is to facilitate the participation of water managers from these countries in SADC activities.



Other efforts to increase access to education and training in IWRM have been ongoing in collaboration with Global Water Partnership- Southern Africa (GWP-SA) and CapNet. Examples are the facilitation of training for GWP-SA's country water partnerships (CWPs) in compiling IWRM plans, a training-the-trainer workshop on Legal Reform in the Water Sector in Brazilia in September 2004 and a workshop on Institutional Arrangements for Water Resource Management, held in Cape Town in December 2004.

To stimulate regional cooperation in the field of education in IWRM by developing a modular Masters Degree Programme to which several institutes in the region contribute

Already at its inception, in March 2000, the WaterNet Steering Committee conceptualised what would become the flagship of WaterNet: the Regional Masters Programme in IWRM.

This programme would train water managers and researchers to the new reality of water management.

To achieve this, an innovative programme has been designed, where WaterNet member institutions in 12 countries combined comparative strengths to develop a modular programme with an interdisciplinary core, five multidisciplinary specialisations and elective modules.

The core modules are:

- Principles of IWRM;
- Principles of Hydrology;
- Socio-economics of Water and Natural Resources;
- Principles of Aquatic Ecology and Environmental Management;
- Water Law and Institutions; and
- Groupwork.

The specialisations are:

- Water Resources Management, comprising the modules of Water Analysis and Planning, GIS and Database Management and Catchment Management;
- Hydrology, comprising the modules of Geohydrology, River Engineering, Remote Sensing and GIS;
- Water and the Environment, comprising the modules of Environmental Water Requirements, Environmental Impact Assessment and Water Quality Management;
- Water for People, comprising the modules of Water Supply and Sanitation, Utility Management and Waste Water Management; and
- Water and Society, comprising the modules of Water and Security, Water and Development and Environmental Education.

Any of the modules from the specialisations, as well as Water Demand Management, Conflict Resolution, Early Warning of Floods and Droughts, Water Resources Modelling, Water Quality Modelling or Groundwater Management, may be selected as an elective.

The full Masters Programme is offered by the University of Dar es Salaam and the University of Zimbabwe, with specialisations offered by the University of Malawi, the Polytechnic of Namibia, and the University of the Western Cape.

Eighty-three Masters Fellowships have been awarded to students in southern Africa. Eighty of these students have completed their studies.

To stimulate, regionalise and strengthen research in the field of IWRM in the southern Africa region by offering opportunities to perform joint research

WaterNet, together with the Water Research Fund for Southern Africa (WARFSA), has stimulated research and research collaboration through its symposia, a staff exchange between institutions in the region and the Masters thesis research projects that have been supported from the WaterNet Fellowship Fund.

Research is also stimulated through:

• **The Challenge Programme on Water for Food**

The WaterNet Secretariat, together with seven WaterNet members - namely the departments of Civil Engineering, Soil Science and Agricultural Engineering, the Centre for Applied Social Science and the Mineral Resources Centre (all from the University of Zimbabwe); University of Eduardo Mondlane (in Mozambique); National University of Science and Technology (Zimbabwe); the University of Natal and the International Water Management Institute in South Africa, as well as UNESCO-IHE - and other partners in Mozambique, South Africa and Zimbabwe (17 partners in total), wrote a research proposal on implementing IWRM in the Limpopo Basin, through the Challenge Programme on Water for Food.

• **Smallholder System Innovations (SSI)**

The four-year SSI Research Programme (2003-2007) is an associated programme of WaterNet. The regional research programme is carried out by WaterNet members, with funding from WOTRO, Sida and DGIS, and is administered through IWMI and UNESCO-IHE. The programme has six research components focusing on two river basins in South Africa and Tanzania.

• **Other projects in the process of being developed**

Other collaborative research projects are at the proposal stage. One such project, led by Dr Innocent Nhapi and entitled 'Eco-technologies for Sustainable Wastewater Treatment and Re-use in Southern Africa', concerns the use of eco-technologies in wastewater treatment for small municipalities. Another project proposal, led by Prof. Larry Swatuk and entitled 'Towards Best Practice: the Political Ecology of River Basin Governance in Southern Africa', is seeking to understand the phenomenon of 'progressive policy and regressive practice'.

To raise awareness with regard to the regional scale of IWRM among institutes and people active in this field

The WaterNet/WARFSA Symposium

Through its annual symposium, WaterNet has contributed to raising awareness about the multiple facets of IWRM. The WaterNet/WARFSA symposia have grown from humble beginnings of mainly WaterNet members to a significant gathering of educationists, researchers, water professionals, the private sector and other interested persons. The attendances at these symposia have increased from approximately 45 participants in

Maputo in 2000 to an estimated 180 in Windhoek in 2004. This growth in the popularity and size of the WaterNet/WARFSA Symposium was largely unplanned, and is an indication of the visionary project that WaterNet is.

The WaterNet/WARFSA annual scientific symposium has been held five times (Maputo, Mozambique in 2000; Cape Town, South Africa, in 2001; Dar es Salaam, Tanzania in 2002; Gaborone, Botswana, in 2003 and Windhoek, Namibia, in 2004). The IUCN, realising the significance of the event, hosted a special session at the 2003 Gaborone symposium dedicated to Water Demand Management. The potential of the symposium as an awareness-raising occasion and an educational event has also been recognised by GWP-SA, and a new symposium programme was negotiated between WaterNet/WARFSA and GWP-SA to broaden the reach of the symposium from 2004. The 2004 symposium was organised with GWP-SA as a partner, in order to bridge the gap between science, policy and the implementation of IWRM. Furthermore, the 2004 symposium included a workshop on Prediction in Ungauged Basins (PUBs) in collaboration with the International Association of Hydrological Science (IAHS), as well as a workshop on wetland management.

Since the symposium held in Cape Town, the best papers of the previous year's symposium have been published in a special issue of an international peer-reviewed journal, Physics and Chemistry of the Earth. This has been a highlight for WaterNet.

General outreach

While WaterNet, at its core, is a network of higher learning institutions, it aims at being closely linked to the water sector in its widest context - professionals, scientists, managers, policymakers and government institutions involved in water management. The key strategy to achieve this is through close links to SADC Water Division and GWP-SA. Both these organisations serve on the WaterNet Steering Committee.



LESSONS LEARNT

The title of this article contains the word 'training'. Recently, the concept of 'capacity development' has been used instead of training and/or education. Capacity development is made up of two words; capacity meaning 'the ability or power to do something', and development meaning 'become or make larger or more advanced'. Combining these two words creates a powerful concept that means 'to make larger or more advanced the ability or power to do something'.

Capacity development, being a complex concept, cannot be implemented through a homogeneous activity. For successful capacity development, targeted activities are of crucial importance. Targeted activities are geared towards different audiences and aimed at achieving:

- **Awareness.**

This means knowing what to do without really knowing why; knowing how things work without knowing why they work. These activities are aimed at creating awareness amongst all water users.

- **Understanding.**

This entails a deeper sense of awareness; knowing what to do and why; and knowing how things work and why they work. The target audience for these activities could be stakeholder representatives and policymakers.

- **Competency.**

This is having the skills to make things work. The target audience would be people employed in the water sector. The knowledge available under each of these categories is not mutually exclusive, but available to the all water users, if and when needed.

Like all new concepts, the concept of capacity development has been used so often that it runs the risk of losing its meaning and becoming just another buzz word, used whenever it is required to say something about human resource development. I want to argue that we trivialise capacity building to our own long-term peril. We need to ensure that with every project, every programme and every plan, a separate line item for capacity development is included. We also need to ensure that the amount of this line item is substantial and not just a token.

When thinking about capacity development, we need to keep two matters in mind. Firstly, capacity development is a long-term and continuous process. Secondly, that capacity development is expensive and the investment is vulnerable.

CHALLENGES

In the capacity development endeavours of WaterNet, the 'network' plays a pivotal role. Networks in higher education seem to represent a shift from:

- Concentrated expertise to dispersed expertise;
- Competition to cooperation; and
- Conformity of ideas to diversity of ideas.

Within the WaterNet network the challenges have been to:

- Balance the needs of the stronger with the needs of the weaker institutions;
- Balance generalist with specialist training;
- Balance academic with professional training;
- Balance the needs of the network with the needs of its members; and
- Ensure long-term sustainability.

CONCLUSION

The WaterNet Project has been visionary in its conception, mind-boggling in its complexity and audacious in its implementation. Five years on, it may be concluded that WaterNet is fulfilling the expectations that eventually gave rise to its establishment as an initiative within the RSAP. A joint curriculum in IWRM has been developed; lecturers from member institutions have cooperated in education and conducting research; professionals and students from 10 southern and eastern African countries have been or are being trained in this interdisciplinary postgraduate curriculum, and they actively generate new knowledge and insights through MSc dissertation research; and, finally, research findings are being disseminated and shared during the annual WaterNet/WARFSA symposia, and the proceedings are made available on the Internet and published in a scientific journal.

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ANNEX 1: List of WaterNet members (June 2004)

	Country	Institute	Member
1	Botswana	University of Botswana	Department of Geology
2		University of Botswana	Harry Oppenheimer Okavango Research Centre
3	Democratic Republic of Congo	National Centre for Research in Natural Science	National Centre for Research in Natural Science
4	Kenya	Institute for Meteorological Training and Research	Institute for Meteorological Training and Research
5		Jomo Kenyatta University	Department of Biomechanical & Environmental Engineering
6		University of Nairobi	Department of Meteorology
7	Malawi	University of Malawi	Department of Geography and Earth Sciences
8			Department of History
9			Department of Civil Engineering
10	Mauritius	University of Mauritius	University of Mauritius
11	Mozambique	University Eduardo Mondlane	Department of Civil Engineering
12			Faculty of Agriculture
13	Namibia	Polytechnic of Namibia	School of Engineering
14		University of Namibia	School of Natural Resources and Tourism
15			Faculty of Agriculture
16	Desert Research Foundation of Namibia	Desert Research Foundation of Namibia	
17	South Africa	International Water Management Institute	International Water Management Institute
18		University of Cape Town	Freshwater Research Unit
19		University of KwaZulu-Natal	Centre for Conflict Resolution
20			School of Bio-resources Engineering and Environmental Hydrology
21			Department of Soil, Crop & Climate Sciences
22		University of the Free State	Centre for Southern African Studies
23		University of the Western Cape	Department of Earth Sciences
24		University of the Witwatersrand	Programme for Land and Agrarian Studies
25	School of Civil and Environmental Engineering		
26	School of Law		
27	University of Zululand	Department of Hydrology	
28	Swaziland	University of Swaziland	Department of Geography and Environmental Sciences
29	Tanzania	University of Dar es Salaam	Institute of Resource Assessment
30			Department of Civil Engineering
31		Sokoine University of Agriculture	Department of Geography
32	Sokoine University of Agriculture		
33	Uganda	Makerere University	Institute of Environment and Natural Resources
34	Zambia	University of Zambia	Department of Civil and Environmental Engineering
35	Zimbabwe	Africa University	Faculty of Agriculture and Natural Resources
36		Chinhoyi University	Department of Environmental Science and Technology
37		Institute for Water and Sanitation Development	Institute for Water and Sanitation Development
38		National University of Science and Technology	Department of Civil and Water Engineering
39		University of Zimbabwe	Centre for Applied Social Sciences
40			Department of Civil Engineering
41		Department of Geography and Environmental Science	
42		Department of Geology	
43	Department of Soil Science and Agricultural Engineering		

SUPPORTING MEMBERS

1	Regional	Southern African Development Community	SADC Water Division
2	International	Global Water Partnership	GWP-SA
3	International	UNESCO	UNESCO-IHE Institute for Water Education
4	Netherlands	Netherlands Government	
5	Sweden		Sida

CHAPTER 12 THE CHALLENGE OF KNOWLEDGE GENERATION FOR IWRM: THE CASE OF IMPLEMENTING WARFSA AND THE REGIONAL CONSULTANCY FUND

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INTRODUCTION

The Water Research Fund for Southern Africa (WARFSA) and the Consultancy Fund for Integrated Water Resources Management for Southern Africa (CONFUSA) are two regionally-based funds. They are intended to address a number of structural deficiencies in research and consultancy services in the region, including the scarcity of funds for these activities, the capacity of potential users to access any funds that might be available, the inability of particularly small proposals to attract funds, the fact that many allocation decisions for these activities are made by funding agencies outside the region, the absence of regionally-based professional journals and other means for professionals to publish their results and achieve professional recognition and, finally, the fragmented nature of peer interaction and regional cooperation among water sector professionals.



The primary purpose of the two funds is to build capacity in research, and also to provide a mechanism that allows regionally-based institutions to access regionally-based consultancy services, thereby building the capacity of both the institutions in managing consultants, and also of the consultants themselves. In addition, the funds provide an opportunity for SADC to create a model, and the mechanisms for funding research and consultancies on a regional basis as a contribution to the long-term economic and social integration of the region.

The establishment of the funds will contribute to reversing the perception that Africa lacks capacity to carry out water-related studies, and to develop policies for the region's water development (Agenda 21, 1992; Delft, 1993; Rome, 1990).

Moreover, the intervention should increase the share in world scientific publications that sub-Saharan Africa has, from its current level of approximately 0.4% (Delft, 1993; World Bank, 1990).

The concept of integrated water resource management (IWRM) is relatively new to the water sector in southern Africa. This requires that concerted activities be directed towards the implementation of IWRM strategies. One of the most important issues that can be resolved through WARFSA and CONFUSA is the translation of research results into real activities. Although some of the results could also be of greater benefit in education, training and development programmes, this has often not been realised due to the limited dissemination of results.

The RSAP context

The SADC Regional Strategic Action Plan (RSAP) provides for a specific set of projects to address the issue of training and capacity building. Of significance is Project Number 23: WaterNet, which aims to build capacity through education and training. WARFSA responds to this objective by providing the research component necessary for both quality training and academic excellence, while CONFUSA provides practical support to institutions and consultants to explore new areas and opportunities. In addition, the need to enhance the regional knowledge base on water resources through improved information management, research and technology development (to improve the availability and quality of water) as well as the promotion of awareness and public participation in policy and programme function and implementation are recognised as key to water resources management in the region. WARFSA has supported over 68 research projects throughout the SADC region, and has made significant linkages with associated programmes such as WaterNet.

The RISDP context

In the Regional Indicative Strategic Development Plan (RISDP) (SADC, 2003), SADC has agreed that, by 2005, centres of excellence for water research and technology development will have been identified and developed. 5



ADC has signed a Memorandum of Agreement with the Institute of Water and Sanitation Development (IWSD) in Harare that recognises the IWSD as a regional centre of excellence in water resource management, and has appointed it to manage WARFSA and CONFUSA. The two funds are critical to the achievement of the RISDP's targets of increasing awareness, broad participation and mainstreaming gender in water resource development and management.

THE KEY ISSUES ADDRESSED AND THE MAJOR ACTIVITIES UNDERTAKEN

The Water Research Fund for Southern Africa (WARFSA) was established March 1999. Since its establishment, WARFSA has operated with generous financial support from Sida, more recently supplemented with funding from Danida. A number of activities have been undertaken and these are summarised below. The most important achievement so far has been the establishment of a transparent WARFSA management system, where all decisions pertaining to the allocation of research funds are made by the independent Research Board. The Board is supported by a system of referees and a Fund Managing Agency. In order to facilitate research projects, the Fund has offered accessible and flexible financial support for smaller research projects through periodic calls for proposals. These are mostly granted on a competitive basis. WARFSA has been active in mobilising interest among the regional research community to engage in applied multidisciplinary IWRM research through the calls for proposals, awareness-raising seminars and workshops and the distribution of information brochures, as well as articles published in newsletters and posted on websites.

The type of projects funded to date varies considerably in both scope and content. Some of the research work has resulted in MSc and PhD qualifications for the researchers.

Examples of the research are:

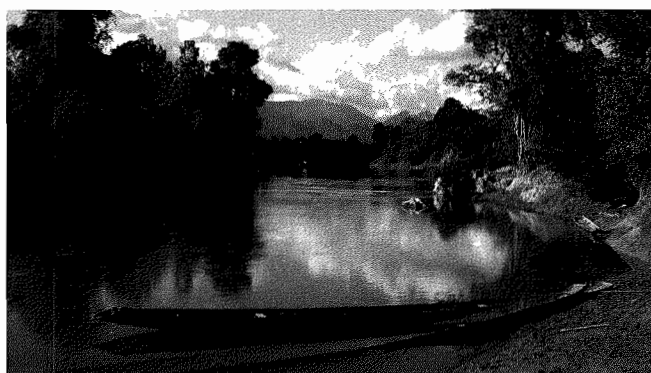
- Aquatic biodiversity and water quality in the Okavango Delta, Botswana;
- Cestoidean parasites of the African sharp tooth catfish (*clarias gariepinus*), as bioaccumulation indicators of heavy metal pollution in the Vaal River catchment in South Africa;
- Reducing irrigation water losses on the slopes of Mount Kilimanjaro, Tanzania;
- Enhancing the role of women in water development projects in the case of the Komati downstream development project in Swaziland;
- Subsurface water and riparian tree interactions in an ephemeral river in Namibia;
- Water management tools for the Runde River catchment in Zimbabwe;
- Single-step activated carbon production from agroforestry (Malawi and Zimbabwe);
 - Analysis of hydrological droughts in Zimbabwe; and
 - Multivariate, criteria and objective analysis of irrigation in Namibia

using systems analysis and modelling.

Capacity building for research has been pursued in a variety of ways including:

- Through training workshops in research methods;
- Substantive feedback on all submitted research proposals;
- Monitoring and (if necessary) technical backstopping of research projects;
- The funding of projects involving younger researchers;
- By providing limited financial and technical support for the further development of worthy proposals; and
- By dedicating a proportion of available funds to (taught) MSc thesis research (outside the regular research competitions).

Dissemination activities have become more important for WARFSA as greater numbers of research projects are completed. WARFSA, partnered with WaterNet, organises annual symposia where all WARFSA grantees are expected to make oral presentations on their research. This is a way of fostering regional peer interaction, the dissemination of results and greater collaboration among researchers. It also serves as a mechanism for encouraging the utilisation of research results.



The Consultancy Fund was also launched in 1999, with funding from Danida. It has two main objectives. Firstly, it is to provide flexible and timely assistance for institutions promoting or implementing integrated water resource management projects in the southern Africa region, using regionally available expertise. Secondly, it is to build capacity for preparing projects and for documenting good practices.

Promotion flyers, in both Portuguese and English, have been prepared and were sent to all countries in the SADC region. In addition, country workshops were held to promote the Fund. During Phase I, 112 project proposals were received and 23 of these were funded. The Fund's statutes and funding guidelines were recently amended, in line with the recommendations of a review report.

ANALYSIS AND DISCUSSION OF THE LESSONS LEARNT

It is evident that WARFSA has generated a great deal of interest in the region through building a workable regional funding mechanism from scratch.

A large number (218) of proposals have been received, out of which 82 (about 38% of the total) have been funded. The evaluation report at the end of Phase I concluded that 'WARFSA has filled a gap as an accessible funding source for water research and provided a rapid-response funding mechanism for smaller projects' (Sida, 2002). WARFSA has also delivered proof of the viability of managing, from within the region, the decision-making processes that decide research funding allocations. Although most WARFSA projects appear to tackle research problems relating to critical water issues in the region, more attention needs to be paid to research utilisation.

WARFSA projects fall under one of five eligible research areas:

- Water use, conservation and technologies;
- Social, political and economic issues;
- Policy and legal issues;
- Ecological water requirements; and
- Promotion of better use of precipitation.

WARFSA would, however, benefit from recasting its research agenda to enhance consistency with IWRM principles, and to make stakeholder entry points more visible.

WARFSA has engaged in capacity-building efforts on several fronts, including organising training courses in proposal development, facilitating on-the-job training of graduate students (within WARFSA projects), providing peer review to applicants through the referee system, holding annual symposia (with WaterNet) that brings grantees together, and organising monitoring visits to 'problem projects'. However, there is room for other capacity-building exercises such as short training courses on aspects of multidisciplinary and gender research methodologies. The facility where students, following MSc taught courses, can access WARFSA funds without going through the refereeing system, has proved popular. The non-competitive mechanism to assist certain applicants with the further development of worthy proposals has seen proposals from Mozambique being funded. Efforts are being made to do the same in Angola and the DRC.



Although WARFSA stresses the need for regional collaboration in research, more needs to be done in this area. As a way of encouraging this, collaborative

research has been allocated more funding than those that are nationally based. Collaboration between WARFSA and WaterNet is good, and the annual symposia contribute to maintaining a strong relationship. As an inter-governmental institution with a broad coordinating mandate for IWRM matters in the region, the SADC Water Division is a very important stakeholder for WARFSA and, through closer links, WARFSA has positioned itself to respond more quickly to the needs of the WD.

BEST PRACTICES AND CHALLENGES

As for the lessons learnt, firstly, it has become apparent that there is a dearth of the data and information that is necessary to support sound policy development, effective programme planning and implementation, and the day-to-day decision-making processes in the regional water sector. Among the various factors that have contributed to this state of affairs, perhaps the most fundamental one is the relative lack of a research culture in the region. In order to build a research culture, it is necessary to instil attitudes and encourage practices that inherently value and promote inquiry-based learning and research as a problem-solving approach. This is at all levels of society and in all sectors of the economy, but particularly within the younger generation. The development of such attitudes and practices must become an integral part of all formal and informal education efforts and processes, starting at early childhood level. An emerging research culture in the region will develop an inherently greater demand for WARFSA and the kinds of water research support services it can provide.

Secondly, measures have to be put in place to disseminate research results effectively. Currently, WARFSA researchers present their progress through oral paper presentations at the annual symposia, and the good papers are eventually published in the international refereed journal *Physics and Chemistry of the Earth*. This improves the publication profile of researchers and improves the chances of them being promoted at their workplaces. The problem is that the journal is not widely distributed in the region, and many stakeholders might never even see a copy. Unfortunately, few stakeholders attend the annual symposia, although attendance is growing.

Thirdly, it has been shown possible to create a transparent adjudicating mechanism for applications within the SADC framework. WARFSA is run by its Research Board, which is drawn from citizens of SADC countries and selected institutions in Europe. This cross fertilisation has allowed for the transfer of skills and knowledge.

Challenges are, firstly, WARFSA's long-term financial sustainability. WARFSA has been largely dependent on donor support (Sida and Danida), but the need for further resource mobilisation and diversification of funding sources remains. In order to build a solid and lasting financial base for WARFSA, it is necessary not only to promote, publicise and market



WARFSA constantly and effectively so as to ensure longer-term demand for its services, but also to explore all possible avenues for financial resource expansion.

Secondly, there is a need to define a regional research agenda. The current WARFSA priority research areas were defined at the formative stages of the Fund, and there is therefore a need for a mechanism to revisit these periodically in order to ensure that WARFSA-funded research remains relevant to the region. The SADC Water Division should have a big role to play within such a regional stakeholder mechanism.

Thirdly, there is a need to establish effective mechanisms for the dissemination and utilisation of results. Effective dissemination of research findings to water sector managers and decisionmakers will increase the likelihood that research actually informs practical actions and decisions on the ground. Currently, efforts are underway to come up with simple publications for circulation in the region that emanate from the research results. In addition, mechanisms of creating institutional channels for communication and interaction between researchers and stakeholders are being explored. The existence of such channels will help researchers and WARFSA to disseminate research results to actual and potential users.

A fourth challenge relates to the legal status of WARFSA itself. At present, WARFSA is a project managed by the IWSD, and therefore draws its legality and recognition from the legal status of IWSD. In future, the Fund should be seen to be drawing its relevance and legality from the regional instruments of SADC. However, the process of legally establishing WARFSA as an independent fund will be a complex and lengthy one.

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CHAPTER 13

INSTITUTIONAL REFORMS IN THE SADC WATER SECTOR TO MEET THE CHALLENGES OF IWRM: THE EXAMPLE OF ZIMBABWE

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ABSTRACT

Zimbabwe is in southern Africa, sharing international borders and rivers with Botswana, Mozambique, South Africa, and Zambia. Water reforms in Zimbabwe were triggered by two important milestones in water resource management, namely the UN Conference on Sustainable Development in Rio de Janeiro in 1992 and the drought experienced in the country during the 1991/92 season.

The reforms comprised legal, institutional, financial and administrative changes and the capacity building of major stakeholder institutions.

The main objectives of the reforms were to improve:

- Equity in access to water;
- The management of the resource;
- Environmental protection; and
- The administration of the Water Act.

The concept of integrated water resource management was embraced as a tool for achieving the desired outcomes.

By the end of 2000, the new institutional arrangements and legal instruments were in place. Six levels of water administration had emerged in the new institutional framework; three of the lowest levels being stakeholder institutions.

A number of challenges still exist to fully implement IWRM principles, such as the management of international rivers, self financing of the sector, the participation of women at all levels, the development of river system outline plans and the protection of the resource against degradation.

INTRODUCTION

Zimbabwe is a land-locked country in southern Africa, sharing international borders and rivers with South Africa to the south, Mozambique to the east, Botswana to the west and Zambia to the north. The country is generally poor in water resources due to variable rainfall and, in the case of groundwater, this is aggravated by unfavourable geology. Competition for water across the sectors has been increasing due to population growth and industrial, mining, urban and agricultural developments.

Water reforms in Zimbabwe were triggered by two important milestones in water resources management, namely the UN Conference on Sustainable Development in Rio de Janeiro in 1992, whose Agenda 21 brought about the concept of Integrated Water Resource

Management, and the drought experienced in the country during the 1991/92 season. The drought nearly paralysed most of the major water supplies to urban centres, irrigation schemes and rural water supplies. It resulted in the death of both domestic and wild animals, and there was a dramatic increase in conflict among water users. Water sector reforms were necessary for developing systems to address these problems.

The reforms started as early as 1993, and were spearheaded by the Water Resources Management Strategy (WRMS) Steering Group, a committee comprised of government ministries responsible for the various aspects of water management aspects, and major stakeholders.

The objectives of this committee were:

- To improve equity in access to water;
- To improve the management of the resource;
- To strengthen environmental protection; and
- To improve the administration of the Water Act.

The reforms started before the development of the SADC Regional Strategic Action Plan (RSAP), and were therefore able to provide important lessons for other SADC members as these members embarked on the sector reforms and harmonisation called for by the RSAP.

MAJOR ACTIVITIES

The reforms comprised legal, institutional, financial and administrative changes and the capacity building of major stakeholder institutions. These activities created the water administrative and legal regime in the country today. The concept of integrated water resource management was embraced as a tool for achieving the desired outcome.

In 1995, a group of experts from the donor community - namely Germany, UK, Norway and the Netherlands - assisted the government in producing an appraisal report that initiated the Water Resources Management Strategy (WRMS) project. The project had the following institutional arrangement: the Ministry of Water Resources, the WRMS Steering Group and the WRMS Technical Secretariat of five experts, which participated in the:

- Development and establishment of a legal framework;
- Development and establishment of an institutional framework;
- Development of a pilot catchment plan;
- Development and implementation of financing framework;
- Development of water management guidelines; and
- Capacity building.

The WRMS project ran concurrently with a GTZ project called Rural Water Supply. The two projects and the four cooperating partners played a pivotal role in financing the different aspects of the reforms, in partnership with the government of Zimbabwe.

CHALLENGES

In order to achieve its objectives, the WRMS Steering Group identified six challenges that had to be addressed in the legislation and institutional set-up:

- Dispute resolution and water allocation had been centralised at the Water Court in Harare. This had resulted in a backlog in processing water rights and dealing with water conflict cases.
- Only people with water rights had been able to participate in the water management stakeholder institutions, which resulted in the neglect of traditional primary water users of the river systems.
- The principle of 'first come first served' had been used in the allocation of water, and water rights had been granted in perpetuity. Thus, newcomers could not get a fair share of the resources, especially in areas that were over-committed.
- Groundwater had been treated as a private resource, resulting in a lack of monitoring and over-utilisation.
- The environment had not been explicitly recognised as a water user and, hence, no specific allocation had been made to cater for its needs.



Institutional

In the Water Act of 1976, apart from the Department of Water Development, the Regional Water Authority and local authorities, there were stakeholder institutions that were also involved in water resource planning and management. These were the water development advisory councils (WDACs), river boards and combined irrigation schemes.

The WDACs had the responsibility of water resource planning along catchment boundaries, but they were only operational in the late 1970s and early 1980s. River boards were later constituted in 1984, and were given the responsibility of administering water rights in large commercial farming areas. Combined irrigation schemes managed water on specific schemes and made operational decisions.

The shortcomings of these institutions were that only water right holders could participate in them. This marginalised traditional water users along the river system, and neglected the environment. The reforms were intended to address these problems. During the development of the Water Act of 1998, the Mazoe and Mupfure catchments were used as test grounds for the proposed changes to the Act. This exercise concentrated mainly on institutional building and failed to operationalise other principles, due to the fact that the original Water Act of 1976 was still in force. Thus, the history of the existing catchment and sub-catchment councils started in earnest in 1996.

The pilot case study in Mazoe was to be a stakeholder-driven exercise funded by the stakeholders themselves, although GTZ financed some activities of the pilot project. Government provided technical expertise whenever it was required. A secretariat of three people was responsible for the day-to-day co-ordination of stakeholder's activities and providing secretarial services to subcommittees. After wide consultation and awareness campaigns, the following institutional framework was established:

- Catchment councils;
- Sub-catchment councils; and
- Water user boards or associations.

The Mupfure pilot project was different from the Mazoe project in that it was borne out of a document prepared by consultants, and everything was done according to the book. The project was run by a chief executive and four supporting staff, with Dutch support. After wide consultation and awareness campaigns, a similar structure to that of the Mazoe catchment was established.

Legal

In order to create a firm foundation for implementing the changes in the sector, a complete overhaul of the Water Act of 1976 was done. Wide consultations were conducted with the major stakeholders before a set of principles and changes were agreed to, and then enshrined in the new Water Act:

- Ownership of both surface water and groundwater is vested in the state, hence authority to use it is needed except for primary use.
- Involvement of stakeholders in decision-making is a major component of water resource management.
- In order to address pertinent issues, water should be managed on catchment boundaries, not political boundaries.
- Development of the resource should be environmentally friendly, and environmental impact assessments are an essential component of the development process of water resources.
- Water should be recognised both as an economic and a social good.
- Pricing of the resource should be based on the 'user pays' and 'polluter pays' principles.

Capacity building

Institutional reforms are not complete if they do not deal with issues about the processes involved with information gathering, processing, storage and dissemination in the sector. Due to the proposed changes in the new system of administration and the legal requirements, capacity had to be put in place to respond to these new needs. A number of human resources development programmes were introduced during the reform process. These included formal courses, on-the-job training and short courses. New equipment, such as computer software, computer hardware, vehicles, laboratory equipment and gauging equipment, was made available through donors. When the Act was passed by parliament and assented to by the president in 1998, new regulations were developed to give effect to the new Act. In 2000, the Water Act of 1976 was repealed and the new Water Act of 1998 was operationalised.

BEST PRACTISES

By the end of 2000, the new institutional arrangements and legal regime were already operational. Six levels of administration emerged in the new institutional framework:

- The Administrative Court for appeal cases (judiciary);
- The Department of Water Development for policy making (policy);
- The Zimbabwe National Water Authority (ZINWA) for policy implementation (regulatory);
- Catchment councils for water allocation and dispute resolution (arbitration);
- Sub-catchment councils for day-to-day resources monitoring (policing); and
- The combined schemes for day-to-day operational activities (users).

Thus, the Regional Water Authority was upgraded to ZINWA, WDAC upgraded to catchment councils, river boards upgraded to sub-catchment councils and combined irrigation schemes upgraded to combined schemes. Due to the government policy on decentralisation, more functions and powers were given to these new institutions. The Administrative Court and the Department of Water Resources shed their responsibilities to catchment councils and the ZINWA, respectively.

Department of Water Resources

The Department of Water Resources is now a lean secretariat to the Ministry of Water Resources and Infrastructural Development, dealing with policy on legislation, financing, institutional, socio-economic, transboundary and technical issues.

Zimbabwe National Water Authority

The Zimbabwe National Water Authority is the policy implementation arm of the Ministry of Water Resources and Infrastructural Development.

It is responsible for:

- The planning of water resources;
- The development of the water resources (dams, boreholes, water supplies stations);
- The management of these developments;
- Providing secretariat services to catchment councils; and
- The monitoring of the water resources, in terms of quality and quantity.

Catchment councils

Seven catchment councils were established throughout the country. Due to limitations in both time and financial resources, the Mupfure model was adopted in the establishment of the councils. Regulations determine the operation of catchment councils by stipulating membership, succession, powers and how they conduct business. The functions of catchment councils in their river system are:

- The preparation, in conjunction with ZINWA, of river system outline plans;
- The determining and granting of water permits;
- The regulation and supervision of the exercise of permits;
- Supervision of the performance of sub-catchment councils; and
- Ensuring that users comply with the provisions of the Water Act.

The business of catchment councils is conducted in four kinds of meetings:

- An annual general meeting of stakeholder representatives;
- An extraordinary annual general meeting, following a petition by not less than one quarter of the members;
- An ordinary meeting, when requested by a stakeholder group or a group of sub-catchment councils sharing a public stream; and
- An ordinary meeting a week after sub-catchment council meetings of which it has been notified.

Sub-catchment councils

The sub-catchment councils are involved in matters of day-to-day stakeholder operations. This is the area where much of the stakeholder activity and representation exists.

The major stakeholder groupings that elect members to represent them at the sub-catchment council are:

- Rural district councils;
- Large-scale and small-scale miners;
- Large-scale and small-scale farmers;
- Communal and resettled farmers; and
- Urban local authorities and industrialists.

The chairman and vice-chairman of the sub-catchment council are automatically members of the catchment council, and government institutions are technical advisors.

The functions of sub-catchment councils are to:

- Regulate and supervise the exercise of permits;
- Monitor flows and water use in accordance with permits;
- Promote catchment protection;

- Submit reports as and when required by catchment councils;
- Ensure measuring devices are in place to facilitate water measurements; and
- Receive new applications for water permits.

The business of sub-catchment councils is also conducted in four kinds of meetings, similar to those of catchment councils

Administration systems

A number of administration systems are now in place for water management. The areas that have benefited from this are the groundwater, water quality and hydrology sections. The following guidelines have been published:

- Groundwater Development Guidelines;
- Water Quality Monitoring Guidelines;
- Water Allocation Guidelines;
- Water Pricing Policy; and
- Water Management Strategy.

Legislative instruments (regulations) that give effect to provisions of the new Water Act are:

- Catchment Council Regulations;
- Sub-catchment Council Regulations;
- Water Allocation Regulations;
- Waste and Waste Water Regulations;
- Catchment and Sub-catchment Boundaries Regulations;
- Water Levies Regulations; and
- Sub-catchment Council Levies Regulations.



Financing framework

The vision, in financial terms, is to have the sector financing itself without external support from the fiscus. The following principles have been adopted in the current Water Pricing Policy, and are already being implemented:

- Water is a social and an economic good;
- The user pays; and
- The polluter pays.

From this, it follows that everyone who uses water for economic activities, or is supplied with water, pays - and anyone who pollutes, also pays a levy. In order to safeguard the social requirement, cross subsidies are used. The sector has been

concentrating on functionalising the institutional and administrative systems while, at the same time, slowly building towards financing self-sufficiency. As a result, government has continued to support the development of new infrastructure and the running of the new catchment councils. Funds to support these statutory functions are supposed to come from charging:

- Water permits and pollution permit holders;
- Water levies;
- Water quality monitoring fees; or
- Environmental fees.

ZINWA's commercial activities are fully financed by the sale of:

- Raw water from dams;
- Clean water for drinking; and
- Engineering services.



FUTURE PERSPECTIVE

The aspiration of the sector is to improve equity in access to water, to improve management of the resource, to improve the administration of the Water Act and to strengthen environmental protection. A number of challenges still exist to implement the IWRM principles fully, in order for the country to realise the objectives of the reforms. Future challenges include the management of international rivers, self financing of the sector, the participation of women at all levels, the development of river system outline plans and the protection of the resource against degradation.

The desire is to have an elaborate structure that facilitates communication by stakeholders from the basin level all the way to the policy and strategic levels, and to develop communication systems that facilitate speedy dissemination of information. This is a challenge in achieving IWRM. Currently a National Steering Committee, which links national and basin activities with catchment councils and the rest of the stakeholders, is in the making, but is not yet provided for in the Water Act.

In the endeavour to develop the new structure, there should be sufficient financial provision to maintain the structure and to facilitate interaction among players in order to achieve IWRM. Currently, government is still supporting some of these operations but, for sustainability reasons, the system

should be self financing. The challenge is how to raise sufficient funds without overburdening the users.

It has been recognised that women play an important role in water resource management and are an important stakeholder group. However, their current involvement has always been limited to the lowest (water user board) level, where they are closer to their day-to-day activities at home. A number of factors have been cited for their lack of participation at higher levels; most of them to do with their traditional roles. The challenge that still exists is how to develop good incentives that will encourage them to participate at higher levels of water resource management.



Water development plans are needed to achieve the objectives of equitable water allocation and use, but the challenge that exists currently is how to overcome the lack of financial and human capacity to develop such plans.

As a developing country, there is still heavy dependence on land resources, and improper methods of cultivation and waste disposal practices. These factors continue to pose challenges for the sustainability of the riverine environment and the few water resources already developed.

CONCLUSION

Institutional reforms are a dynamic process. The current water management institutions in Zimbabwe were built on their predecessors, mindful of their inadequacies. International thinking about IWRM came at an opportune moment and was found to be a good tool to solve Zimbabwe's problems. Since the implementation of the current structure in 2000, there has not been a drought anywhere near as severe as that experienced in 1991/92. Only when such a phenomena occurs will it be possible to judge the effectiveness of the current institutional and legal set-up. Thus, more challenges are still to come.

The reforms were a response to national problems. However, the coming of the SADC water sector and the RSAP means that the country has to look beyond its boundaries. Currently, Zimbabwe is also participating in the development of watercourse institutions and the harmonisation of policies. The SADC framework is being built into the existing structures and legal framework.

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CHAPTER 14 COLLABORATION BEYOND THE GOVERNMENT LEVEL AND PROMOTING BROADPARTICIPATION: THE CASE OF THE FFA

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ABSTRACT

The contribution of stakeholders in the management of water resources in the Southern African Development Community (SADC) region is illustrated by the process of developing the Framework for Action (FFA) to achieve the Southern Africa Vision for Water, Life and Environment, as facilitated by the Global Water Partnership - Southern Africa (GWP-SA). It has been an implementation of the second Integrated Water Resource Management (IWRM) principle, which stipulates that water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels. The FFA process has involved the active contribution of stakeholders in all 13 SADC countries, and at regional level through consultative workshops. At country level, especially, the consultations were fully owned by the stakeholders, who customised the FFA to their respective countries while contributing to the regional process. The GWP-SA structures of country water partnerships have, in most instances, provided a multi-sectoral platform through which all interested stakeholders participated in the process, at country and regional levels. The process has confirmed, and contributed to, the development of the strategic priorities that the SADC leadership had identified through the Regional Strategic Action Plan (RSAP) and the Regional Indicative Strategic Development Plan (RISDP). It has further enriched the formulation of the Regional Water Policy and Strategy (RWPS).

Key words: stakeholder participation, IWRM, Water Vision, Framework for Action, southern Africa



INTRODUCTION

The Global Water Partnership (GWP) provides a multi-stakeholder platform where the second Rio/Dublin IWRM Principle - which States that water development and management should be based on a participatory approach, involving users, planners and policymakers at all levels (GWP, 2000) - finds its full meaning. In southern Africa, the formulation of the Southern Africa Vision for Water, Life and Environment was facilitated by the regional partnership, Global Water Partnership - Southern Africa (GWP-SA), through a multi-stakeholder consultation process undertaken in all Southern African Development Community (SADC) countries.

The Vision was subsequently adopted by the SADC Council of Ministers in December 1999, and presented at the World Water Forum II (WWF II) in The Hague in March 2000. Since then, while strengthening its country structures through the establishment of country water partnerships (CWPs), GWP-SA has continued to provide such a platform, where the SADC Water Division has consulted stakeholders on critical water issues. This takes place not only during the annual consulting partners (CP) meetings, where more than 100 regional stakeholders from all sectors participate, but also during targeted regional and country workshops related to several SADC initiatives. This paper presents the experiences resulting from one specific initiative: the development of a Framework for Action (FFA) to achieve the Southern Africa Vision for Water, Life and Environment - simply called the Vision in the rest of this paper - by 2025, following WWF II.

The Vision calls for 'equitable and sustainable utilisation of water for social, environmental justice and economic benefit for present and future generations' (SADC et al, 2000).

It asserts the following eight sub-Vision statements:

1. Equitable and sustainable social and economic development in southern Africa.
2. Equitable access to water of an acceptable quantity and quality.
3. Proper sanitation for all and safe waste disposal.
4. Food security for all households.
5. Energy security for all households.
6. A sustainable environment.
7. Security from natural disasters.
8. Integrated water resource development and management.

The FFA process has been undertaken in tandem, and through interaction, with the Regional Strategic Action Plan (RSAP) Project AAA11 on the development of a Regional Water

Policy and Strategy (RWPS). It is evident from the SADC Regional Water Policy (SADC, 2005), which has just been developed, that the Vision and the FFA have been embedded in the various policy pronouncements. The draft regional water strategy will demonstrate the same. The FFA process, like the formulation of the Vision, has been undertaken with the funding of the UK Department for International Development (DFID) to GWP-SA.

MAJOR ACTIVITIES UNDERTAKEN

The FFA process was designed in consultation between the then SADC Water Sector Coordinating Unit (SADC-WSCU) and GWP-SA in 2001. It comprised three components, namely a regional component, a national component and an information dissemination drive. The involvement of communities in the regional and national components is described below.

The regional component of the FFA process

All the major steps of the development of the regional FFA that were undertaken as part of the FFA process were validated by regional stakeholders' workshops held in January 2003, April 2004 and October 2004. The participants were representatives from all the SADC countries, including government departments, the private sector and NGOs. The SADC Water Division participated actively in these meetings, using this opportunity to explain to the regional stakeholders the different initiatives that it have developed over the years, including the Protocol, the RWPS, the RSAP and the Regional Indicative Strategic Development Plan (RISDP). Given the multi-sectoral nature of the sub-Vision statements, representatives of these sectors participated in these regional consultations as far as possible. Reaching consensus was not always granted, but through intellectual engagement and the crossing of minds, a way forward was always agreed upon. The result of this is that the regional FFA is a synthesis of all inputs received through these gatherings, as well as inputs received from each SADC country through national consultations and other comments. Of greater significance was the April 2004 workshop, during which the regional water policy was discussed back-to-back with the FFA, and where the multi-sectoral representation was at its highest level, compared to the other workshops. Focused workshops to support the development of the RWPS also took place, assembling selected regional water experts. Progress on the FFA process and associated regional initiatives, such as the development of the RWPS and the development of IWRM and water efficiency plans, have also been consistently on the agenda of the annual CP meetings. Organised by GWP-SA, these meetings draw together more than 100 regional partners involved in the water sector. The FFA process was discussed during the 2003 and 2004 CP meetings in Zambia and Swaziland respectively.

The national component

The national component was initially designed to cover three countries - Malawi, Mozambique and Tanzania - with in-depth consultations, supported by studies. In the remainder of the SADC countries, this component was envisioned to consist only of first-level consultations. However, the national component of the FFA process resulted in intensive consultations in all countries. This was a consequence of the devolution of ownership of the process at country level, and national coordinators were identified to steer the process in their respective countries. The consultations consisted of thematic presentations around the eight sub-Vision statements, resulting in multi-sectoral interactions. Local ownership meant that those involved in a specific sector were tasked to prepare and present the contribution of water to achieving the Vision associated with their respective sector. Thus, for example, a representative of the ministry in charge of agriculture would introduce the role of water in agriculture, in view of achieving food security. Through this process, members from grassroots communities were, as was the case in Swaziland, afforded the opportunity to interact with government officials on specific water issues affecting their daily livelihoods, for the first time.



Since these discussions were facilitated by GWP-SA, a logical step of the national FFA consultations was the subsequent establishment of CWPs. This has been the case in the Democratic Republic of Congo and Swaziland, at least. In other countries, the FFA consultations revived the process of establishing these CWPs, which were then launched either at the same time (as in the case of Tanzania) or a few weeks earlier (Lesotho). The CWPs provide the multi-stakeholder platform through which water issues can be discussed in a consultative manner. The diversity of perspectives evident during the national FFA consultations was enriching. In many instances, contradictions inherent to the laws related to the different sectors were highlighted. Conflicts in the institutional mandates for the management of water resources also emerged as a recurring obstacle. In several cases, the participants were also educated on specific provisions, such as for disaster management. And in Mauritius, the success of an aggressive water supply and sanitation programme was acknowledged. All in all, water stakeholders rallied around a sense of common destiny, calling for a responsible and collaborative management of their country's – and the region's – water resources in order to achieve the Vision.

LESSONS LEARNT AND CHALLENGES

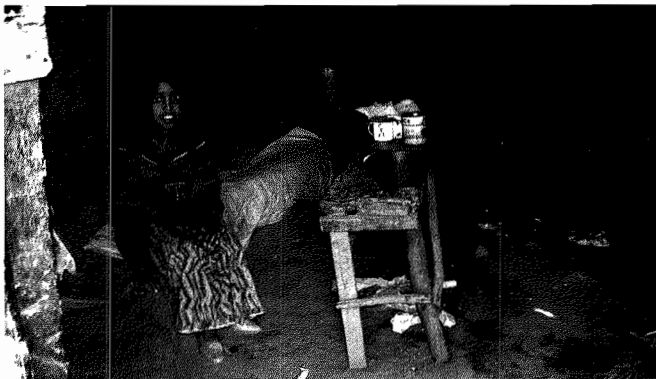
Existence of a good base of stakeholders for ownership of processes

The water sector enjoys a good stakeholder base across the SADC region, and this base can be relied upon for future regional and national initiatives. One major challenge of the FFA process was to ensure ownership and buy-in by countries - it was, somehow, a test of the effectiveness and commitment of this stakeholder base. Though the process was initiated in January 2003, the consultations in SADC countries spanned from June 2003 to March 2005.

Internalising the Vision and customising it to the context of the country, to the point of being able to probe it in a multi-sectoral platform, required commitment from those who had to drive the process within each country. The process had to fit within other ongoing activities in each country, and it was not necessarily a priority. Thus, it took some time but, when it came to fruition, it demonstrated the commitment and professionalism of those who drove it, and that of the stakeholders that they mobilised.

Water is a cross-cutting commodity requiring a multi-sectoral platform for consultations

All sectors of society depend on water. Since the Vision itself encompasses various themes, the FFA consultations gathered stakeholders from all concerned sectors and provided a unique opportunity for an exchange of information about each sector. It emerged that, within many countries, most sectors do not have the opportunity to share their plans and initiatives and that, sometimes, conflicting policies have been developed by each sector in isolation. These consultations further created a sense of common destiny between the participating stakeholders, leading to discussions that lasted well beyond the scheduled times due to the passion and interest that they raised. This first step towards Integrated Water Resource Management demonstrated its relevance. The logical consequence was the emergence or strengthening of CWP as a platform through which such interactions could be pursued further. Countries have at their disposal a structure that they can use, in an all-inclusive fashion, to cater for the cross-cutting nature of water use. SADC has increasingly used the regional partnership, GWP-SA, in this way - with positive outcomes.



Coordination of activities and linkages with other initiatives

With the plethora of initiatives in the water sector in the region and the diversity of role players, there is a strong need for coordination. The consultations, at both regional and country levels, demonstrated that there is always a danger of duplication or confusion, and called for harmonisation and consistency. This is often the case when initiatives are driven with various agendas controlled by those providing the resources, or in order to comply with global undertakings, such as the Vision itself, for the World Water Forum II, the Millennium Development Goals (MDGs) from the United Nations by 2015, or the Johannesburg Plan of Implementation of the resolution to develop Integrated Water Resource Management and Water Efficiency Plans (IWRM/WE Plans) by 2005. Yet, it was possible to understand all these initiatives and to align them to regional or national priorities.

Thus, for example, the MDG that seeks to halve the number of people without access to safe water and adequate sanitation by 2015 was linked to the relevant sub-Vision statements (numbers 2 and 3) in recognising that this specific MDG provided a milestone on the path towards the Vision, which has to be achieved by 2025. Similarly, the development of IWRM/WE Plans could also be consistently linked with the last sub-Vision statement (number 8). At national level, the FFA undertook to identify ongoing initiatives that could contribute to the achievement of the Vision. It emerged strongly that, rather than competing, initiatives had to be seen as building blocks towards the same objective of achieving the socio-economic development of the SADC region. The SADC Water Division is aware of the need to coordinate different initiatives in the water sector in the region, and makes an effort to do so. All role players, both from within and outside the region, should therefore acknowledge this responsibility and cooperate with the Division in an endeavour to maximise the benefits of the different activities through coordination and collaboration.

Resource mobilisation, capacity building and political commitment

Achieving the SADC goals of regional integration and poverty eradication requires resources. At both regional and country levels, it was evident that resources would have to be mobilised for the Vision to be translated into reality. Similarly, capacity to manage such resources and to drive the different perspectives of the Vision would be required. It emerged that the commitment of the political leadership was critical. Successes in water supply and sanitation in Botswana and Mauritius could only be attributed to such a commitment. Peace and stability, emerging in the entire SADC region, are recognised as a welcome development. These moves now have to be followed by an aggressive capacity-building drive and resource mobilisation and investments, in order to realise the SADC goals. Achieving the Vision would certainly contribute to this goal.

Moving to action

Engaging into workshop discussions is easier and cheaper than initiating actions that will bring change to any situation. It is felt that, in the water sector in southern Africa, a combination of discussions and actions is now desirable, with resources increasingly being allocated to actions rather than to workshops. Despite the enthusiasm raised by the FFA consultations, they were indeed short of leading to concrete action. Workshop fatigue was recognised as a possible danger, if the numerous regional and national gatherings did not translate into tangible initiatives on the ground to address the development needs of the region. A key challenge is, therefore, to move a step closer to the ground by actions that will begin to make a difference to the livelihoods of people. Further workshops with proceedings as the only outcomes would, somehow, no longer be welcome.

Building on the outcomes

Most workshop proceedings incorporate document inputs from the participants, often containing innovative suggestions. The FFA was no exception. Fortunately, the SADC region is gearing itself, through the second phase of the RSAP (called RSAP II), to making a tangible difference in the development of its water resources. The outcomes of the FFA process capture a set of recommended actions. These will inspire the RSAP II in the same way as the RWPS process captured the deliberations of the earlier phase of the FFA process, influencing the formulation of regional policy and strategy. The outcomes of the proceedings are therefore reflected in these key documents, which will influence the future development and management of water resources in the region. The RSAP II itself will represent the contribution of the water sector to the RISDP. Thus, the FFA process and its outcomes are important building blocks to SADC. The regional FFA report will be used as a reference to guide decisions and choices of actions, in order to translate the Vision into reality. The report has called for integration with other initiatives, while suggesting numerous stand-alone actions (SADC & GWP-SA, 2005).

BEST PRACTICES

As stakeholders are increasingly given a say in the management of the water resources of the SADC region, the FFA process provides several insights that need to be documented, and that could be useful to future initiatives:

- A bottom-up approach (supporting a top-down one) is a key ingredient for ownership and the buy-in of development projects. The RSAP manager recognised that 'the FFA process confirmed that the aspirations of the stakeholders, as expressed through the consultations, coincided with the strategic decisions that were taken by SADC for the future development and management of the region's water resources'. This approach is a welcome culture and is being fostered by the SADC Water Division

- as in the RSAP, which was recently submitted to a regional review, albeit with the limited number of participants. It is expected that future initiatives, especially the revised RSAP II, will be submitted to the same process of consultation for validation and stakeholder buy-in.

- Capacitating stakeholders meant that they were given the freedom to internalise the Vision and, with guidance, to develop the processes required at both country and regional levels. Stakeholders were able to 'unpack' the Vision so as to appreciate its challenges and the actions for which it calls. This ownership has a lasting effect, which leads to further initiatives and raises commitment to action. It is the opposite of a process where all initiatives are dictated and imposed onto stakeholders. It is, therefore, necessary to allow for a gestation period in order for the internalisation to take place. Tight and unrealistic timelines may lead to botched processes that are not sufficiently owned by the stakeholders, with the result that their commitment to follow-up actions is not guaranteed. This is often the case when funding has been secured at a late stage, while deadlines have not been adjusted accordingly.
- Indeed, the direct spin-off of capacitating stakeholders is that the platform provided by the FFA consultations was institutionalised in the form of CWPs in several countries. These multi-sectoral platforms have further facilitated the rollout of other initiatives, such as the development of IWRM/WE Plans for countries including Malawi and Zambia, and soon Mozambique and Swaziland. Other initiatives can benefit from the existence of such platforms. These platforms also provide a pool of committed institutions and representatives within each country.
- Despite the tensions that arose from the efforts to internalise the process during consultations, these objective confrontations - evident at several regional FFA workshops and CP meetings - were critical. The outcome was a better appreciation of the several initiatives that were taking place at either country or regional level, and a commitment to ensure that synergies are maximised through integration, collaboration and complementarity. In this respect, the workshops were, in themselves, a capacity-building exercise.
- While recognising that each country is at a different level of development and has different priorities, balancing the regional component with each country's own agenda and capacity requires flexibility in the levels of financial and technical support. A 'one size fits all' approach cannot work, and an appreciation of each country's particular needs is therefore required. Whatever the case, an appropriate - if not providential - champion is desired to drive such a process within the country. In several countries, credit for the success of the FFA process can be attributed to such champions.
- Finally, the level of community participation is commensurate with the means available. As a rule, the required topic guides the selection of the participants. The lower this level in the hierarchy of layers of community structures, the better. However, an optimum level is that at which the costs of community participation no longer adds any value to the process.

This optimum level hardly corresponds to the lowest grassroots level, where stakeholder consultation could become a prohibitively expensive exercise with no extra value to be gained. The size of a targeted area (the SADC region for the regional consultations, and each country for the country consultations) and the intended water resource development objectives, will serve as a guide. Advice should be sought from key individuals within the area. The approach to community participation in developing the FFA would be different to that of developing an important water infrastructure, such as a dam, which will affect the livelihoods of nearby communities. It is essential to profile the community appropriately, so as to pitch the consultation at the desired optimum level.



FUTURE PERSPECTIVES AND CONCLUSION

Consolidating the gains from peace and stability in the SADC region means that ownership of the development agenda will gradually be devolved to the lowest level through consultations, while strategic decisions are still taken at political level. The FFA consultations illustrated how this can take place in the water sector: because this sector serves many others, multi-sectoral platforms in the form of CWPs or others are a welcome development. This will give the opportunity, not only to communities to play a part in any initiative aimed at serving them, but also to critical role players, for coordination and integration.

Such consultations are critical as the region seeks to translate its strategies into action on the ground, through the RISDP. The success of such actions depends on the buy-in of the targeted communities, not only for understanding their needs (and tailoring the responses accordingly), but also for the opportunity to develop and use the human capital that they are in themselves. Ownership can be achieved in this way, ensuring the sustainability of the benefits beyond the lifetime of a project.

While each initiative will call for an appropriate community participation component, the approach will have to be commensurate with the scale of the initiative and the resources available. In the specific case of the Vision and any initiative that will contribute to its achievement, the communities of the SADC region

are ready to take charge of their destiny and are eager to be involved.

It is comforting to realise that the SADC Water Division acknowledges the role of its stakeholders in the management of the region's water resources. It is, at the same time, hoped that the culture of consultations will be maintained throughout future processes. While GWP-SA and its CWP offer the platform for such consultations, in a continued partnership with the SADC Water Division or the relevant government authorities, they need to maintain their independence and not become subservient. The key is a constructive engagement that seeks to add value, even at the cost of confrontation. The onus remains on the stakeholders themselves, who are brought together for consultations, to add substantial value to the regional and country processes in which they are involved. The experience, so far, has been positive. The trust between decisionmakers in the water sector and their constituencies is on the increase. The SADC region has indeed embraced IWRM, despite the challenges that it entails and the long way still to go.

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PART E

INFORMATION



PART E

INFORMATION

Decision-making in integrated water resource management can only be optimal if the best possible information on which to base the decision is available. For example, infrastructure may be under- or over-sized if the available flows are not accurately known. Hydrological processes are inherently variable and introduce uncertainties and risk. The RSAP stated that integrated management is dependent on acquiring appropriate information, managing this information and making it available to a diverse group of end users. International initiatives in the field of hydrological information include the SADC-HYCOS, Southern African FRIEND and the GEMS programme.

This section examines two projects in the field. Firstly, Steven van Biljon describes the SADC Hydrological Cycle Observation System (SADC-HYCOS). Conceived as part of the global-scale WHYCOS, the system is intended to provide hydrological data from a number of key sites, all in real time. Initially, based on the most sophisticated technology designed to deliver automatic observations via satellite to regional institutions and on to global databases, it is pointed out that a number of difficulties were experienced in the regional environment. Problems included difficulties in validating data, flood damage and the vandalism of power systems. These are progressively being resolved, and the system is delivering good results. Spin-off benefits include training and cooperation initiatives between the hydrological departments, leading to greater standardisation.

Secondly, John Farr and co-authors outline the importance of groundwater, particularly in relation to drought management. Unfortunately, the region is characterised by shallow aquifers contained in the weathered basement rocks, and groundwater potential is low. Nevertheless, groundwater sustains many rural communities. A situation analysis of the SADC region reveals that reliable and comprehensive groundwater data is a major deficiency throughout the region. An interesting observation is that the availability of groundwater data on a country basis is a useful surrogate for groundwater dependence and, likewise, groundwater demand data is a useful indicator of drought vulnerability. Farr calls for a long-term strategy that is directly related to groundwater assessment and monitoring, and the accumulation and dissemination of essential datasets.

CHAPTER 15

SADC-HYCOS: ESTABLISHING THE BASIS FOR JOINT MANAGEMENT OF WATER RESOURCES

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ABSTRACT

Worldwide, water resources are currently under great threat due to the accelerated demand on surface and groundwater sources. Population growth and over-exploitation give rise to the problems of salinisation, saltwater intrusion and the pollution of water resources and the environment. In an attempt to reconcile water resources development and environmental protection, the United Nations Conference on Environment and Development in 1992 produced Agenda 21 as a blueprint for the future. The freshwater chapter (Chapter 18) recognised that knowledge of the hydrological cycle, in terms of quantity and quality, forms the essential basis for effective water resource management. The World Meteorological Organization (WMO) and the World Bank proposed a worldwide network of key stations linked by satellite, with an associated quality controlled database called the World Hydrological Cycle Observing System (WHYCOS). The proposal envisaged WHYCOS to consist of a number of regional HYCOS projects where river stage, water quality and meteorological variables were to be captured and transmitted via satellite to regional centres, where regional databases would be established.

The Mediterranean HYCOS and SADC-HYCOS were the first two projects commissioned to promote regional cooperation on integrated water resources management. The lessons learnt in the implementation of such a project within the SADC region is discussed, and some ideas are expressed towards enhancing practical implementation of future projects.

INTRODUCTION AND CONTEXT OF INTERVENTION

Realising an increased pace in the demand for water by growing populations and industry, as well as an increased realisation of the importance of the environment, the United Nations Conference on Environment and Development (UNCED) was held in Rio de Janeiro in 1992. This was an attempt to reconcile, amongst others, water resources development and environmental protection. As a result of this, Agenda 21 was produced as a blueprint for the future. The freshwater chapter (Chapter 18) of Agenda 21 recognised that knowledge of the hydrological cycle, in terms of quantity and quality, forms the essential basis for effective water resources management. A number of other documents realised the need for monitoring systems, data archives, resources assessment and pollution protection and control.

Country reports of the UNDP and World Bank Sub-Saharan Africa Hydrological Assessment highlighted the decline of monitoring networks, the absence of

computer-based archives and the lack of qualified staff as a result of funding cuts to the hydrological services. This situation is true for many countries and particularly for the African continent, as reflected in the country reports.

As a result of a lack of hydrological information, numerous water resources development schemes could not be designed optimally, with a consequent wastage of financial resources. Water resources are currently under great threat due to the accelerated demand on surface and groundwater sources, while pollution is accelerating. Other problems are difficulties with saltwater intrusion and salinisation as a result of over-exploitation of the natural resources. It is estimated that before 2050, when the global water demand has doubled, a quarter of the total average flow of all the rivers in the world would have been committed to use. Only few global hydrological data sets are available currently.

To address these problems, the WMO and the World Bank proposed a worldwide network of key stations linked by satellite, with an associated quality controlled database called the World Hydrological Cycle Observing System (WHYCOS) (Rodda et al, 1993). The proposal envisaged WHYCOS to consist of a number of regional HYCOS projects where river stage, water quality and meteorological variables were to be captured and transmitted via satellite to regional centres, where regional databases would be established. The Global Telecommunication System (GTS) of WMO or the Internet were considered to be the mediums for data dissemination.

The ultimate objective of this initiative is to promote and facilitate the collection, exchange, dissemination and use of water-related information, using modern information technologies, especially those of the Internet.

The original article on WHYCOS stipulated the following principles:

- a) 'There must be committed national participation and recognition that WHYCOS complements the existing national data collection, processing and product preparation;
- b) National hydrological services must obtain the full benefit of WHYCOS;
- c) There must be a long-term commitment to WHYCOS;
- d) WHYCOS must be sustainable and it must be capable of upgrading;
- e) Free exchange of data must be agreed by all participants;
- f) Monitoring sites are to be selected so that the data can meet the widest possible use; and
- g) Participants are encouraged to contribute extra stations to WHYCOS.'

WHYCOS is being developed in the form of regional components referred to as HYCOS projects; each of those meets the priorities expressed by the national hydrological services (NHSs) and end-users of the participating countries. Such a regional approach also allows each HYCOS to establish institutional and financial arrangements, which are best appropriate to the region and external support agencies (ESAs). For each project, the participating countries agree upon a project regional centre (PRC) hosted by a relevant existing institution in the region. The role of the PRC is twofold by improving regional cooperation and being responsible for specific activities related to project implementation, such as the regional database and the Internet server of the project.

KEY ISSUES ADDRESSED

Objectives of the SADC-HYCOS project

The general objective of SADC-HYCOS is to contribute to regional socio-economic development through the provision of management tools necessary for sustainable and economical water resources development and management¹. It has, as its objective, the provision of water resources data and information in the form needed for decision-making on all aspects of integrated water resources development and management.

In order to attain the overall objective, the project has three main purposes:

- To provide SADC with one of the necessary operational tools (information system) for the sustainable improvement of regional integrated water resources assessment, monitoring and management, for a peaceful and sustainable development of the region;
- To assist the participating countries in developing their own national capacity in these fields, to allow them to participate fully in and benefit from the project; and
- To collaborate with other national, regional and international projects and programmes, towards the modernisation, rationalisation and improvement of the efficiency, cost-effectiveness and sustainability of the water resources' and related fields' information systems, in the continental part of the SADC region and at the international level.

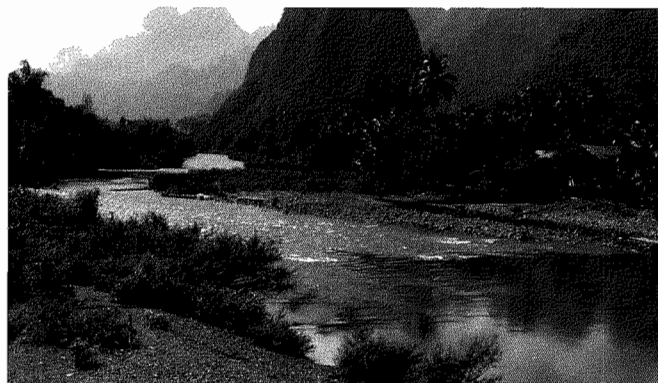
The specific objectives of the project are:

- The installation of a network of 50 data collection platforms (DCPs) for the collection and data transmission through the METEOSAT data collection system, at three-hourly intervals;
- Support to national hydrological services (NHSs) in enhancing the management of the national databases by providing software and training;
 - Setting up a regional database of current data from the DCP network, and historical data and information provided by the NHSs and the UNESCO-IHP Southern Africa FRIEND project; and
 - Enhancement of regional

cooperation among the NHSs, and between the NHSs and the PRC.

ANALYSIS AND DISCUSSION OF LESSONS LEARNT

The SADC-HYCOS project started in August 1998. Project support consisted of WMO as the supervising agency, SADC (Water Sector) as the contracting authority, the pilot regional centre (Directorate of Hydrology, Department of Water Affairs and Forestry, Pretoria), in collaboration with the Institute of Hydrology, Wallingford (later the Centre for Ecology and Hydrology) as technical assistance (TA) for the project.



The decision on the network of SADC-HYCOS stations was driven largely by the needs of participating countries, in terms of quantitative surface water hydrology. DCPs were installed at existing gauging stations, which had stage (over flow depth) records for different durations. Access to the observations is by means of the SADC-HYCOS website, where hydrographs are displayed for the different sites. Participating countries have the rights to upload to and download data from the website. Data is disseminated on request only, through contact with the NHSs. Contact information is supplied on the website.

The density of the network of DCPs is currently too low to address the needs for integrated water resource management effectively. In addition, water quality monitoring had not been successful due to the large-scale failure of conductivity and water temperature probes. Conjunctive use of surface and groundwater had not been possible, since no groundwater observations had been included in the design of the project.

As stipulated by the project document for SADC-HYCOS, which was drawn up by WMO in collaboration with SADC, an evaluation was undertaken towards the end of the project. Some findings contained in the 70-page report² are the following:

- In terms of network planning, it was an unrealistic expectation to allocate six DCPs to a country where a security risk prevailed. The allocation should have been less, concentrating on secure areas. The siting of some DCPs were criticised, since some did not benefit flood warnings to downstream areas. Local sitings of some DCPs were done too close to the rivers, making them susceptible

- to inundation during floods.
- Insufficient resourcing of the NHSs contributed to a lack of maintenance. In some instances, gauging stations were visited in excess of one-year intervals.
- Only 13 stage-discharge rating curves were provided to the PRC. Resource-related problems within the NHSs contributed to very little streamflow measurements being undertaken. Ratings were thus outdated and inaccurate.
- Although comprehensive training was provided by members of the PRC and TA teams on DCP installation and maintenance, data verification and database operation and maintenance, use of the SADC-HYCOS website and hands-on data validation, countries expressed a need for more training - even repetitive training - in order to reach as many people from the SADC region as possible.
- Incidents of vandalism impacted negatively on data quality and increased the need for maintenance. Most NHSs did not budget for replacement spares, and were dependent on the spares provided by the project and kept at the PRC.
- The Internet access in most countries was very slow, which inhibited data validation and data exchange in the SADC region.
- The website, which was developed by the TA team, only became available towards the end of the project, which negatively impacted on data validation and data exchange. A new website was designed and implemented by the PRC at the end of the project.

The evaluation report concluded that the SADC Water Resources Technical Committee (WRTC) played the role of a steering committee for the project, but that it did not function properly. Important matters, such as the non-validation of the data by the NHSs and the problematic access to data on the RDB due to the slow Internet service and complicated website, should have been identified and corrective action taken.

Despite highlighting these problems, the evaluation team summarised its findings on a positive note as follows: 'On the whole, the present arrangement and level of achievement of the project can ensure the sustainability of the project. The continued access to the METEOSAT satellite and the preparedness of the PRC to continue with its role, which are critical to sustenance of the project, are guaranteed. Certain aspects of the project, such as in-country capacity to maintain and repair DCPs, acquisition or provision of back-up data logger readers, validation of data by the countries, ensuring availability of spares for vandalised or damaged DCPs and allocation of trained staff to the project need to be addressed. It is the view of the evaluation team that the countries and the PRC, with a little bit of support from the funding agencies and SADC, are capable of addressing these shortcomings.

Towards this end, any unutilised resources from the original budget of the project may be committed to support the project and ensure its sustenance.'

BEST PRACTICES, CHALLENGES AND FUTURE PERSPECTIVES

Based on the experience from implementing the SADC-HYCOS project, a revision of the emphasis on modern instrumentation, modern information technologies and the reliance on the Internet as the sole vehicle for transfer of data, is required. This approach led to partial failure in the SADC region, due to weak telecommunication links.



In addition, successful implementation of the SADC-HYCOS project was curbed by vandalism and theft. Reliance on the use of modern field equipment should be restricted to specific sites where vandalism is considered to be at low risk. Sites with a high risk of vandalism should either be instrumented differently or secured through special measures.

The SADC-HYCOS project utilises modern technology for transferring data from the field to the PRC, for archiving in the RDB and dissemination to participating countries. The success of maintaining the field instrumentation may be open to debate. Threats to the performance of the instrumentation may be classified into (a) instrument failure, (b) natural hazards such as floods and lightning, and (c) theft or vandalism of equipment. Apart from water pressure and conductivity probes, the instrumentation proved to be reliable. It has to be realised that the instrumentation is fragile and does not tolerate errors in installation or electrical coupling easily. Losses due to natural hazards were experienced, although very extreme flooding did take place within SADC-HYCOS. Theft and vandalism unfortunately played the dominating role in damage to or loss of instrumentation. The most successful protective operation in combating theft and vandalism is seen in Zimbabwe, where a local person is employed to take daily gauge plate readings, thereby ensuring that someone is available to 'guard' the station. Control readings are valuable in terms of the quality of the data. Most other hydrological services do not operate in such a manner, and find it difficult to implement such a system in very remote places.

Transmission of data in near real-time is a prerequisite for flood warning and management. The SADC-HYCOS project provided valuable data during the February 2000 floods, despite the fact that very few gauging stations were calibrated. The PRC only received calibration detail for 13 of the 47 sites.

Data for normal operational purposes is required in near real-time for the management of reservoirs and hydroelectric plants. Table 1 lists a number of technologies that may be considered for obtaining data in near real-time. It ranges from a very basic system, utilising the services of an observer, who can also operate as a flood warning officer to more advanced systems. It is proposed that basic systems be considered for incorporation into future HYCOS projects, provided that a communication means for the transfer of data from the field to an operational centre is available. Data will have to be converted from analogue to digital form at the centre. The main disadvantages of such a system are reliance on the human element, and a longer delay between the measurement and display of data on communication mediums, such as the Global Telecommunication System (GTS) of WMO or the Internet. The main advantages of a basic system are work creation, the duality of responsibilities of the observer (data capturing and flood warning officer), with the susceptibility to vandalism and theft almost zero. Only generalised statements in terms of cost and operation are made in Table 1.

The best solution should be implemented following an in-depth investigation of circumstances in the country (creation of work as a government initiative to combat poverty, availability of supporting technologies such as landlines, GSM systems in remote places, data dissemination via direct telecommunication links or networks, etc.) and the specific data requirements from the river at selected gauging sites.

Satellite technology has the best advantage, despite the initial capital outlay for the equipment. The latest advances in instrumentation, in terms of low power consumption, are very attractive. It is possible that by closer inspection, 'mixed technology' solutions, such as cellular or radio transmission to a specific node from where this information is collated and then sent by satellite to a national or regional archive, may prove to be feasible.

When cellular telephone communication is not available (unreliable landlines, especially during floods), the question should be asked whether modern-day technology should be used or whether older technology, such as a radio system, should be implemented. A land-based radio system is restricted in terms of distance, but repeater stations may be utilised. A number of local observers may report to a central point equipped with satellite transmission technology. At such a node, all the information can be integrated and sent via satellite to a regional or national centre. Local personnel, acting as observers or watchmen, can be trained to act as links between the satellite base and the local people living on the flood planes, to carry warnings and information of upstream river behaviour being received from the nearest satellite node. Observations at the river can either be done by reading installed gauge plates or taking readings from electronic instrumentation, and sending this information by voice to the satellite base, where it is entered on a computer or transferred into digital form and sent to a collation point.

Table 1: Comparison of different technologies

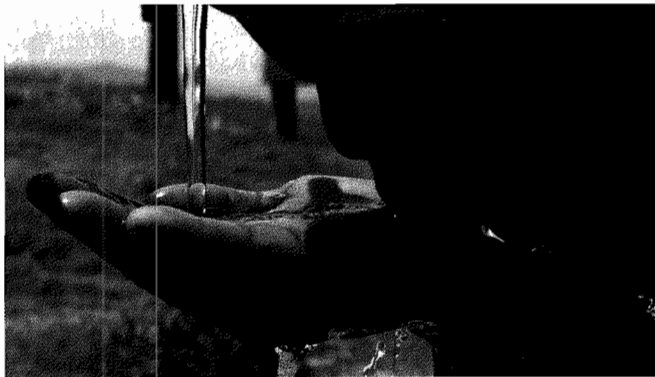
Technology	Equipment and installation cost	Cost of maintenance and operation	Reliability during floods	Form of data at point of measurement	Advantages / disadvantages and comments
1. Observer and flood warning officer	Negligible (gauge plates and communication medium)	Salary of observer	Acceptable	Analogue	The officer fulfils two important duties
2. Landline telephone	Low	Low	Not acceptable	Analogue / digital	Prone to breakdown during floods
3. Radio	Expensive (repeater stations required)	Medium to high – technician for maintenance	Risky but acceptable	Digital	Lightning protection compulsory, theft and vandalism
4. Cellular telephone	Low	Low	Risky	Digital	Prone to overloading, emergency channel required. Theft and vandalism
5. Meteoburst	Very expensive	Medium to high – technician required for maintenance	Acceptable only for very large catchments	Digital	Requires master stations and service provider. Theft and vandalism
6. Satellite	Expensive	Low	Acceptable	Digital	Theft and vandalism

The opportunity afforded by the HYCOS system design is that such satellite messages can be received, archived and disseminated via the Internet or GTS. The technology utilised in the field to obtain the data is almost irrelevant, although at least one satellite node is required for collating data and transferring the data into a digital form. The main disadvantages of such a system are the number of nodes within the data chain and the human element.

A HYCOS project presents a unique opportunity to act as a data archive and a dissemination system for every technology (or 'mix of technologies') listed in table 1, provided the data is transferred into a digital form for transmission. It has the advantage of informing the public as well as organisations, national and international, of the current river status. Such knowledge of the river dynamics in a region has the advantages of creating awareness, understanding and cooperation.

Water quality

Anthropogenic changes highlight the importance of water quality. Fixed water quality instrumentation (such as conductivity probes) proved to be unreliable in the SADC-HYCOS project. Sediment sensors, on the other hand, require frequent cleaning and calibration. The feasibility of the fixed installation of water quality instrumentation is questioned.



Two possibilities remain to be implemented with a HYCOS project, namely the use of portable water quality instrumentation and/or cooperation with the national or basin authority water quality monitoring programme. If well designed, structured and operational, the latter option is advisable. If this is not the case, the HYCOS project should provide the necessary technological and financial support to the appropriate national or regional agency to implement a water quality monitoring network. In return, data and information should be supplied for archiving on the RDB at the PRC, and display on the project website.

Alternately, or in addition to, identified water quality variables should be monitored by hydrologists or technicians from the national service, basin authority or PRC using portable instrumentation. This is not the ideal solution, since monitoring

may be infrequent. In countries where regional or district offices have responsibility for monitoring, a number of portable units will be required.

Groundwater

Many countries are largely dependent on groundwater and, for that reason, the monitoring and assessment of this resource should be included in future HYCOS projects. Effective management of this resource is possible by receiving data in near real-time to monitor abstraction rates and the status of groundwater levels, recharge, seawater intrusion, etc.

It is foreseen that a further phase of the project should contribute significantly to network density, and towards integrated water resources management by including data on surface and groundwater quality.

Project governance and management

Each HYCOS component is being developed to meet specific regional needs, and the management structure has to be tailored to comply with these needs and with the requirements of the donor agencies. The basic institutional set-up usually includes the following components: a steering committee, an executing or supervising agency, a regional centre and participating NHTs. The responsibility and role of each of these bodies need to be clearly defined in the plans for the project.

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CHAPTER 16 GROUNDWATER DEPENDENCE AND THE STRATEGIC USE OF GROUNDWATER RESOURCES IN DROUGHT-PRONE AREAS OF SADC

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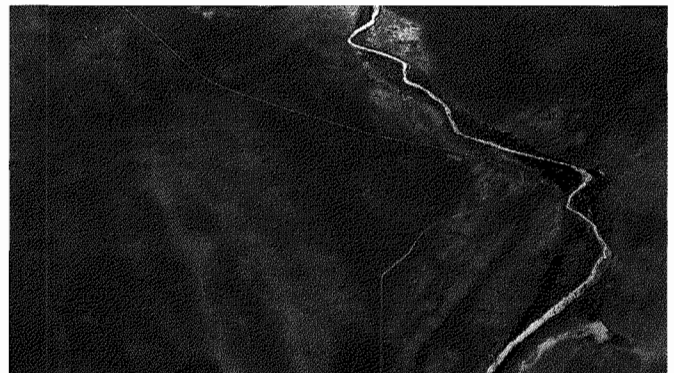
ABSTRACT

A groundwater situation analysis of the SADC region has been undertaken as part of the Regional Strategic Action Plan (RSAP) and funded by the World Bank GEF Programme as a basis for ensuring the equitable use of groundwater resources, particularly during periods of drought, both for human needs and for sustaining ecosystems. For the most part, groundwater in the SADC region is available within shallow aquifers contained in the weathered basement rocks that characterise the region. Although more productive aquifers occur in some areas, groundwater is mainly used to sustain rural and peri-urban communities, and less for urban centres. The southern and eastern African SADC Member States are most dependent on groundwater, whereas the Democratic Republic of Congo is the least dependent. The availability of groundwater data on a country basis is a useful surrogate for groundwater dependence and, likewise, groundwater demand data is a useful indicator of drought vulnerability. However, it is very apparent that reliable and comprehensive groundwater data is a major deficiency throughout the SADC region. All the groundwater-dependent States are vulnerable to drought, which is now considered to be endemic in the east and south of the region, and all need to consider mitigation strategies to lessen the hardships imposed largely on their rural population. Such strategy requires long-term intervention, a process that is directly related to groundwater assessment and monitoring and the accumulation and dissemination of essential datasets, if rural population livelihoods are to be maintained in future years when water supply is projected to be in deficit in over half of the SADC Member States.



INTRODUCTION

The fourteen Member States of the Southern African Development Community (SADC) collectively account for almost 70% of the gross national product of sub-Saharan Africa, are home to a third of its people, and are characterised by recent rapid population growth. Dependence on surface water and groundwater varies between Member States, but there are indications that water will become scarce in nine of the Member States over the next few decades. Comprehensive regional planning and water conservation will be crucial to reducing the impact of drought in the region over this period. The Regional Strategic Action Plan for Integrated Water Resource Development and Management (RSAP-IWRM), now being implemented, addresses key water management issues for both surface water bodies and major aquifers, and is key to drought preparedness.



There are significant economic and social values attached to groundwater in most SADC Member States. Groundwater is extensively used for a range of productive and consumptive purposes and, during the last few decades, the use of groundwater for irrigation and food production has increased considerably. Groundwater now accounts for about 14% of the total irrigated area in Namibia, 18% in South Africa, and as much as 56% in Botswana (FAO AQUASTAT database). Apart from agriculture, groundwater is also important for small-scale production activities, such as brick making and brewing, thus contributing to local employment and income generation.

Extremes of climate bring both frequent drought and substantial flood events, which impact on livelihoods as well as on national productivity. In many Member States, rural communities are dependent on groundwater, which is a key element for the alleviation of the hardship drought can inflict upon them. However, past policy responses to drought have invariably been based on short-term crisis reactions

- whereas proactive, sustainable and integrated management of groundwater resources may help provide a longer-term solution.

A situation analysis of the region with respect to groundwater use, water demands and other water-related issues has been undertaken as part of the RSAP-IWRM, and was funded as part of the World Bank GEF Programme (Wellfield Consulting, 2003). The objective was to gather information from which to develop a strategic regional approach to support and enhance the capacity of SADC Member States in the definition of drought management policies, with specific reference to the availability and supply potential of groundwater resources. It also examined the reconciliation of demands for socio-economic development and those of the principal groundwater-dependent ecosystems.

GROUNDWATER INFORMATION

The study revealed that groundwater information in the SADC region is generally divided between six principal sources, namely:

- **Hydrogeological mapping programmes:**
Recently completed hydrogeological maps are those for Lesotho and Namibia. Hydrogeological maps are also available for Mauritius (1999) and South Africa (regional 1:500 000 scale, commencing 1995). Other hydrogeological maps in the region (Botswana, Tanzania) can be regarded as 'first attempts', using local formats and legends.
- **National water development plans:**
Documents produced as part of national water development plans form a major source of baseline data on hydrogeology and related climatology, hydrology, water use and sanitation. Examples include Botswana (National Water Development Plan, 1991-92), Namibia (national database for the national hydrogeology map, 2001), Tanzania (Region Water Master Plans, early 1980s for all regions except for Dodoma, Arusha, Singida and Morogoro), Zambia (JICA, 1995) and Zimbabwe (Norad/Interconsult 1986).
- **Donor aid agencies and NGOs:**
Databases from individual projects are normally held within both the donor and recipient countries. However, many instances may be cited where data from major (often 'emergency') groundwater programmes was not gathered and/or not archived, and there is no resultant database.
- **Consultants and institutions:**
A variety of consultant organisations with offices in centres such as Gaborone, Harare, Lusaka and Windhoek, and various centres in South Africa are active in the region. Others are based in Europe and elsewhere. Such organisations are beginning to realise the commercial value of their data, especially long-term time series and detailed point source data that would be expensive to replicate. *It should be noted that to organise the collection and collation of geo-referenced datasets from such sources could, in future, be a relatively*

expensive undertaking. Some universities in the SADC region are taking an active role in training and ensuring best hydrogeological practice (WaterNet, and the universities of Botswana, Dar es Salaam, Namibia and Zimbabwe).

- **District level institutions:**

Following global trends, the decentralisation of responsibility and the management of rural groundwater supply schemes has occurred in many Member States. This has created significant difficulties where there are insufficient qualified personnel to take an active role in management and reliable data collection. Urban supplies are frequently operated by parastatals or private water companies with poor knowledge of groundwater resources, and city councils are involved in groundwater for urban supply in several capital cities (Windhoek; Lusaka).

- **National level institutions:**

A number of the most comprehensive national databases are those originally collected by geological surveys and, in later years, water departments. Archives of geological surveys in Botswana, Malawi, Tanzania, Swaziland, Zambia and Zimbabwe include some of the first hydrogeological works undertaken in the SADC region. However, in recent years, most of these databases have suffered from poor data input, resultant from decentralisation and the privatisation of siting and drilling.

GROUNDWATER DEPENDENCE

The role and perception of the importance of groundwater in a national water supply strategy is overwhelmingly influenced by availability and the access to surface water sources. Botswana, Namibia and Zimbabwe are the most groundwater-dependent countries in SADC. The Democratic Republic of Congo (DR Congo) is the least dependent on groundwater, being well endowed with surface water resources (Table 1). All other SADC nations are dependent to a greater or lesser degree on groundwater, especially for water supply to rural communities. It is also apparent that irrigation using groundwater, both on a small community-garden scale and on larger commercial scales for crops such as citrus and sugar, is set to increase in the future as pressures for economic growth and increased food security become more acute.



TABLE 1: Groundwater dependency in SADC Member States

Scale: 🚰🚰🚰 major, 🚰🚰 moderate, 🚰 minor

Member State	Rural	Urban	Agriculture	Industry	Overall dependency
Angola	🚰🚰	🚰🚰	🚰🚰	🚰	🚰🚰
Botswana	🚰🚰🚰	🚰🚰	🚰🚰🚰	🚰🚰🚰	🚰🚰🚰
DR Congo	🚰	🚰	🚰	🚰	🚰
Lesotho	🚰🚰	🚰🚰	🚰	🚰	🚰
Madagascar					
Malawi	🚰🚰🚰	🚰	🚰🚰	🚰	🚰🚰
Mauritius	🚰	🚰🚰	🚰🚰	🚰🚰	🚰🚰
Mozambique	🚰🚰	🚰🚰	🚰	🚰	🚰🚰
Namibia	🚰🚰🚰	🚰🚰🚰	🚰🚰🚰	🚰🚰🚰	🚰🚰🚰
South Africa	🚰🚰🚰	🚰🚰	🚰🚰	🚰🚰	🚰🚰
Swaziland	🚰🚰	🚰	🚰	🚰	🚰
Tanzania	🚰🚰🚰	🚰🚰	🚰🚰	🚰	🚰🚰
Zambia	🚰🚰	🚰🚰	🚰	🚰🚰	🚰🚰
Zimbabwe	🚰🚰🚰	🚰🚰	🚰🚰🚰	🚰🚰	🚰🚰🚰

Much of the groundwater in the region occurs in weathered crystalline basement rocks that are low yielding but suitable for the dispersed supply of rural communities. There are few groundwater resources capable of sustaining major urban areas, although significant limestone and fractured quartzite aquifers contribute to the supply of some of the major cities, notably Dar es Salaam, Lusaka and Windhoek. The regional situation analysis has revealed that a useful surrogate when examining groundwater dependence is the availability of groundwater data, although data scarcity in general is a widespread problem throughout the region. In countries where surface sources are plentiful (eg DR Congo), groundwater data coverage is almost non-existent and groundwater resources are consequently poorly understood and managed. In countries that have few potential surface water sources (eg Botswana, Namibia), groundwater data coverage is good, groundwater resources play a much more important role in national planning and population livelihood, and sustainable resource management has a high priority (Table 2).

Similarly, the availability and coverage of groundwater demand data, when viewed in conjunction with groundwater occurrence information, closely correlates with the vulnerability of Member States to drought events. Where coverage of both data sets is poor, then vulnerability to drought can be assumed to be low (such as Angola, DRC). Where coverage is good, then drought vulnerability is high (Botswana, Namibia).

GROUNDWATER DEMAND

An assessment of overall groundwater demand has been based upon the quality and quantity of the nine data types listed in Table 3, which are largely derived from Member State census information and generic water consumption figures. However, groundwater

demand evaluation is complex, since demand also varies annually with season and climatic regimes, as well as periodically with drought events, which may be severe enough to cause population migration from dry to wetter areas, as has happened in Tanzania and Zambia.

Little specific information is available on the interaction between groundwater and surface water (ie rivers and lakes) in the SADC region, although the hydrological monitoring network used for the FRIEND project could enable the relative contributions of groundwater to surface water systems to be modelled. However, recent river basin studies that considered ecological and hydrogeological factors have been undertaken in the Usangu and Pangani basins of south-eastern Tanzania, as well as in the wetlands of KwaZulu-Natal province of South Africa. With the strengthening of major river basin organisations (Limpopo, Zambezi, Orange, Okavango etc), greater knowledge of this component of the water cycle may be expected.

With respect to the role of groundwater in the maintenance of various ecosystems of the region and, in particular, wetlands, it is apparent that although information is available in scientific literature (eg RAMSAR publications) and in



national reports and studies (general country/region specific reviews), data is patchy, even to the extent of definitions of what actually constitutes a wetland. Unfortunately, many of these studies are established from a wildlife/vegetation/environmental perspective, with the result that there is generally very limited reference to groundwater and its role in the particular ecosystem.

DROUGHT VULNERABILITY

Of the 14 SADC Member States, 11 are directly and periodically affected by drought events (Table 3). Of the other three, current information would indicate that DRC is not affected, and that Mauritius, as an island state, is partly isolated from the rigours of continental drought. Meteorological drought is endemic in those Member States that straddle the Tropic of Capricorn, and it is apparent that increasing climatic variability attributed to El Niño variations is increasing the periodicity and severity of drought occurrence throughout the SADC region.

The definition of drought is both sector-specific (ie defined by climatic changes as well as sectoral impacts) as well as nation-specific (a perceived drought period with reduced rainfall in higher rainfall States would be considered a relatively wet event in, say, Botswana or Namibia).

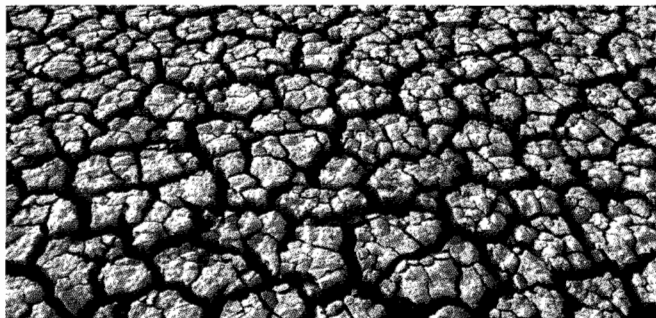
Groundwater significantly contributes to rural water supply in many Member States, and the natural buffering capacity of groundwater systems during periods of drought provides considerable advantage in terms of reliability of supply. However, the imposition of greater natural and artificial (abstraction) stress on the groundwater system during drought events also creates longer-term problems. This is because groundwater takes longer to recover after drought than surface sources. There is, therefore, a need for careful management and continuous monitoring of groundwater resources, since specific drought monitoring and assessment programmes may fail to pick up these significant longer-term impacts on groundwater, with the result that potentially predictable and manageable problems become emergencies.

Quite frequently, anecdotal evidence about how groundwater systems perform during drought is all that is available. For example, it is known that in southern Zambia, at the time of the 1984 drought, ponds and ephemeral rivers that were formerly the main supply dried up, and hand-dug wells had to be sunk. During the 1990-92 drought, it appears that these wells dried up and were deepened and new boreholes drilled. Little recorded data actually exists, while this same pattern of crisis intervention with resultant poor documentation has been observed in Malawi, Tanzania,

Zimbabwe and elsewhere in the region. In all cases, critical data sets that will be of future use to those who depend upon drought-prone aquifer systems clearly were not identified or gathered, and no water table

or borehole yield monitoring was implemented from which to gather this data in the future.

UNICEF reported that reliable information on the status of rural water supplies was unavailable at the onset of the recent drought periods in southern Africa. The lack of this information, at least in an accessible and useable form, has been a serious and continuing constraint on sector planning and management during recent drought events. This situation was exacerbated by the fact that data holdings that do exist are usually dispersed amongst a range of different organisations (such as government and NGOs) at different administrative levels (national, regional and local) with little relationship or coordination between them.



FUTURE PERSPECTIVE

From the study undertaken, it has become very apparent that the need for a clearer understanding of the groundwater resource base throughout the SADC region is essential, if increased use of groundwater during drought periods is to be motivated and instituted in an appropriate and sustainable fashion.

It is also very apparent that both the quality and quantity of essential data currently available to achieve this on a regional basis is, to a large extent, lacking, and that data sets that are available are often in a declining state, despite ever-increasing development of groundwater resources.

Thus, with respect to the acquisition of crucial information on groundwater systems for regional development planning, and for drought alleviation in particular, it must be considered a matter of high priority that Member States should:

- Recognise the importance of establishing (and maintaining) reliable and comprehensive hydrogeological, hydrological and meteorological databases that are accessible and updated routinely, and can be used both for the planning of new groundwater projects as well as for instituting groundwater drought prevention and mitigation measures;
- Establish drought monitoring systems that extend beyond rainfall, surface water and food security indicators to groundwater and groundwater supply status, recognising that antecedent conditions (eg river flows and groundwater levels of the previous year) are essential guides for predicting future hydrological and hydrogeological (not meteorological) conditions;

- Acknowledge and address the current shortcomings in data gathering and information dissemination systems that make evaluating the impact of past droughts on groundwater resources - and those dependent on them - difficult and unreliable; and
- Implement predictive techniques to assess the impact of drought conditions of different severity upon groundwater, as well as the rate of its recovery following the onset of rains, so that effective methods of abstraction can be planned.

CONCLUSIONS

For the most part, groundwater in the SADC region is available within shallow aquifers contained in the weathered basement rocks that characterise the region.

More productive aquifers occur in some areas, but groundwater is mainly used to sustain rural communities and is less used for urban centres. The availability of groundwater data on a country basis is a useful surrogate for groundwater dependence and, likewise, groundwater demand data is a useful indicator of drought vulnerability. The southern and eastern African SADC Member States are most dependent on groundwater, whereas the DR Congo is least dependent. All the groundwater-dependent States are vulnerable to drought, which is now considered to be endemic in the east and south of the region.

Groundwater resources are difficult to quantify in terms of useable volume and replenishment or sustainability.

This contributes to a lower level of importance being ascribed to groundwater in the financial decision-making process related to national water supply. In turn, this perception inhibits the release of funding for groundwater monitoring, exploration and data gathering programmes. This has the inevitable consequence that the nature and reliability of the resource remains poorly understood, when in times of drought it may contribute the only reliable source of water to large, mainly rural, sections of the population.

Acknowledgements: The authors are grateful to the numerous organisations and their staff throughout the SADC Member States for providing valuable information and data during the course of the study.

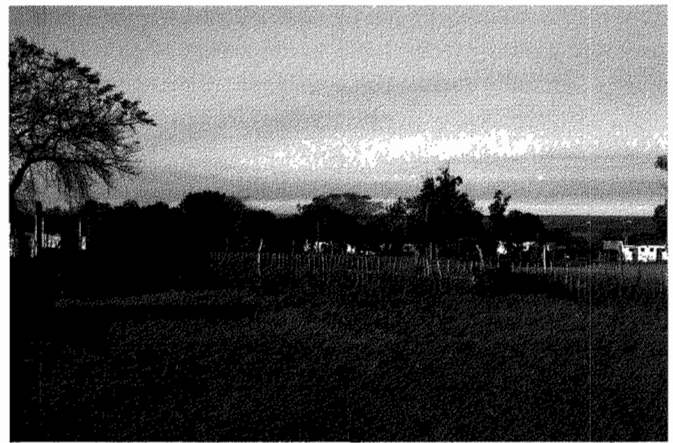


TABLE 2: Availability of groundwater occurrence data

Member State	Data type	Format	Department /agency	Coverage	Comments
Angola	Dpwa, Bhdp, Bhyd, Bhlc	HC, D	DW, DGS, DRA	*	Weathered crystalline basement (Pre-Cambrian), coastal sedimentary (Cretaceous to recent) and recent alluvial sand aquifers. DNA - 3 618 bh. records countrywide. Hidromina – 2 546 southern three regions.
Botswana	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC, D	DW, DGS, DRA, WSO	***	Weathered crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and recent alluvial sand aquifers. DGS and DWA >20 000 bh. records in National bh. Archive.
DR Congo	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC, D	DW, DGS, DRA, WSO	*	Sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers. AIDR - about 800 bh. records, REGIDSO - 210 digitised bh. records, SNHR - 838 bh. records.
Lesotho	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DG, DW, DRA, WSO	**	Crystalline basement (Pre-Cambrian), volcanic and sedimentary (Cretaceous) aquifers. Hydrocon - 206 digitised bh. records, Monitoring - 89 digitised monitoring bh. records, IGP-1 047 bh. records, TAMS-8 070 bh. Records.
Madagascar					
Malawi	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DW, DGS, DRA, NGO	*	Crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers. MWD - ~6 000 digitised bh. records, 15 288-bh records in project files, MASAF - 2 200 bh. records, CPAR - bh. records.
Mauritius	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DW, DGS, DRA	***	Volcanic (Cretaceous) and non-consolidated alluvial (Recent) aquifers. Unknown number of bh. records with WRU and CWA.
Mozambique	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DW, DGS, DRA, NGO, WSO	*	Crystalline basement (Pre-Cambrian), coastal sedimentary (Cretaceous) and non-consolidated deltaic and fluvial (Recent) aquifers. Sdg – 12 000 digitised bh. records, GEOMOC – 9 000 bh. records.

TABLE 2: Availability of groundwater occurrence data continued...

Member State	Data type	Format	Department /agency	Coverage	Comments
Namibia	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC, D	DW, DGS, DRA, WSO	***	Crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers. 42 500 bh. records of which 32 000 contain useful data.
South Africa	Gwlv, Dpwa, Bhdp, Bhyd, hlc, hgl	HC, D	DW, DGS, DRA, NGO, WSO, DA	***	Crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and non-consolidated alluvial (Recent). DWAF – NGDB - >220 000 digitised bh. records, WMS - >55 000 digitised bh. records.
Swaziland	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC, D	DW, DGS, DRA, NGO, WSO	**	Crystalline basement (Pre-Cambrian), and sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers. DGSM–SWAZIDAT-> 2 600 digitised bh. records.
Tanzania	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DW, DGS, DRA, NGO, WSO	**	Weathered crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers. MWLD - ~7 000 bh. records
Zambia	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC	DW, DGS, DRA, NGO, WSO	**	Crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and non-consolidated alluvial (Recent) aquifers.
Zimbabwe	Gwlv, Dpwa, Bhdp, Bhyd, Bhlc, Bhgl	HC,D	DW, DGS, DRA, NGO, WSO	**	Crystalline basement (Pre-Cambrian), sedimentary (Cretaceous) and un-consolidated alluvial (Recent) aquifers. ZNGD - ~15 000 bh. records.

Data Type:

Gwlv – Groundwater level
 Dpwa – Depth to water
 Bhdp – Borehole depth
 Bhyd – Borehole yield
 Bhlc – Borehole location
 Bhgl – Borehole geological log

Format:

HC – Hard copy
 D – Digital

Department/agency:

DW – Dept of Water
 DGS – Dept Geological Survey
 DRA – District/regional authorities
 WSO – Water supply organisations
 NGO – Non-governmental organisations
 DA – Department of Agriculture

Coverage

*** - Good
 ** - Moderate to patchy
 * - Poor to non-existent

TABLE 3: Groundwater demand information

Member State	Data type	Format	Department /agency	Coverage	Comments
Angola	Popc, Rrwd, Lvst, Crtp, Urwd, Ldus	HC	DW, ID, DRA, WSO, DA, NSO	*	Affected by drought and economic situation
Botswana	Popc, Rrwd, Lvst, Idtp, Urwd, Hden	HC, D	DW, ID, DRA, WSO, DA, NSO	***	Affected by drought and economic situation
DR Congo	Popc, Rrwd, Lvst, Irar, Crtp, Idtp, Urwd, Ldus, Hden	HC	DW, ID, DRA, WSO, DA, NSO	*	Little groundwater used
Lesotho	Popc, Rrwd, Urwd, Hden	HC	DW, DRA, WSO, DA, NSO	**	Groundwater supplies peri-urban and rural communities
Madagascar					
Malawi	Popc, Rrwd, Irar, Crtp, Ldus, Hden	HC, D	DW, ID, DRA, WSO, DA, NSO	**	Affected by drought and economic situation
Mauritius	Popc, Rrwd, Irar, Crtp, Urwd, Ldus, Hden	HC, D	DW, ID, WSO, DA, NSO	***	
Mozambique	Popc, Rrwd, Lvst, Irar, Crtp, Urwd, Ldus, Hden	HC	DW, ID, DRA, WSO, DA, NSO	**	Affected by drought and economic situation
Namibia	Popc, Rrwd, Lvst, Crtp, Idtp, Urwd, Ldus, Hden	HC, D	DW, DRA, WSO, DA, NSO	***	Affected by drought
South Africa	Popc, Rrwd, Lvst, Irar, Crtp, Idtp, Urwd, Ldus, Hden	HC, D	DW, ID, DRA, WSO, DA, NSO	***	Affected by drought and increased demand from former homeland areas
Swaziland	Popc, Rrwd, Irar, Crtp, Urwd, Ldus, Hden	HC	DW, ID, WSO, DA, NSO	**	
Tanzania	Popc, Rrwd, Lvst, Irar, Crtp, Urwd, Ldus, Hden	HC	DW, DRA, WSO, DA, NSO	*	Affected by drought and economic situation – demand for groundwater difficult to assess

TABLE 3: Groundwater demand information continued...

Member State	Data type	Format	Department /agency	Coverage	Comments
Zambia	Popc, Rrwd, Lvst, Irar, Crtp, Idtp, Urwd, Ldus, Hdcn	HC	DW, ID, DRA, WSO, DA, NSO	**	Affected by drought and economic situation
Zimbabwe	Popc, Rrwd, Irar, Crtp, Idtp, Urwd, Ldus, Hdcn	HC	DW, ID, DRA, WSO, DA, NSO	**	Affected by drought and poor Lvst, economic situation

Data type:

Popc – Population census
 Rrwd – Rural water demand
 Lvst – Livestock distribution
 Irar – Irrigation area
 Crtp – Crop type/distribution
 Idtp – Industry type/distribution
 Urwd – Urban water demand
 Ldus – Land use
 Hdcn – Hydrocensus

Format:

HC – Hard copy
 D – Digital

Department/agency:

DW – Dept of Water
 ID – Irrigation Department
 DRA – District/regional authorities
 WSO – Water supply organisations
 DA – Department of Agriculture
 NSO – National Statistics Office

Coverage

*** - Good
 ** - Moderate to patchy
 * - Poor to non-existent

PART F

INFRASTRUCTURE



PART F

INFRASTRUCTURE

When the RSAP was formulated, it was hoped that one of the outcomes would be progress in implementing regional water resource infrastructure. It became apparent that improving the enabling environment to deliver infrastructure would be a prerequisite. Consequently, most of the RSAP projects are directed at the enabling environment. Nevertheless, this section showcases two major projects that have depended heavily on international cooperation of the type that is envisaged in the SADC Treaty and Protocol.

Rob Clanahan describes the *institutional structure of KOBWA*, an international water agency that was created to implement the first phase of the Komati Basin development, consisting of the Driekoppies and Maguga dams. Initially conceived as purely technical implementers, Clanahan tracks how KOBWA's role evolved to being more of a development agency and manager of water resources. There are significant lessons in this evolution, not least the difficulty of the relationship with governments, where government departments must perform functions that are on the critical path of a large construction project with international contractors.

The social issues surrounding dams are once again highlighted, with the additional overlay that responses were required that could deal with the differences in the two governments' policies regarding compensation and resettlement of affected communities.

Liphapang Potloane and Victoria Qheku describe how the *Lesotho Highlands Water Project* was implemented. In contrast to KOBWA, the Lesotho Highlands Development Authority (LHDA) is a national institution in Lesotho, charged with meeting that government's obligations in terms of the international treaty to implement the major parts of the project. Several of the lessons are linked to the social problems, caused by a large influx of international contractors' employees to what was hitherto a remote rural setting. These problems include labour relations and disease. The importance of seizing opportunities created during the construction phase is emphasised.

CHAPTER 17

JOINT WATER INFRASTRUCTURE DEVELOPMENT AND MANAGEMENT FOR ECONOMIC PROSPERITY: THE EXAMPLE OF KOBWA

By Robin Clanahan

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ABSTRACT

The Komati Basin Water Authority (KOBWA) was a pioneer in the SADC region as a transboundary water resource development agency, supported by South Africa and Swaziland. In implementing the Driekoppies and Maguga dams projects, KOBWA put into practice the key principles of the Protocol on Shared Watercourses, the RISDP and the RSAP. The lessons learnt were that socio-economic challenges are costly, long term and more onerous than technical problems. The reparation for alienation of land to dams or irrigated agriculture is an extremely sensitive and difficult issue to deal with, particularly since the land alienated is always considered better than the replacement land, and fragmented social structures are never properly mended. The eradication of poverty may be the goal of a major dam scheme, but it can generate poverty far more easily than is generally realised. To counter this, development of the rural communities as a whole is essential, with monitoring and evaluation of progress within affected, disrupted or relocated communities and families. It is, therefore, imperative that the terms of reference of the agency and its directors are very well defined, and that the people in the director body and leading the agency are competent technicians with good negotiating skills.

INTRODUCTION

Preamble and institutional arrangements

KOBWA - the Komati Basin Water Authority - was established in 1992, with the Joint Water Commission (JWC), by treaties between South Africa and Swaziland. These had the express purpose of implementing the development and utilisation of the water resources of the Komati River Basin. This followed on from the 1964 agreement between South Africa and Portugal (as the colonial power) on rivers of mutual interest, to which Swaziland acceded in 1967. KOBWA is the implementing agency for the JWC and South Africa and Swaziland have equal representation on both.

Phase 1 of the Komati Basin Development Programme

The Treaty parties agreed in principle to develop the Komati River Basin water resources following a comprehensive development plan. The envisaged development would secure a net storage capacity of between 1 200hm³ and 1 900hm³. Driekoppies Dam (251hm³) and Maguga Dam (332hm³)

comprise approximately one third of this target. All development costs of Driekoppies Dam (Phase 1a) and 60% of Maguga Dam (Phase 1b) costs would be borne by South Africa, with Swaziland bearing the remainder.

Social and environmental considerations

The parties agreed to take all reasonable measures to ensure that the design, construction, operation and maintenance of the project were 'compatible with the protection of the existing quality of the environment and should pay due regard to the maintenance of the welfare of persons and communities immediately affected by the project'. In terms of the Treaty, all land required for the construction, operation and maintenance of the project was to be made available to KOBWA free of any third party interest.



KOBWA LEADS WITH SADC POLICIES AND STRATEGIES

Basic policies and strategies

The KOBWA Treaty and the initiation of its implementation were concurrent with the development of SADC and the initiation of the Water Sector in 1992. The aims of the KOBWA Treaty and the SADC Regional Indicative Strategic Development Plan (RISDP) regarding water resource development are remarkably similar.

The goal of the SADC Water Sector is the attainment of sustainable, integrated planning and the development, utilisation and management of water resources that contribute to the SADC objective of an integrated regional economy, on the basis of balance, equity and mutual benefit for all Member States. The Revised Protocol on Shared Watercourses aims at promoting and facilitating the 'sustainable, equitable and reasonable utilisation of shared watercourses' through the establishment of shared watercourse agreements and institutions. These issues and aims are echoed in the KOBWA Treaty.

KOBWA and the RSAP objectives

Improving the legal and regulatory framework
KOBWA was not in a position to initiate changes to the legal and regulatory framework - this had to be done by government. However, in the case of Swaziland, KOBWA contributed to the formulation of guidelines on the relocation and compensation of households and communities affected

by the construction of the dams and infrastructure, and the flooding of reservoir areas.

Institutional strengthening

KOBWA assisted in the recruitment, employment and secondment of senior personnel, who were experienced in the socio-economic evaluation of resettlement and compensation, to the Swaziland Project Coordinating Unit (later restructured as the Swaziland Komati Public Enterprise).

Sustainable development policies

The basic intentions of constructing the Driekoppies and Maguga dams were to:

- Provide for the expected increase in primary water demand in the basin, and transmission losses, which will in the main satisfy the environmental flow requirements;
- Stabilise the supply of irrigation water from the Lomati and Komati rivers to existing irrigated agriculture in both South Africa and Swaziland;
- Allow an increase of some 7 150ha of irrigation in the Nkomazi area in South Africa, and 7 400ha in Swaziland; and
- Stabilise the river flows, recognising the needs of the natural environment and of Mozambique.



The undertaking in the Treaty on social and environmental considerations sets out the requirements for sustainable social and environmental development. Apart from the primary aims of the project, development benefiting the communities affected by the project was to be initiated. This is now well recognised as essential for any relocation and rehabilitation programme.

Information acquisition, management and dissemination
KOBWA was able to interact with both governments at tertiary level on a daily basis. This enabled rapid and effective communications on technical and development issues, once the protocol and policies had been established at ministerial and JWC levels. However, very little was achieved through poorly attended multi-sectoral project management meetings for the Maguga project. This was mainly due to the erratic attendance of delegated personnel and little continuity or commitment by government departments, represented at too low a level in their own structures.

Awareness building, education and training

Awareness building at Driekoppies Dam was carried out by the KOBWA CEO and project staff in meetings on labour issues and recruitment, entrepreneurial opportunities and flora identification field trips, and Sunday morning community meetings. Formal education and training were done on the job site, by the contractor.

At Maguga, major emphasis was placed on HIV/Aids awareness. KOBWA put a team into the field with a mobile large-screen TV on which to show video material on HIV and STDs, chronic illnesses such as TB and schistosomiasis (bilharzia), and general household preventative medicine. This proved to be very successful. Formal education and training were again done on the job site.

On both sites, housing was built by emergent contractors as a means of training and skills transfer into a perceived poorly-trained commercial sector. This programme was fraught with problems, and similar programmes need to be approached with care and led by a management team already experienced in such a programme.

Public participation

Public participation was essential for both projects, with the Maguga project benefiting from lessons learnt at Driekoppies. Public participation at Driekoppies Dam involved the local town and farming communities, which were kept informed of contracts and jobs available at the dam site, as well as relocation and compensation issues, through IAP committees such as the Local Entrepreneurs Opportunities Committee (LEOC).

Similar approaches were used at Maguga Dam, where representatives of each of the traditional authorities were involved, on a regular basis, in the relocation and compensation issues. The routing of access roads and the relocation of cattle required significant public input in the early stages of construction, as did the final relocation of some 80-odd households.

The most important aspects of these programmes were to allow a sufficient number of public meetings to disseminate information, to ask for opinions, to formulate programmes and to look for feedback. Apart from overcoming the customary reliance of the individual to have problems solved by traditional leaders, there had to be time spent on careful explanation of the issues at hand, the potential losses (risks) and what the communities could expect in return.

Infrastructure development

Apart from the two dams, KOBWA developed a permanent housing suburb for construction personnel at both dams.

Some 67 medium- to high-cost houses were built in Malelane, for Driekoppies Dam, which have since been sold to the public. These now provide an income base for the municipality through rates and taxes.

Low-cost rented housing was provided at Schoemansdal to house contractors' operators, using a system whereby the local entrepreneurs were lent funds to construct the houses, which were then recovered from rentals due.

The entrepreneurs owned the houses free of debt at the end of construction. Community halls were built at Schoemansdal and Malelane, which were handed over to the communities after the completion of the dam.

Contractors' housing was also built in Pigg's Peak, for Maguga Dam, which required extensive additional permanent infrastructure. KOBWA provided a new water treatment plant at Maguga, with rising main and booster pump stations, a new solid waste disposal facility, a multi-purpose community hall and a temporary clinic in Pigg's Peak. A permanent clinic was built at the Maguga Dam site, and local dip tanks were constructed for livestock. The access roads to the dam site now form part of the national road network, allowing travel into Pigg's Peak from the Komati Valley in a third of the time taken previously, and a safer heavy-haulage through-route.

ECONOMIC BENEFITS

KOBWA's role

Initially, KOBWA acted only as the treasury for relocation and development, other than the construction of the dams and essential associated infrastructure. Only in the most recent phases, was KOBWA charged with completion of the relocation and compensation issues at both dams. The project development areas have not been under KOBWA management.



Agricultural and social development

It is too soon to say (2005) whether the intended agricultural development and social upliftment expected from the projects have fully materialised. Some of the land-based compensation at Driekoppies Dam has had to be reviewed and re-engineered. Development of the relocation area for Maguga Dam is nearing completion, and time will tell how effective this process has been and how well the resettled families are adapting to their new situations.

The Driekoppies area appears to have benefited from increased income, but is now lacking employment

opportunities. Pigg's Peak appears to have experienced a 'boom and bust', following the completion of the Maguga Dam construction. Prior to construction, KOBWA initiated an economic impact study, the findings of which gave rise to a strong recommendation to Swaziland to implement development programmes to counter this, which could piggyback on the project. Unfortunately, this was not done and the benefits of increased income from the dam construction were not fully realised.



LESSONS LEARNT

Treaty implementation

Long-term role of KOBWA

KOBWA's role was defined as being the implementing agent for the period of the project construction and the operating agent of the completed dams. All KOBWA activities were to be approved and regulated by the JWC. KOBWA's long-term role was not envisioned as leading in catchment management, in either South Africa or Swaziland or in expanding its role into Mozambique. This was a waste of established expertise, part of which has been lost to the organisation.

Taxes

Nowhere in the document is it stated that loan or joint development funding would not be taxed. Swaziland applied its 12% general sales tax to materials and services - including the construction costs - which was not recoverable. This effectively siphoned off about E100 million to the Swaziland fiscus, and skewed the agreed cost-sharing significantly. Similar treaties should be very clear on such issues.

Making land available free of third party interests

The principle here was specific and excellent: that KOBWA should not have to initiate and complete relocation and compensation activities to clear the dam basins and works areas. The governments were to relocate all households that would be affected by flooding, access roads etc, provide alternative land, infrastructure and services and ensure that all affected people were compensated and better off than prior to the project development. In practice, this was approached differently by the two governments, each with a degree of success mixed with some failures.

At Driekoppies, land provided in compensation was too far away for daily travel for tending and cultivation by farmers, and homesteads were not relocated to the new farms. There were also land claims, which had not been finalised at the time, and the process has had to be reviewed and rectified. Political systems and heritage created problems for the compensation and relocation processes.

At Maguga, land for resettlement had been bought some time beforehand. This was left vacant and was settled over a period of three to four years by persons taking the opportunity, with settlers taking up what agricultural land was available. The residual was inadequate to support the dam oustees, and a new resettlement area had to be found. Inadequate planning and understanding of the issues was evident.

It would be easy to say that the developing agency must deal with all environmental, relocation and compensation issues, with government ensuring policies have been adhered to. However, land, the availability of water and environmental resources are the major issues, and access to land and water are essentially controlled by government, unless available for purchase at market prices. In retrospect, it would have been better to have KOBWA deal with the relocation and compensation issues, with the usual concurrence of the JWC. Activities could have been synchronised better, and close management of development projects would have been better exercised. Having said that, there were apparently no cases of injustice or prejudice that were not rectified as soon as the circumstances became known.

Ensuring that affected communities are not worse off
Ensuring that the affected communities are better off than before is frequently a matter of heated debate. The replacement of prime land in a dam basin essentially requires irrigated land of good quality in recompense, because crop yields must be as good as, or better, than those of the alienated land, with an additional yield to cover the costs of water application and maintenance and the replacement of irrigation equipment. If not, the agricultural compensation is inadequate. To make this substitution viable, there must be substantially greater support from government and financial institutions, as well as social support in the form of coping strategies, counselling and the initiation of new community support groups in both the resettlement areas and the residual community areas.

The eradication of poverty can be the goal of a major dam scheme, but it can generate poverty far more easily than is generally realised. To counter this, development of the rural communities as a whole is essential, with the monitoring and evaluation of progress within affected, fragmented or relocated communities and families. Social monitoring on a homestead level is essential.

Management structures and staffing

The success of the project development was to be ensured by a competent technical team in KOBWA, backed up by a non-executive Board of Directors, also with specific knowledge of such development. Initially, appointees to the Board were essentially non-government from Swaziland, with new appointees coming from government, and government or quasi government from South Africa. Whether appointees are from government or not is not really the issue - it is necessary for some directors to have very close links with the regulating government bodies, such as water and environment affairs, in order to provide active communication links and up-to-date knowledge of government policies. This also engenders a trust in the Board by the respective governments, which is essential for reasonably fast decision-making and ratification by the JWC or similar overseeing body.

KOBWA staff at the time of the Driekoppies Dam construction was envisaged to be four people - the CEO plus a secretary, bookkeeper and linguistic clerk. This was an incredible underestimate of the work involved. KOBWA offices were always very lean during the construction period, peaking at 18 head office staff. One of the problems perceived was that the lifespan of KOBWA as a development agency was short, with the associated difficulty of providing a career path for specialist employees. This affected the quality of recruits, and it took some time to put a reasonably competent engineering, financial and management team in place.



It may be better to have an agency staffed at upper and intermediate levels by staff seconded from other agencies or authorities, until such time as recruited staff have been employed and trained. The agency must itself train staff for ongoing agency activities, which should expand into the requirements for infrastructure management, rather than development.

The development of dams has a lead time long enough to train people from communities that will be affected, to assist with the socio-economic studies and resettlement and compensation. Only people who have lived in a particular environment, and have been trained to recognise the benefits of that environment, can properly assess the losses and needs of the affected communities. These trainees quickly become expert in their immediate fields, and are key personnel in rehabilitating affected communities.



Summary of lessons learnt

The lessons learnt during the construction of these dams were:

- Inter-government communications are facilitated by properly empowered multinational agencies tasked with implementing development.
- Skills levels in multinational agencies must be high and overarching, in all aspects of the development, including relocation and compensation.
- Institutional capacities, particularly in government departments and quasi government agencies, need to be assessed early in cooperative water resource development and boosted immediately, allowing a learning period for newcomers.
- Land issues are a challenge, particularly the question of whether land users should be compensated for the loss of usufruct of state-owned land, administered by traditional authorities. Such issues need to be addressed in the early stages of a project, so that delays or pre-emptive actions are avoided. A household or individual has lost a means of income, which must be replaced in any resettlement programme, including the use of land for illegal crops.
- Community disruption by the construction of access roads can be more problematic than that of reservoir flooding.
- People in traditional communities are not used to stating their concerns or demands openly - they are used to working through headmen to their traditional leaders.
- Affected parties get weary and disaffected very quickly by repeated surveys, meetings and information dissemination, particularly when there's no apparent progress. The degree and level of information dissemination has to be judged carefully.
- The less a household has, the more the development proponents must reassure them that they will not lose their rights or goods.
- The loss of a riverine habitat is as traumatic for humans as it is for animals. In a traditional community, the river provides food, water, building materials, winter grazing, venues for religious ceremonies, washing and bathing – and covert viewing of prospective brides or husbands playing in the water.
 - The relocation of graves and religious icons is of prime importance and must be handled with sensitivity, including the costs of traditional ceremonies.

- The relocation of icons is important nationally.
- The independence and interdependence of affected communities and individuals must be respected and protected. Extended families and support groups should be maintained as far as possible.
- The loss of land use or environmental goods and services can only be compensated for by replacement with similar land, goods and services, at whatever the project cost may be, otherwise the replacement cost is, more often than not, borne by the oustee or affected family.
- No matter what emergent contractors may say, the fact that they are emergent contractors means that, in all probability, their knowledge of contracts, programming and labour regulations will be limited, and construction will require a high level of supervision to maintain reasonable quality and the observance of the programme. These costs need to be built in to the budgets.



BEST PRACTICES AND CHALLENGES

In fulfilling its role as an international agency for the development of shared water resources, a Basin Authority will inevitably come into conflict with one or other of the parent States. It is essential that the terms of reference of the agency, and its directors, are very well defined and that the people in the director body and leading the agency are competent technicians with good negotiating skills. Where differences cannot be worked through initially, there has to be a mechanism to review and resolve contentious issues.

The challenges are more socio-economic than technical. These are to negotiate and resolve complex issues around compensation, relocation and rehabilitation, the equitable allocation of benefits - including ensuring an upliftment of the local rural communities - and the sharing of costs of water resource development. One of the major issues is land ownership or usufruct - whether this is government, traditional authority, titular head of family or male dominated; land needs to be owned by the family that works it - whether the de facto head is male or female.

PERSPECTIVES FOR THE FUTURE

How can the KOBWA experience be used as a model?

The KOBWA experience is probably unique in that the role of KOBWA was to implement two dam projects and to operate the dams. There was nothing in the Treaty as to where and how KOBWA could take the lead in regional water resource development, catchment management or poverty alleviation. This was to be the preserve of the respective governments, through the Swaziland Komati Public Enterprise unit (and its successor) and the Department of Water Affairs and Forestry in South Africa. However, KOBWA has been a demonstration of how an international authority can be set up and can operate successfully, in coordinating transboundary development.

The future

In the past 10 to 15 years, significant strides have been made in a number of countries regarding land issues, compensation and relocation, environmental conservation and the recognition of the sharing of benefits from shared river basins, as well as the equitable sharing of resources within each state. This should be developed further throughout southern Africa, leading to the relief of the extreme poverty in many rural and urban areas, through judicious water resource development and conservation and, especially, equitable access to water. The World Commission on Dams Report can provide guidance.

The major issue is that the supporting governments must give sufficient autonomy to multilateral organisations, provide for the recruitment of a substantial body of expertise and enable the organisation to grow into different and further-reaching roles as the expertise is consolidated. Examples of this metamorphosis are the Trans Caledon Tunnel Authority (TCTA) and the Swaziland PCU/SKPE development, which has again taken on a new role with the Lower Usuthu Irrigation Project.



CHAPTER 18

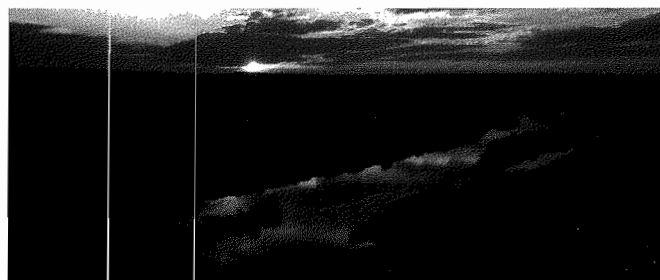
THE SCRAMBLE FOR THE CONGO RIVER

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INTRODUCTION

When the notion of transferring water from the Congo River to countries to the south, such as Botswana, Namibia and South Africa, is mentioned, the first reaction is to ridicule such an idea. However, as engineers, we are often requested to look into something that originally sounds ridiculous, and later we develop enthusiasm for such projects, once apparently insurmountable obstacles are analysed and plausible solutions are found. The quest for tapping the waters of the Congo River is one of those projects, and once one becomes involved in this, it does not come as a surprise that others have similar designs. At least this reassures you that the notion is not as far-fetched as you originally assumed.



Inter-basin transfer of water is not a new concept and has been exercised often in the past. When different countries are involved, such water transfer projects became more complex because, besides the normal investigations on engineering and economic feasibility, environmental and social acceptability, national interests became an issue as well. The result of this is that international inter-basin water transfer projects take a long time from inception to completion.

One example of an international inter-basin transfer is the Calueque inter-basin transfer scheme, where water is transferred from the Kunene River in Angola to Namibia. The agreement that formed the basis for the project was signed in 1928 by Portugal and South Africa, the colonial governments at that time. The final 'Agreement between the Government of the Republic of South Africa and the Government of Portugal in regard to the First Phase Development of the Water Resources of the Kunene River Basin' (also referred to as the 3rd Water Use Agreement on the Kunene River) was signed in Lisbon on 21 January 1969. The first stage of the project was completed in 1974. The

Lesotho Highlands Water Project, a very well-known international inter-basin water transfer project, was conceptualised in the 1930s, while the first stage

was only completed in the 1990s, some 60 years later. It stands to reason that sufficient lead time has to be provided for in such complex international water management projects.

FEASIBILITY OF TRANSFERRING WATER FROM THE CONGO TO THE SOUTH

Transferring water from the Congo River to water-deficient countries in the south involves many countries - including the Congo River Basin States as well as potential beneficiaries and affected countries, such as Angola, Botswana, Namibia, South Africa, Zambia and Zimbabwe. Geographically, the site is located in Angola, but in line with the principles set out in the SADC Protocol on Shared Watercourses, the cooperation of all the Congo River Basin States will have to be obtained before such an infrastructure project can be launched. It is, therefore, appropriate to conduct such a study at a level where these countries are represented. SADC is a regional body representing some of the Congo River Basin States as well as the potential beneficiaries, and is therefore an appropriate institution to do such a study. A desk study to determine the engineering feasibility and financial implications of the proposal was carried out as a SADC project by the SADC Water Division, under the guidance of the SADC Water Resources Technical Committee. This arrangement also aligns with the Regional Strategic Action Plan for Integrated Water Resource Development (RSAP-IWRM), which seeks to create a supportive environment for infrastructure of regional significance.

Factors conducive to the feasibility of transferring water from one river basin to another include mountainous topography, high localised rainfall and a long rainy season. During the desk study, six different options for the transfer of water from the upper reaches of the Congo River to the Zambezi River were investigated. It was found that the best alternative is to transfer water from the headwaters of the Kassai tributary in the Congo Basin to the Lungue-Bungu tributary of the Zambezi River, where such conditions exist. This is not only feasible, but if such a transfer is done on a relatively large scale, the cost per cubic metre transferred will be relatively low and in the same range as the Lesotho Highlands Water Transfer Project. In 2002, it was estimated that a capital investment of ZAR236 million would be required to transfer $10\text{m}^3/\text{s}$ by pumping water across the watershed at an operating cost of ZAR18.4 million and a maintenance cost of ZAR6.5 million. This would result in a unit cost of transfer of ZAR0.24/ m^3 . The next stage of the project will be to transfer water from the Zambezi River Basin to the Okavango River Basin. This can be achieved by an inter-basin transfer from the Lungue-Gungo River to the Cuando River in Angola. In 2002, it was estimated that a capital

investment of ZAR1 733 million would be required to transfer 10m³/s by pumping water across the watershed at an operating cost of ZAR126 million and a maintenance cost of ZAR16 million. This would result in a unit cost of transfer of ZAR1.70/m³. Such a project could be enhanced by making it a multi-purpose project, which both generates hydropower and serves irrigation. Should this be feasible, it will bring benefits to Angola, over-and-above the secondary benefits from the infrastructure development required for the project.

The total cost of transferring water from the Congo River to the Okavango will therefore be just below ZAR2.00/m³. This cost is acceptable if sufficient value can be added to the price of water to consumers. It is unlikely that it will be economically viable to use this water for the irrigation of low-value crops such as cereals, considering the present world market prices for such crops. The mining sector and industry would, however, be able to pay this price for water and still operate profitably. Presently, there is still scope to practice integrated water resource management without inhibiting growth due to a lack of water. If the Millennium Development Goals are to be met, and southern Africa experiences the economic growth presently achieved by countries in the East, the region will be in a position to afford such a project within a few decades. Since the Zambezi River presently has surplus water available, it would be prudent to execute this phase of the project first, while giving Zambezi River Basin States the assurance that once the river's water resources become stretched, the next stage to divert water from the Congo River will be constructed.

STAKING A CLAIM

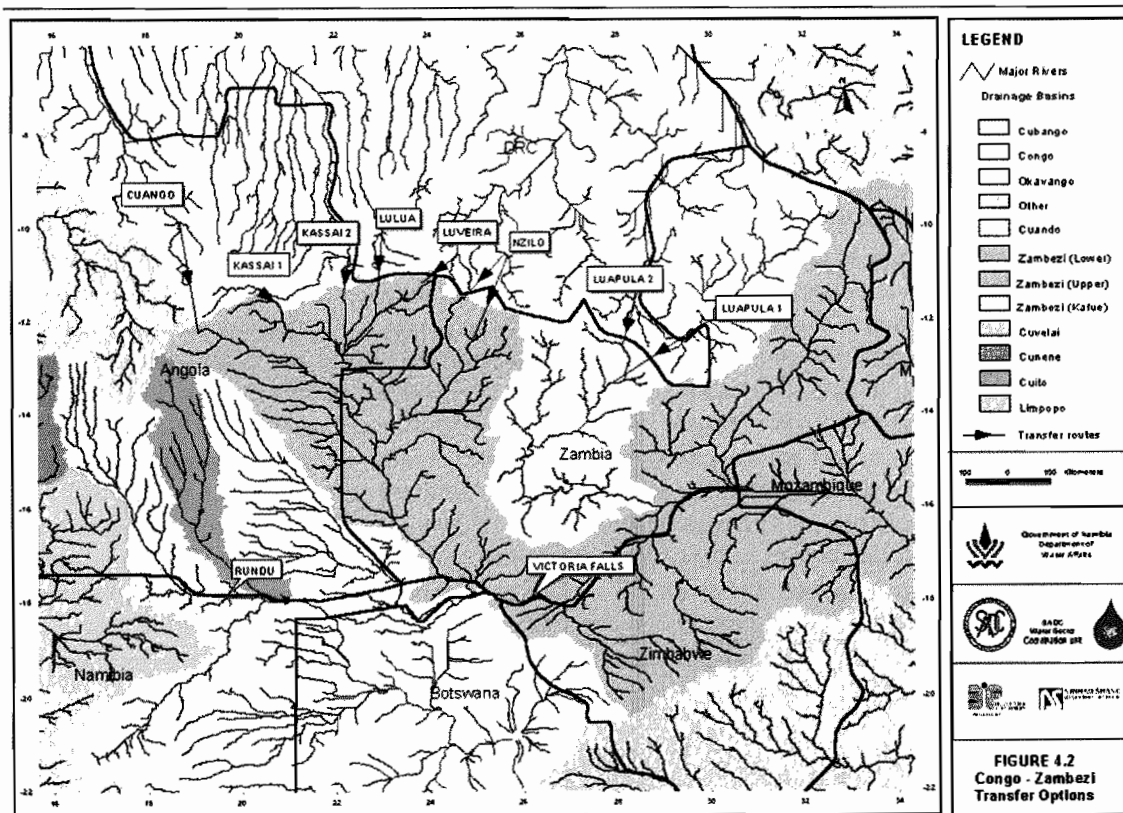
It is interesting to note that not only southern Africa is considering the possibility of transferring water from the Congo River Basin.

The countries sharing the Lake Chad Basin are very interested in transferring water from the northern part of the Congo River Basin to Lake Chad. By studying a map of river basins in Africa, it becomes easy to understand that, in the same way water could be transferred from the southern headwaters of the Congo River, it could also be transferred from the northern headwaters to the Lake Chad Basin. What appears initially as somewhat ridiculous is the idea of transferring water from the Congo River Basin to Saudi Arabia and Israel, two water transfer projects that are also being considered. This would include the transfer of water from the headwaters of the Congo to the headwaters of the White Nile. The headwaters of the Nile and Congo rivers share a watershed in central Africa, where the topography is mountainous and the rainfall is high. It is very likely that conditions conducive to inter-basin transfers of water can be found here. The Nile would then convey the water to Egypt where water can be abstracted from the Nile and transferred to these countries via the Red Sea or the Sinai Peninsula.

Although the Congo River is the second largest river in the world in terms of mean annual runoff, it is not impossible to envisage that the basin States may, at some stage, become reluctant to commit themselves to inter-basin transfers from the river. The conclusion is that if southern Africa wants to procure sufficient water for continued economic growth and development, it should have the vision to engage in research, exploration and negotiations, and that preliminary planning and negotiations should commence now.

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CHAPTER 19

THE LESOTHO HIGHLANDS WATER PROJECT

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ABSTRACT

The Lesotho Highlands Water Project (LHWP) is a water resources development initiative between Lesotho and South Africa. It has won awards for best engineering practice. Major construction activity commenced on Phase IA in May 1990 and the follow-up Phase IB was completed on 16 March 2004. Negotiations to undertake feasibility studies for Phase II are underway. The Project addresses the issues of poverty alleviation and health through mitigation and development programmes in both countries. Lesotho has benefited from the creation of rural infrastructure, energy from the 'Muela Hydropower Station and from royalty payments. Notable was the creation, in Lesotho, of a system for the management and treatment of trauma cases. This report notes the importance of inclusive participation by all stakeholders, the importance of avoiding a dependency syndrome among project-affected communities - created inadvertently by compensation programmes, the reasons for missed opportunities in the tourism sector and the crucial role of the regulatory framework for the implementation of large dams.

INTRODUCTION

The Lesotho Highlands Water Project (LHWP) is a water resources development initiative between Lesotho and South Africa. The Project was envisaged as early as the 1950s, but only became a reality with the signing of the LHWP Treaty on 24 October 1986. The LHWP impounds the Senqu-Orange highlands water in Lesotho and diverts the south-western flow of the river and its tributaries in a northward direction to the Ash River and, finally, into the Vaal River system in South Africa. The Project was designed in four phases. Phase I is now complete, and negotiations to undertake feasibility studies for Phase II are underway. The development would address issues of poverty alleviation and health, through its various programmes, in both countries.

While the Project predated the Protocol and RSAP, it is an example of how the ideals expressed in these documents can be achieved. In many respects, the LHWP has contributed to the enhancement of regional cooperation.

The two governments established a Joint Permanent Technical Commission (JPTC) - now the Lesotho Highlands Water Commission (LHWC) - to oversee the implementation and operation of the LHWP in Lesotho and South Africa.

The Lesotho Highlands Development Authority (LHDA) and the Trans-Caledon Tunnel Authority (TCTA)

are the implementing agencies in the respective countries. Under the Treaty obligations, South Africa pays for all capital costs directly related to water transfer. This includes costs incurred in Lesotho, which are funded by loans raised by the LHDA. Lesotho is responsible for capital costs on the 'Muela Hydropower Station and the tail pond dam.

Project funding amounting to M12.2 billion in capital costs was solicited from several sources, namely the South African long- and short-term capital and money markets, export credits, offshore commercial loans, the Development Bank of Southern Africa (DBSA), South African Common Monetary Area (CMA) currencies, the governments of Lesotho and South Africa, the World Bank and concessionary loans from aid agencies.



MAJOR ACTIVITIES UNDERTAKEN IN THE LHWP

Major construction activity in Phase IA of the LHWP commenced in May 1990, and was completed in 1998 with a high-profile celebration of the launching of the water transfer component on 22 January 1998.

Phase IA delivers 18m³/s (cubic metres per second) to the RSA and comprises:

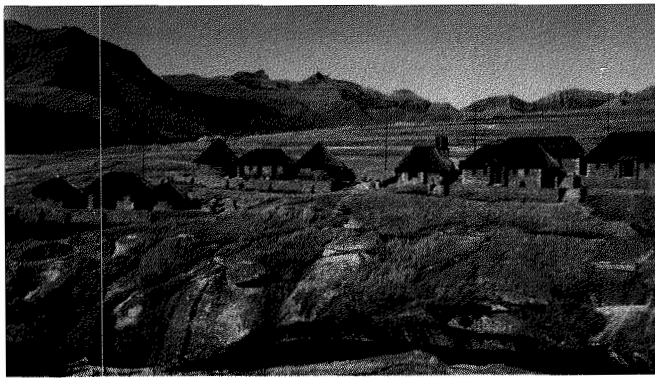
- The 180m high, double curvature-concrete, Katse Dam on Malibamats'o River;
- A 190m high, concrete intake tower at Mphorosane, 45 minutes upstream of the dam;
- A 45km long concrete-lined transfer tunnel from Mphorosane to 'Muela power house in the north district of Lesotho;
- The 72MW 'Muela Hydropower Station
- The 55m high double curvature-concrete 'Muela tail pond on the Nqoe River; and
- A 36km long delivery tunnel from 'Muela via a meter section at Ngoajane in Lesotho and below the Caledon River that is the international border, and on to the Ash River in South Africa.

Phase IB is designed to deliver 11.8m³/s. The first stage of Phase IB commenced in 1998 with the Matsoku weir and diversion tunnel being advanced to meet the water demand in South Africa. The weir intercepts the Matsoku River flow, itself a tributary of Malibamats'o River. The construction works were completed and launched on 26 November 2001.

The second stage of Phase IB - the Mohale Dam and associated works - commenced in 2001 and was completed in May 2004. His Majesty King Letsie III and the President of South Africa, His Excellency Thabo Mbeki, officiated at the ceremony of completion of Phase IB in March 2004.

The main components of Phase IB are:

- The 145m high, concrete-faced, rock-fill Mohale Dam on the Senqunyane River;
- A 32km interconnecting Mohale-Katse concrete-lined tunnel, capable of delivering 9.6m³/s; and
- The 19m high, 180m long concrete, twelve-stepped weir on Matsoku River and a 5.6km long 4.5m diameter diversion tunnel, capable of delivering 2.2m³/s into Katse Reservoir at Kutukutu.



The associated advanced infrastructure in both Phase IA and Phase IB included a network of power lines, telecommunications and new and upgraded roads to the highlands, thus making it more accessible - and therefore amenable - to other potential water resource development initiatives. Modern commercial centres were established in Katse and Ha Mohale, which included modern health clinics. But perhaps the establishment of the Leribe Trauma Unit (LTU), in the northern district of Leribe, is perceived to be the most strategic in adding to Lesotho's capacity to deal with trauma cases. An enabling landscape for the management and treatment of trauma cases in Lesotho's entire medical field was created.

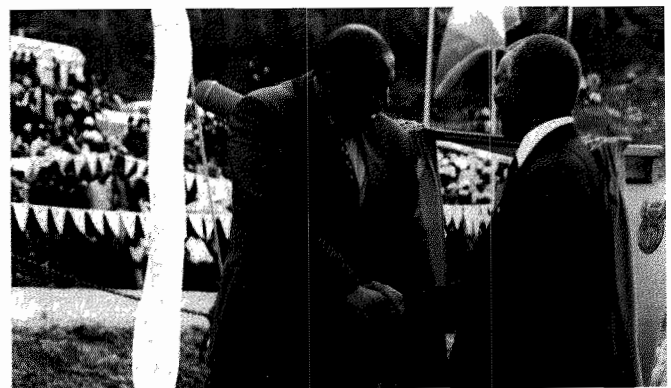
Another first was the establishment of the underground hydropower generation facility. The set-up provides a 300m hydrostatic head for three turbines of 24MW each, to generate hydroelectricity for Lesotho. Lesotho is now self-sufficient in respect of power needs, and exports the surplus power to South Africa. Electricity sales to the local Lesotho Electricity Corporation (LEC) amounted to

M230 million, and exports to South Africa were M2 million in December 2004.

Under the Resettlement and Development Programme, the project has contributed significantly in housing the people displaced by the Project. It is now commonplace to find highlands communities living in improved housing conditions (with full sanitation facilities of ventilated improved pit latrines and reliable potable water supplies); upgraded school facilities (with 21 primary schools benefiting from additional classrooms, kitchen places, staff rooms, book offices and ablution facilities for staff and pupils); commercial agriculture programmes on seed potato production, highland maize, paprika and garlic; forestry programmes for communal use, as well as medicinal plants fields for propagation; and the establishment of cooperative structures to implement community-based projects funded from communal assets compensation.

The Natural Environment and Heritage Programme has facilitated the establishment of ecotourism institutions such as the Ts'ehlanyane Nature Reserve, Bokong Information Centre, Katse Botanical Garden and Liphofung Cultural Village. The latter overlooks an historic cave that provided a safe overnight haven for Moshoeshe I, the founder of the Basotho nation. Archaeological prints by the San are found at Liphofung Cave and are part of the Liphofung Cultural Village ecotourism package. The spectacular newly-formed reservoirs have added to the tourism package that Lesotho offers.

The LHWP has set a trend in compensating affected people for their losses and the sacrifices made to allow development of the Project. Cash compensation took various forms, including annual compensation for lost arable land, replacement housing and a disturbance allowance for resettlement. Annual compensation is based on the lifetime of the dam, in this case 50 years. Other forms of compensation relate to the loss of communal assets such as medicinal plants and vegetables, wood and grazing land.



LESSONS LEARNED

Importance of stakeholder participation from early project planning through to the implementation stages

At the time of project conception, the political climate in both countries did not allow for the inclusion of stakeholders' views. Consequently, the detail and intentions of the Project were not familiar to the nations of the two countries.

The Project was received with the scepticism that the-then military regime had sold Lesotho to apartheid South Africa. The contents of the Treaty governing the implementation of the LHWP were not disclosed to the general public.

Only much later, in the democratic Lesotho, the Ministry of Natural Resources organised a two-day stakeholder workshop (28-29 October 1999) to inform and review, at the same time, the Treaty contents. Members of the different political parties, representatives of non-governmental organisations and media houses were provided with copies of the Treaty.

Missed opportunities for an enhanced tourism industry

When the first foundations of Katse Dam were laid in 1990, the Project was placed in the international spotlight as a newsmaker. Many foreign travellers came to witness the occasion, and professionals exchanged experiences on best practice principles. The northern districts of Leribe and Butha-Buthe were swarmed with the influx. Although upgrades to the border crossings in Maputsoe-Ficksburg and Butha-Buthe-Fouriesburg were affected, the long-term vision to sustain the influx of travellers into the Project sites, and in Lesotho, was not achieved. The hospitality industry lagged behind in making good of the opportunities and, ten years later, the area experienced an uncomfortable decline in visitors to Katse Dam. This resulted in the simultaneous collapse of commercial activities in the area.

Effective management of industrial action

The industrial strike that occurred at 'Muela in 1994 over the recruitment strategy revealed that Lesotho had not prepared well for managing industrial relations on a large scale. South African foreign companies brought a semi-skilled labour force with them, and there were disagreements over equity in remuneration and other employment benefits. Five local people lost their lives in the strike. Foreign labour supervisors also became targets of acts of violence. The situation prompted a speedy reaction, and the Employment Act was reviewed and amended.



Subsequently, employment strategies and procedures were revised for Phase IB. Professional and highly-skilled labour from South Africa was allowed. Foreign-based companies bidding for work on the LHWP were obliged to include local professionals in their manpower

schedule. The work on the Matsoku Weir was undertaken by a 50:50 consulting partnership of Basotho and South African professionals. A central recruiting agency was also established in Maseru. At the project sites, representatives of the affected communities ensured equity in rotational job allocations to ensure that everyone enjoyed the benefits from the short-term employment. Peace prevailed.

Lack of adequate media engagement in LHWP activities

The limited engagement of the local Lesotho media in the implementation of various mitigation strategies such as compensation programmes, development and other income-generating programmes also came to the fore. This would have ensured the widest possible information dissemination on activities aimed at mitigating adverse impacts on the people and the environment. It would also have elicited varying perceptions, comments and opinions that the LHDA could have endeavoured to accommodate during the implementation.

Need for external audit body to manage post implementation processes.

In February 2004, the affected communities confronted the LHDA on outstanding and agreed compensation and mitigation measures. They invited the national Ombudsman to mediate in the cases. The Ombudsman's findings revealed significant shortcomings that had contributed to the severing of cooperative relationships between the two parties. Later, the shortcomings were addressed. This indicated the necessity for engaging an external body to conduct an audit routinely, as implementation progressed.

Management of the Environmental Action Plan and compensation disbursements

The management of the Environmental Action Plan (EAP), aimed at mitigating and redressing adverse impacts on the environment and people, did not proceed as planned, in respect of timeframes. Firstly, the compensation programme of grain and pulses for people who lost their fields in Phase IA was scheduled for 15 years. It was planned that, during this time, development programmes would have been in place to sustain livelihoods. The latter entailed small, medium and micro enterprises of agric-based type projects (dairy farming, commercial agriculture, poultry, piggery etc) and other income-generating ventures relating to ecotourism and commercial business.

However, logistical delays in implementing the programmes and new thinking from all concerned stakeholders resulted in the compensation disbursement being reviewed from 15 to 50 years, in line with the predicted lifespan of the LHWP dams. The decision has resulted in unforeseen increased project costs.

The LHDA also missed early opportunities to make an impact on boosting the agriculture sector. Local farmers were not informed in good time to prepare to contribute to the LHDA compensation programme. Procurement still came from South Africa. It was only in 2003 that the locals were given a market outlet.

The compensation dependency syndrome

A serious dependency syndrome has developed, where the affected people have come to depend solely on compensation funds. A large number look towards the LHDA to sustain livelihoods on a daily basis. In the process, they have rendered themselves incapable of new innovative means of survival.

Inadequate management of resettlement issues

The relationship between the resettled people and host communities presented yet another challenge. It is taking quite a long time for both the resettled and host communities to accept each other, despite efforts to introduce the two parties. The resettles needed time to adjust to the dramatically changed living conditions. The host communities were, on the other hand, eager to benefit from the outcome of developments that would come with the new people. This was the case with the larger contingency of the resettled communities, such as Ha Makotoko and Makhoakhoeng, where at least twenty households per village were resettled.

It is therefore necessary to make regular and consistent follow-ups on the welfare of incoming resettles, as well as to update the receiving hosts on unfolding developments, to ensure the maintenance of relationships that can facilitate development.

Lack of anticipation of intervention by non-governmental organisations (NGOs)

Limitations on the part of the LHDA in various programmes such as compensation disbursements, resettlement and development issues exposed it to severe criticism by local and international NGOs. The International Rivers Network, colluding with the local NGO, Transformation Resource Centre, have criticised the LHDA, as well as discredited efforts made for the benefit of the people. This has resulted in the World Bank LHWP Supervision Mission, which incorporates NGOs in their agenda list.

Effective coordination with parent ministries and the private sector for effective exit strategies

Lack of effective coordination between the LHDA and the parent ministries and the private sector has rendered the disposal of assets generated through the implementation of the LHWP difficult. The result is that the LHDA has had to invest in non-core responsibilities, at the expense of maximising performance on core operations and maintenance sectors and implementing the EAP. At the same time, when assets were transferred to ministries, there was no adequate planning to receive, operate and maintain them. This was despite the appointment of principal secretaries to the Board of Directors of the LHDA.

HIV/Aids management

The international HIV/Aids pandemic has not spared the LHWP sites.

With the influx of foreigners - and especially unaccompanied male labourers - the sex trade found conducive conditions to prosper. Earlier epidemiological studies had indicated an upswing in prevalence. Extensive awareness campaigns on HIV/Aids and related communicable diseases were then undertaken. A detailed evaluation of the scourge, post the completion of Phase I, is being prepared.

BEST PRACTICE

Awards for best engineering practice

The LHWP has received international acclaim and awards in engineering. The greatest spectacle on the Project is Katse Dam itself. At 180m high, it is one of the highest dams in Africa. In December 2004, the Project received the international award for Best Engineering Project of the Century by the South African Institution of Civil Engineering. As few as five fatalities were recorded during the construction of Katse Dam and intake tower. The 'Muela Hydropower Station received the highest award from NOSA, namely Five Stars for Safety, Health and Environment. Overall, the entire multi-billion dollar scale project was constructed on time and within budget.

Establishment of infrastructure in rural Lesotho

The rural landscape in the highlands of Lesotho is now accessible, as a result of infrastructure developed through the LHWP. All-weather tarmac roads and quality gravel feeder roads bordering the circumference of the reservoirs provide easy communication and travel within the highlands areas. Health centres have been brought closer to the people. Provision of improved pit latrines and the supply of potable water for the remote areas can only ensure the well-being of rural communities. There are kilometres of power lines and communication lines linking the highlands and lowlands, thus opening up the area for further development programmes

Baseline studies resulting in monuments for sustainable development

Environmental and Social Impact Assessment exercises were carried out during the planning stage of Phase IB, where baseline studies in diversified disciplines were undertaken. The outcome of the studies produced conservation and preservation monuments for sustainable development in the future.

Enjoying a reliable capita injection from royalty earnings

Lesotho continues to earn reliable royalties for transferring water to South Africa. By 2005, M1.4 billion royalties had been earned. This money is administered through the Lesotho Fund for Community Development (LFCD). The government of Lesotho therefore enjoys a reliable capital injection to advance the socio-economic well-being of its people at grassroots level.

A classic example of peaceful coexistence

The LHWP has demonstrated that it is possible for neighbouring countries to work together for the benefit of

their peoples and economies, creating a showcase of bilateral cooperation. The sharing of Lesotho's highlands water has become a reality, and a living example of effective regional collaboration and economic integration, as espoused by SADC and NEPAD.

Environmental sustainability

The drafting and implementation of the In-stream Flow Requirement (IFR) policy and procedures have put the LHWP on the map for large dam development projects that demonstrate deserving recognition for downstream ecology and communities, in Lesotho and other riparian States in the LHWP, such as Botswana, Namibia, and South Africa. Consideration for IFRs to sustain downstream communities and ecology were to become the integral part of the meeting of February 1999. In December 2003, an IFR policy was approved.

Empowering local NGOs through development initiatives

Empowering local NGOs through implementing aspects of the EAP, whilst mitigating social and environmental impacts of the Project, is yet another good example. Some M3 million was put aside to fund NGO programmes focusing on water safety, reproductive health, agro-based initiatives and credit management.

Engagement of clear auditing principles

Tight procurement processes and procedures, including clear delegation, are a prerequisite to ward off the corrupt allocation of contracts. The infamous LHWP bribery case happened because of deficient financial procedures.

Creation of a local pool of professionals

The diversified character of the Project and the influx of foreign experts have led to the creation of local capacity that is marketable internationally. Many of the environmental studies for similar water and other projects can now be done efficiently by local professionals.

CONCLUSION

The LHWP was the regional forerunner on large-scale infrastructure cooperation in the region, and many of the lessons - both of a local and international nature - were learnt the hard way. Future undertakings in large water resource development initiatives will need to make good use of these lessons learned.

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PART G

URGENT PRIORITIES



PART G

URGENT PRIORITIES

The study work that went into formulating the RSAP effectively ended in 1998. It was only to be expected that, in time and as the RSAP projects were implemented, new priorities would arise. This final section takes a far more forward look at emerging priorities.

The droughts of recent years have emphasised the link between water resources and food security. Many of the SADC countries do not have adequate national food security. Consequently, in poor seasons, some countries as a whole do not have sufficient food. On the other hand, South Africa has adequate national food security but inadequate at the household level and localised deficiencies arise. Emmanuel Manzungu explains the importance of food security in the Regional Indicative Strategic Development Plan and the SADC objective of poverty alleviation. He points out that food security is diverse in nature and that it requires many types of responses, underlining the need for institutional coordination between SADC agencies. He welcomes the SADC initiative for a Regional Strategic Water Infrastructure Development Programme (RSWIDP) and advocates an acceleration of water resource infrastructure as one of the essential responses.

Kwabena Asante and James Verdin, in contrast, address the question of floods. In 2000, the Limpopo River added to a long history of devastating flood events in the SADC region. These flood events have demonstrated the lack of warning systems, the vulnerability of communities along the river and the low capacity of governments to respond effectively to such emergencies.

A special initiative was launched in the SADC Water Division, and this paper documents the progress that has been made to address regional issues.

It describes the preparedness, early warning, response, recovery and mitigation activities undertaken by the Division. It describes pre-season and post-season assessment forums and the development of a regional flood and drought network. The development of a pilot flood warning system and an Atlas for Disaster Preparedness and Response in the Limpopo Basin in Mozambique indicate the way forward in regional early warning and response efforts.

Lastly, picking up on the international focus, Ian Pearson describes a project that assesses the region's progress towards meeting the Millennium Development Goals. He concludes that without coordinated regional action the achievement of the goals will be very mixed. Regional action can assist countries that are battling to meet the programme. Proposals include the study of alternative financing options, enhancing institutional performance, water supply and sanitation infrastructure, project implementation support, development and implementation of a water supply and sanitation monitoring and reporting programme, and the development and implementation of a knowledge management, advocacy and information-sharing programme.

CHAPTER 20 THE ROLE OF REGIONAL WATER RESOURCE MANAGEMENT IN ADDRESSING FOOD SECURITY CHALLENGES IN SOUTHERN AFRICA

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ABSTRACT

The southern Africa region suffers from widespread food insecurity, as shown by inadequate average per capita dietary energy and protein intakes by the majority of the population. The Regional Indicative Strategic Development Plan (RISDP), SADC's development plan, not only acknowledges this fact but also recognises the important role that regional water resource management can play in addressing the situation. The Regional Strategic Action Plan on Integrated Water Resource Management (RSAP-IWRM) represents a deliberate effort by SADC to ensure that water plays its vital developmental role. The first phase of the RSAP (1997/98-2004) created the necessary enabling environment in the form of a policy and legal framework, with the Revised Protocol on Shared Watercourses being most significant. The Mid-term Review of the RSAP, among other things, recommended a deliberate effort to move towards the next stage of infrastructure development. This explains the launch of the Regional Strategic Water Infrastructure Development Programme (RSWIDP) in 2005, and is complemented by other projects in the RSAP. Food security is diverse in nature, requiring many types of responses, which underlines the need for institutional coordination between SADC agencies.

INTRODUCTION

The Regional Indicative Strategic Development Plan (RISDP), SADC's development plan, paints a disturbing picture of food security challenges in the region. Between 1990-92 and 1997-99, the number of undernourished people increased from 52.7 to 77.2 million. This represented 42 and 51 percent of the total population respectively (SADC, n.d.: 70). In general, with the exception of a small number of countries, the average per capita dietary energy and protein intakes are reported to be 2 160kcal and 49g per day respectively, against the recommended levels of 2 700kcal and 68g per day. Over and above chronic food shortages, periodic crises expose many people to food deficiencies. For example, in the 2001/2002 season, over 15.2 million people were affected across the region.

Food security in the region is critical, not only because it contributes directly to poverty reduction but also to overall regional development (SADC, n.d.: 70). Rising food shortages divert valuable resources from productive investments.

Food imports, which have almost doubled over the past 15 years, are paid for in foreign currency. This paper outlines the contribution regional water

resource management can make in addressing the food security challenges. In this paper, regional water resource management refers to the institutionalisation of region-wide policies and strategies in pursuance of common goals for the realisation of local, national and regional food security-related outcomes.

In the southern African region, such policies and strategies are contained in the Regional Strategic Action Plan on Integrated Water Resource Management (RSAP-IWRM).

This paper outlines the main proposals aimed at strengthening the food security-water nexus. This is because water is a critical input into food production that, in turn, makes an important contribution to food security. Two issues, however, need to be emphasised from the outset. First, the RISDP correctly recognises the multidimensional nature of food security. This point is briefly explained in the next section of this paper and highlighted in the subsequent paragraphs. Second, it is important to note that out of the 31 projects that made up of the first phase of the RSAP (1997/8-2004), there was not one project that was designed to address food security directly. This was largely due to the fact that, as observed by the Mid-term Review (MTR) of the Plan undertaken between February and September 2004, the first phase was primarily aimed at creating an enabling environment for the implementation of hard projects in the future (SADC, 2004). Creating an enabling environment meant putting in place the necessary legal and policy framework. In this respect, the Revised Protocol on Shared Watercourses was the most important highlight. The MTR also observed that the enabling environment has largely been achieved; hence the importance of shifting gear into hard projects. As a consequence, attempts at addressing food security within the RSAP framework are just beginning to be developed. This paper documents the main ideas.



DIMENSIONS OF FOOD SECURITY

Food security has been defined as a situation in which all households have both the physical and economic access to adequate food for all members, where households are not at risk of losing such access (FAO, 1996). It depends on demand rather than supply, since its principal determinant is the purchasing power of the individual or household unit. Household and national food security can be achieved by domestic production, secured imports to make up the food deficits, and effective distribution systems. The RISDP recognises the importance of both national and food security to which regional water resource management can make a significant contribution. It is, however, important to realise that it is possible to have adequate national stocks and yet have food insecurity at household level (Rukuni and Jayne, 1995). National and regional interventions should, among other things, be evaluated in terms of how they facilitate household security. In the context of the RSAP, the focus should also be on the measures that can be put in place to enable households to produce enough to meet their own food requirements. This will translate to national and regional food security.



Policies should therefore be about providing a 'livelihood' level of water in the most effective way, so as to add value and advantage to the economies of poor households. Such an approach may turn out to be more important than stopping at sectoral water allocation to agriculture (Turton et al, 2003). A holistic approach is important, not just to understand the concept of household water economy, but what constitutes it. Firstly, a water resource management regime that enables poor communities and households to create economic and social value from water use is needed. Secondly, conditions must be created to ensure that poor communities take advantage of other economic alternatives, for example moves to greater industrial demand for wage labour or engaging in small-scale trade and own production. In other words, household food security should not always be thought of in terms of production. Thirdly, the water and livelihood situation of rural people poses significant constraints to the diversification of activities that can be undertaken to reduce economic vulnerability. There is clearly a need to ensure that policies, institutions and processes at the macro level have a positive impact on the different livelihood strategies of the poor households.

The RISDP highlights some of the issues.

There is another point that needs to be highlighted.

The pursuit of food self-sufficiency, which refers to a situation where food needs are met through domestic production without considering the comparative advantage that may be involved, amounts to a waste of vital resources. The irony is that countries whose food production is inadequate, for a variety of reasons, tend not have the finances to source food on the world market, or even the regional market. Such countries are said to have a poor ratio of total exports to food imports. This measures a country's ability to finance its food imports from its total revenues (Ingco and Nash, 2004). In such cases, food grants may be an alternative.

The world food market, which also impacts the regional market, is an imperfect one. Price distortions impact negatively on a country's 'strategic' interests if there is reliance on such markets. Trade tariffs can also be another problem, although the region is working towards creating a free trade area by 2008. The significance of this in relation to grain trade and its impact on food security is beyond the scope of this paper. However, the point that needs to be emphasised is that because of the complexities of the issues that are involved in agricultural trade, food security problems are unlikely to be resolved by a reform of the world agricultural system. The answer lies in agrarian reform that, among other things, includes the provision of infrastructure for agriculture in general and smallholder farmers in particular (Watkins, 1995: 82). This point is adequately captured in the RISDP, and is an important pointer to the development of sustainable policies that can bring about food security in the region.

PLANS FOR ACHIEVING FOOD SECURITY IN SADC

According to Chapter 4 of the RISDP, policies and strategies meant to address food security fall in two priority intervention areas, namely infrastructure support for regional integration and poverty eradication and sustainable food security. The selection of the intervention areas was based on their perceived contribution to the overarching objectives and priorities identified in the Report of the Review of the SADC Institutions that was approved by the SADC Heads of State and Government in Windhoek, Namibia. Table 1 summarises the main elements of the two priority areas as they relate to food security. Three things should be noted from Table 1. Firstly, food security, as noted in the introduction, is multidimensional. This means that interventions in one specific area, however well designed, will not necessarily yield the desired outcomes in another area. This point was emphasised by the MTR. This becomes more relevant when food insecurity is viewed as a component of poverty. Secondly, the food security portfolio does not have a single 'institutional home' in SADC. For example, the two priority areas cited here fall under two separate directorates, that of Infrastructure and Services and Food and Natural Resources respectively. This raises questions regarding the coordinating of the various activities.

TABLE 1: KEY ELEMENTS OF THE TWO PRIORITY INTERVENTION AREAS

	PRIORITY AREA	
	Infrastructure support for regional integration	Sustainable food security
Overall goal	Ensure availability of sufficient, integrated, efficient and cost-effective infrastructure system and provision of sustainable services that will support and sustain regional economic development, trade, investment, and agriculture, thus contributing to poverty eradication	Achieve sustainable access to safe and adequate food at all times in SADC for an active and healthy life
Relevant focus areas	Promoting integrated water resource development and management and the equitable sharing of the resource and benefits therefrom, for the mutual benefit of all	Improve availability of food Improve forecasting, prevention, mitigation and recovery from adverse effects of natural disasters Strengthen the institutional framework and build capacity for implementing food security programmes
Targets	1. Long-term regional water policy and strategy developed and approved by March 2004	1. Establish a technical facility to support land reform programmes by 2005/6
	2. Increased awareness, broad participation and gender mainstreamed in water resource development and management by 2005	2. Double cropland under irrigation from 35% to 70%, as percentage of the total, by 2015
	3. Centres of excellence for water research and technology development identified and strengthened by 2005	3. Increase fertiliser consumption from 44.6kg per ha of arable land to 65kg by 2015
	4. Water sector policies and legislation harmonised by 2006	4. Increase cereal yield from 1 392kg to 2 000kg per ha by 2015
	5. Establish and strengthen at least eight river basin organisations by 2008	5. Double adoption rate of proven technologies, such as improved seed varieties and management of water, by 2015
	6. Water data banks and planning networks established and fully operational by 2007	6. Reduce incidences of transboundary animal diseases by 2015
	7. Training and institutional capacity-strengthening programmes developed and implemented by 2008	7. Increase livestock by at least 4% annually
	8. Halve population of people without access to safe water and sanitation services by 2015	8. Adherence to SPS Measures and standards in line with WTO agreements
	9. Develop water resource infrastructure to double land under irrigation by 2015	

Source: SADC (n.d.)

THE REGIONAL STRATEGIC WATER INFRASTRUCTURE DEVELOPMENT PROGRAMME

The recommendation of the Mid-term Review to streamline the RSAP was well received by the various stakeholders in deliberations at the Water Resources Technical Committee (WRTC) meeting (held 24-25 July 2004), the meeting of the cooperating partners who financially support the RSAP at the 11th Water Strategy Reference Group (WSRG) (held 1-2 February 2005) and the meeting of the Water Ministers (held 7-9 March 2005). One important recommendation emanating from these meetings was that the projects should be clustered around key focus areas. It was also agreed that the projects would be clustered around the four strategic areas of Regional Water Resources Planning and Management, Infrastructure Development Support, Water Governance and Capacity Building (SADC, 2005a).

In one way or another, these four areas contribute to food security. However, in the context of this paper, the focus is on the Infrastructure Development Support cluster. This is because it can contribute directly to food security, through the provision of infrastructure for irrigation, and indirectly, through the development of projects that can contribute to economic growth. This strategic area is expected to have within it projects on agriculture and food security, economic growth, and water and sanitation.

The SADC Water Division is in the process of developing the Regional Strategic Water Infrastructure Development Programme (RSWIDP) within the Infrastructure Development Support strategic area (SADC, 2005b). The overall goal of RSWIDP is to develop a programme that contributes to the reduction of poverty.

Key activities envisaged include:

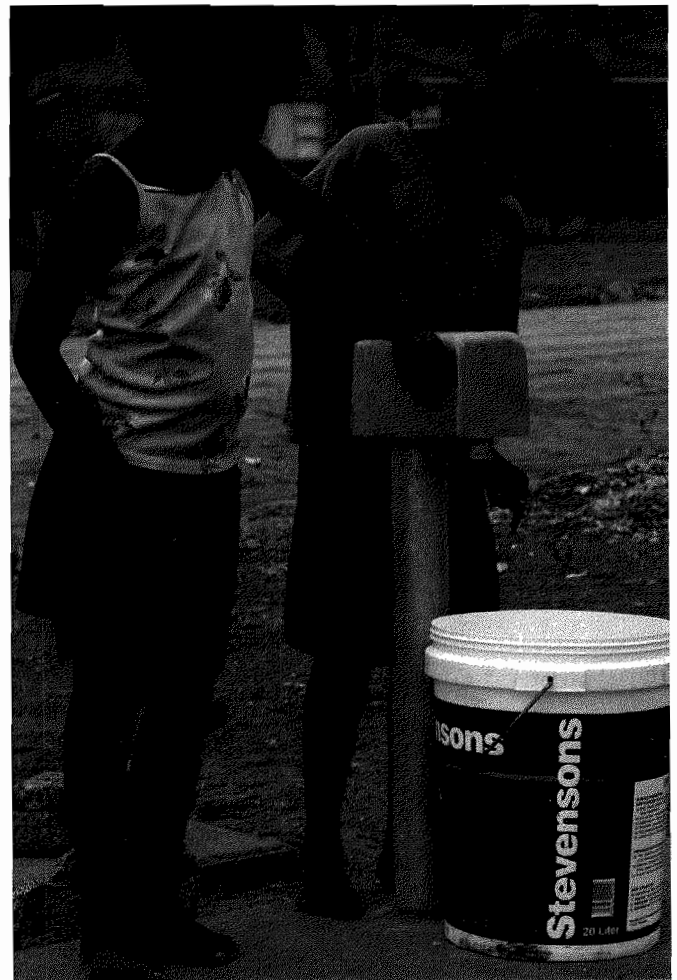
- The definition of strategic areas of intervention;
- Criteria for the selection of priority projects;
- Linkages between the RSWIDP and the RSAP, the RISDP and other SADC programmes;
- To determine the expected benefits of joint projects in relation to inputs and outputs;
- To suggest funding mechanisms;
- Implementation modalities highlighting the linkages and roles; and
- Management arrangements.

CHALLENGES OF MEETING FOOD SECURITY

The potential of water making a significant contribution to meeting food security in the region is huge, which underlines the need to come up with practical measures to translate this potential into reality - an issue that is being addressed under the RSWIDP. There are, however, a number of challenges that can be highlighted here, that are captured in the MTR.

In the first instance, it is important to observe that irrigation

potential in the region has not been fully exploited with the exception of Madagascar, Mauritius and South Africa (Table 2). The MTR observes that this potential cannot be met without addressing a number of challenges.



The following are some of the important challenges:

- There is limited financial capacity in the region to develop the irrigation potential. According to the MTR, FAO estimates the cost of developing one hectare to be USD3 000 to USD8 000, where the latter figure includes the development of the water source. Moreover, it is estimated that one engineer can only design and supervise 100 hectares per year. The skilled human resource base is clearly also a problem. This explains why countries with abundant water resources and irrigation potential, such as Angola and Zambia, are unlikely to exploit their potential, because of limited financial and human capacity.
- Overall, there is low institutional capacity. For example, over the past 12 years 50 000ha of irrigation were developed in the entire region, which averages to 1 500ha per year. Only South Africa, Tanzania and Zimbabwe were capable of developing 2 000ha per year.
- The lack of coordination with other sectors that are critical to achieving food security.
- The attendant environmental impacts resulting from agricultural intensification.
- Low irrigation efficiencies.

TABLE 2: PROPORTION OF IRRIGATED AREA IN SOUTHERN AFRICA

Country	Irrigated land (as % of arable land area)	Annual freshwater withdrawals (as % water resources)
Angola	2.5	0
Botswana	0.5	1
Lesotho	0.9	1
Madagascar		
Malawi	1.7	2
Mauritius	17.0	16
Mozambique	4.0	1
Namibia	0.9	38
South Africa	10.3	18
Swaziland	35.8	4
Tanzania	5.0	1
Zambia	0.9	1
Zimbabwe	7.0	5
Average	7.2	7.3

Source: Chenje et al (1996)

CONCLUSIONS

The southern Africa region suffers from widespread food insecurity, which is symptomatic of the prevailing poverty levels. This needs to be addressed so that the SADC's goal of poverty eradication is attained; a point that has been recognised by the RISDP. In this regard, water can play an important role. However, the multidimensional nature of food security should not be underestimated.

The RSAP represents a deliberate effort by SADC to ensure that water plays its role alongside its other developmental roles. The first phase of the RSAP has created the necessary enabling environment in the form of a policy and legal framework, with the Revised Protocol on Shared Watercourses being most significant. The challenge is now to move to the next stage of facilitating the development of projects on the ground. In this regard, the RWISDP is a significant development. Challenges, however, remain, as identified by the MTR.

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CHAPTER 21 THE ESTABLISHMENT OF REGIONAL FLOOD AND DROUGHT MANAGEMENT ARRANGEMENTS: LESSONS LEARNT AND CHALLENGES

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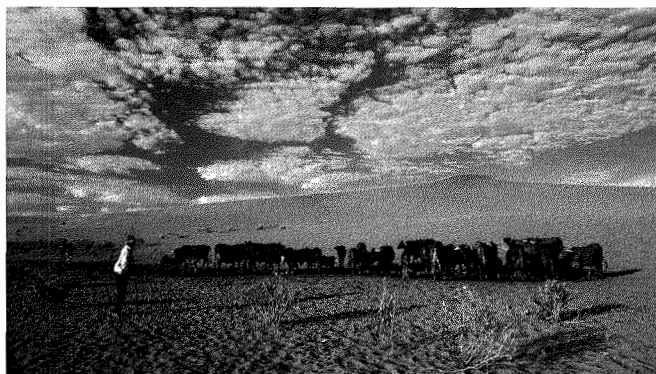
ABSTRACT

Southern Africa frequently experiences extreme climatic events, such as cyclones and droughts, and floods frequently propagate along its numerous international rivers, resulting in adverse impacts to multiple countries and economic sectors. The Protocol on Shared Watercourse Systems in the Southern African Development Community (SADC) region mandates the Water Division to coordinate all phases of regional efforts to minimise the impacts of these events. This paper describes the preparedness, early warning, response, recovery and mitigation activities undertaken by the Division, in conjunction with other partners in the region, in meeting this responsibility. Preseason and post-season assessment forums and the development of a regional flood and drought network are identified as key successes in improving regional preparedness. The development of a pilot flood warning system and an Atlas for Disaster Preparedness and Response in the Limpopo Basin in Mozambique indicate the way forward in regional early warning and response efforts. The Division's facilitation of data access, and coordinating reservoir releases and water use among operators of international reservoirs and water authorities during periods of elevated flood and drought risk, emphasises the importance of its unique role and mandate. However, weaknesses in the regional early warning of floods, and in the recovery and mitigation phases of disasters, have been identified. We propose that the Water Division improves its effectiveness through the creation of a regional flood monitoring centre, dedicated to operational monitoring, archiving and the dissemination of water resource and hazard information, and the training of the region's flood management professionals.

INTRODUCTION

The three major hydrometeorological hazards that impact southern Africa are floods, droughts and cyclones. All of these hazards have water resource implications and are consequently within the domain of the Water Division of the Southern African Development Community (SADC). Droughts are typically slow-onset disasters that gradually deplete existing water resources with subsequent impacts on food production, livestock management, hydropower production and other sectors. By contrast, floods are typically rapid-onset disasters that may be induced by excess precipitation or discharges from impoundments such as reservoirs. The meteorological impacts of cyclones in the region, such as wind

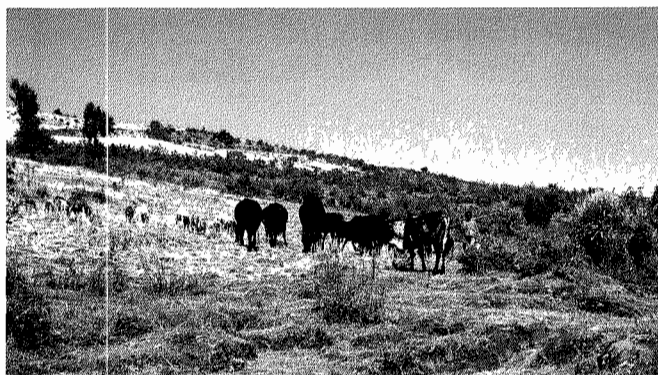
damage and storm surge, are currently monitored by national meteorological agencies in conjunction with specialised cyclone monitoring centres and the World Meteorological Organization. Cyclones are also a concern for the Water Division because of their potential to induce floods.



The Revised Protocol on Shared Watercourses in the SADC Region (SADC, 2000) authorises the Water Division to engage in the monitoring and management of floods and droughts. Under Article 2, Section 9 of the Protocol, primary responsibility for the notification of floods, droughts, planned releases and other emergencies that may potentially impact other riparian countries is placed on the member country from which the emergency originates. However, the Protocol also calls for the creation of a regional monitoring unit that, amongst other responsibilities, monitors regional water control and utilisation in cooperation with river basin commissions, authorities and boards. The promotion of flood and drought mitigation measures and the development of a hydrometeorological monitoring programme are specifically identified as functions of the SADC water management institutions. The river basin management institutions envisaged in the Protocol are gradually being formed under the guidance of the Water Division, and it is expected that these institutions will eventually take over many of the responsibilities for operational monitoring. However, the oversight, promotion and coordination roles will remain with the Division. In addition, the Regional Indicative Strategic Development Plan (RISDP) includes calls for the development of strategic water infrastructure for flood control and drought mitigation, and the identification and strengthening of centres of excellence for water research and technology development, which includes centres for flood and drought research.

THE WATER DIVISION'S FLOOD AND DROUGHT MANAGEMENT ACTIVITIES

Within the flood and drought management arena, the primary operational documents that have guided the work of the Water Division during most of the past decade are the Regional Strategic Action Plan (RSAP) for Integrated Water Resource Management (IWRM) (SADC, 1998) and its associated implementation strategy (SADC, 2003). The RSAP acknowledges high spatial and temporal variability of rainfall as a major source of hydrologic hazards in the region, with references to specific events such as the droughts of 1991/2 and 1995/6, as well as the 1996 flooding of the Limpopo, Incomati and Pungue rivers. Angola, Botswana, Tanzania and Zambia are identified as having inadequate flood control or drainage systems, while most SADC countries are identified as having limited access to safe drinking water, which is partly attributable to water scarcity.



The acquisition, management and dissemination of information are identified as key problems requiring urgent attention. Two major intervention activities are specified to address the information problem as it relates to floods and droughts. These activities include the development of a pilot flood monitoring system in Mozambique and the enhancement of collaboration with existing drought monitoring systems in southern Africa. However, neither of these activities received direct programme funding under the implementation strategy. The relatively low profile given to the hydrometeorological hazards is surprising, given the relative frequency and intensity of such events in southern Africa (Christie and Hanlon, 2001). In spite of this limitation, the SADC Water Division has been an active player in the flood and drought management arena, mainly through donor-funded activities designed to minimise the impacts of the numerous events that have occurred in the region recently.

In this report, we review the activities of the SADC Water Division in managing droughts and flood hazards during the preparedness, early warning, response, recovery and mitigation phases of the disaster cycle. In the preparedness section, we address the activities that have been undertaken to improve hazard identification and communication among Member States well in

advance of any flood or drought hazard. The early warning section addresses actions taken by the Division to reduce damage to lives and property when an imminent water-related hazard has been identified. The response section deals with activities to quantify and minimise the impact of the hazards, and to facilitate the activities of the disaster managers after a hazard has impacted a location within the SADC region. The recovery section deals with activities aimed at restoring existing infrastructure to pre-event conditions, while the mitigation section addresses activities that aim to minimise vulnerability or improve the management of future hazards. Under each section, the challenges facing the Water Division as it seeks to establish a regional flood and drought management capability are identified.

Water Division involvement in preparedness

Beginning in 2001, the Water Division began organising pre-season preparedness forums for the SADC region. The goal of these forums is to bring together water authorities, reservoir operators, meteorologists, food security analysts and disaster managers from across the region, to review preparations prior to the onset of the rainy season. The forums have also been attended by international agencies working in the region, including the World Food Programme (WFP), World Health Organization (WHO), International Water Management Institute (IWMI), Famine Early Warning System Network (FEWS NET), US Geological Survey (USGS) and representatives of the donor community. Activities undertaken have included the evaluation of existing hydrologic conditions, including reservoir storage levels, the analysis of potential impacts of the seasonal forecasts issued by the regional climate outlook forum, a review of national contingency plans and the development of regional contingency plans. For many in the hydrologic and disaster communities, these forums provide a unique opportunity to establish the interpersonal networks needed to obtain information during an emergency, and the contact lists resulting from these meetings are among the most useful outcomes.



The Water Division has also been a key partner in the development of the Internet portal for the Southern Africa Flood and Drought Network, which is currently the most comprehensive collection of information on floods, droughts, meteorology, water management, disaster management

and food security in the SADC region. The site contains links to news, reports and hazard bulletins from SADC agencies as well as international organisations working in the region. While the Water Division has been able to achieve wide participation in the pre-season forums, participation by operational agencies in the region in the Web integration efforts has been limited. Few organisations have signed up for administrative access to the Southern Africa Flood and Drought Network website, designated a contact person or provided contact information for their organisation. Nonetheless, the portal remains an important medium for communicating hazard information and for highlighting upcoming and ongoing activities to non-technical agencies in the region. The challenge for the Water Division is to persuade water authorities and dam operators to assume ownership of the effort, and to begin contributing local hazard information to the website.

Water Division involvement in early warning

The Water Division has supported efforts to develop local flood warning systems and to formulate local response strategies in the SADC region. In the lower reaches of the Limpopo Basin in Mozambique, water authorities have implemented a flood warning system with forecasting capabilities and an associated library of multi-level flood hazard maps for the generation of spatially-specific flood warnings (ARA SUL and USGS, 2002). The Geospatial Streamflow Model (GeoSFM) developed by the USGS (Artan et al, 2001) is used for generating three-day forecasts of river stages at selected gauging stations. The forecasts at these gauges are used to determine the flood warning status of each of the administrative districts in the Lower Limpopo. Because the forecasting model predicts water levels at in situ gauges, flood forecasts are continually checked against observations for forecast verification and updating. Based on the magnitude of the forecast event, one of the multi-level flood hazard maps is identified as being representative of the expected inundation patterns, and warning messages are issued for the population centres within the expected zone of inundation. The Water Division worked with Mozambican water authorities to facilitate the stationing of USGS staff with the local water agency at the initiation of this activity. The Division has also sought to disseminate the Limpopo experience to other river basins in the region by featuring demonstrations of the system at a number of its forums, including the 2002 Post-Season Assessment in Maseru, Lesotho (Asante, 2002). A regional training workshop on the use of the GeoSFM was also conducted during the 2001 Preseason Forum in Pretoria, South Africa (SADC, 2001). Within Mozambique, water authorities have embraced the Limpopo Flood Warning System and are implementing the GeoSFM in other basins including the Incomati, the Umbeluzi and the Save river basins. Continued expansion of the system into other countries and river basins would further contribute to early warning in the SADC region.

On a regional scale, the Water Division has supported efforts

to implement a regional early warning capability by facilitating the dissemination of modelled streamflow forecasts from GeoSFM, through an Internet map server application on the Southern Africa Flood and Drought Network website (Verdin and Asante, 2003). The map server, which was developed in collaboration with the SADC Regional Remote Sensing Unit (RRSU) and the USGS, contains flood hazard maps for many southern African rivers generated from satellite rainfall estimates and other remotely sensed data. The map server enables users to obtain near real-time estimates of flow conditions in many of the major river basins in the region. It serves as a supplementary source of flood hazard information, particularly for ungauged river reaches. The site is most frequently used by the staff of non-technical relief agencies operating in the SADC region. Many of these agencies would otherwise find it difficult to obtain the updated hazard information they need to direct their operations during periods of elevated flood hazard, when national line agencies are busy supporting national early warning and response efforts.



The flood monitoring system, however, has several limitations. Information on the current status and operation of reservoirs, and their potential to exacerbate forecast floods or droughts, is not taken into account in the model simulations. Neither are the model simulation results integrated with existing ground-based gauging networks such as the SADC Hydrologic Cycle Observing System (HYCOS), which could provide for periodic forecast verification and model adjustment. The system currently covers only about half of the river basins in southern Africa, and its operations have not been transferred to a SADC entity. This is because the Water Division currently lacks an operational arm that could undertake daily data processing, monitoring and forecast interpretation activities. The challenge for the Division is to develop an operational monitoring capability using a combination of remotely sensed and ground-based data, while simultaneously motivating local agencies in member countries to formalise their early warning systems and contribute their information to a region-wide system.

Water Division involvement in response

In the response phase of disasters, the Water Division has served as a facilitator of communications among riparian countries, and with major reservoir operators. During each rainy season, there are numerous requests from line agencies and humanitarian organisations in member countries for additional information on hydrologic events

such as heavy downpours, exceptionally high or low gauge readings and reservoir releases on international rivers. Member countries may also call upon the Division to play a mediation role over water rights or reservoir releases, particularly during periods of floods or droughts. The Water Division has successfully leveraged its regional authority to expedite the processing of these requests, or to establish standing procedures on information exchange and release procedures. Several water authorities, including Direcção Nacional de Água (DNA) of Mozambique, the Department of Water Affairs and Forestry (DWAF) of South Africa and the Zambezi River Authority (ZRA), have established websites with streamflow and reservoir release information, as a result of such mediation.

In the Lower Limpopo Basin in Mozambique, hazard maps for floods, cyclones and droughts have been combined with local vulnerability profiles to quantify the impact of different magnitudes of hazards on the infrastructure and livelihood of local populations. The hazard characterisations, vulnerability profiles and impact assessments are presented in the Atlas for Disaster Preparedness and Response in the Limpopo Basin (INGC et al, 2003). The atlas was produced by a partnership of FEWS NET (including the USGS), the Geography Department of Eduardo Mondlane University and the National Disaster Management Institute of Mozambique (INGC) with contributions from many local and regional partners, including SADC institutions. The atlas has garnered strong support from disaster managers who make resource allocation decisions during contingency planning and disaster episodes. This approach to hazard assessment is particularly useful because it facilitates communication among the different sectors involved in disaster response. The challenge for the Water Division is to mobilise water authorities, food security analysts and disaster managers in the region to adopt this structured approach to response planning, and to mobilise resources towards its implementation across the region.

Water Division involvement in recovery

The involvement of the Water Division during the recovery phase of flood and drought disasters has been limited to coordinating the reconstruction of damaged water management infrastructure. In particular, the Division has been called upon by Member States to expedite the reinstatement of flow monitoring equipment damaged during floods in other riparian countries. When two or more countries share a river basin, the gauging stations that one country considers important for monitoring the safety of its citizens and infrastructure are often not the same as those for other countries in the basin. Consequently, unless external pressure is brought to bear, each individual country will prioritise the repair of infrastructure to serve the needs of its own citizens. As was observed in the aftermath of the 2000 floods, the mediation of the Division can help to ensure that the priorities of other riparian countries are also taken into consideration in prioritising

reconstruction efforts. The Water Division could play a more effective role in post-flood recovery efforts if it had a larger water resource information database, including hazard maps, regional aquifer maps and runoff data, which could be used for planning reconstruction. This knowledge base would help to prevent settlements and other infrastructure from being located in vulnerable zones. The reconstructed infrastructure would also be fed back into the database to keep it updated. Member countries would be charged with supplying their water resource monitoring data to the database in exchange for the right to access other regional data and value-added products. To address the problem of regional drought response, the Water Division could serve as a facilitator for conjunctive operation planning of the region's reservoir storage facilities. The goal of conjunctive operation is to optimise the utilisation of water resources throughout the basin by coordinating water consumption, storage and releases. Substantial water resource gains can be achieved through such operations, particularly in reservoirs that are used for hydropower generation. It would also provide the member countries with a common basis for prioritising and obtaining funding for new flood and drought mitigation infrastructure projects. Some of the major reservoir operators in the region have expressed a willingness to explore this concept, and the Water Division should expend further efforts in making conjunctive reservoir operations a reality in the SADC region.

Water Division involvement in mitigation

In the arena of mitigation, the Water Division's major accomplishment has been in organising regional post-season assessment forums. During these forums, participants representing the water, meteorology, disaster management and food security sectors of member countries re-evaluate their performance during the previous rainy season. The accuracy of seasonal climate forecasts and the performance of contingency plans are reviewed. Gaps in communication are identified and efforts are made to bridge them. National food and water balance sheets are presented to identify potential gaps in supply. Problems with malfunctioning gauges, websites and other monitoring infrastructure are also identified. Specific recommendations for actions by Member States are drafted and sent to the SADC governing council for action. The communiqués from these forums are widely distributed amongst decisionmakers and agencies with water-related mandates, and in the public media. These post-season assessment forums are uniquely placed to provide water authorities, food security analysts and disaster managers with information on problems in their information dissemination schemes, so that work toward resolving these problems can be carried out during the off-season when there is less pressure from users.

FUTURE DIRECTIONS

Perhaps the most pressing problem in the flood and drought management set-up of the Water Division is the absence of a regional technical operations centre dedicated to the

study, monitoring, dissemination and archiving of data and information about floods. Within the SADC region, the regional Drought Monitoring Centre and the Regional Remote Sensing Unit are well positioned to monitor droughts, while cyclones are effectively monitored by the Tropical Cyclone Warning Centre in Réunion. The SADC region needs a similar technical centre for flood-related information including streamflow data collected by member countries, hydrologic bulletins, historical documents and imagery of floods, as well as water resource project reports.

The centre would also implement some of the operational concepts identified in this report, including operational flood forecasting at HYCOS and other critical streamflow gauges, and facilitate the development of local flood warning systems and disaster response atlases. Such a centre would be staffed by dedicated operations and training staff, and would have operational and communications capability for 24-hour operations, including weekends during periods of emergency. While the Water Division is well placed to implement this centre on account of its regional influence, it presently does not have the facilities or the staff to make this a reality.

However, existing facilities with appropriate infrastructure and mandate, such as the training centre of the Botswana Department of Water Affairs, which is collocated with the Water Division in Gaborone, could be transformed into a regional resource.

The Water Division also needs to involve itself more directly in the training of the region's hydrologists, reservoir operators, equipment maintenance technicians, disaster managers and other specialists who respond to flood emergencies. The Division needs to ensure that a steady stream of appropriately skilled professionals is receiving hands-on training, on modern computer systems and software appropriate to the water resource monitoring and development needs of the region. It similarly needs to ensure that hydrologic technicians are being trained in the manufacture, calibration and maintenance of hydrologic equipment, including flow gauges, water quality and sediment sampling and analysis tools, groundwater monitoring and mapping tools, and data transmission infrastructure. Existing programmes at educational institutions in the region could be adopted and adapted to ensure that the required skills are being imparted. Shorter-term training programmes, with accompanying certification, could be developed at the proposed regional flood monitoring centre. Without such a capability, progress towards effective regional flood monitoring and management systems will continue to be hampered by the non-uniform distribution of skilled professionals in the member countries. Systems developed at the regional level will have limited impact and sustainability in local settings if there is a shortage of appropriately skilled personnel to implement, interpret and maintain the systems for the benefit of local communities.

CONCLUSIONS

The Water Division has been successful in the two major intervention activities that it set out to implement in the management of floods and droughts, namely the implementation of a pilot flood monitoring system and the improvement of collaboration with existing drought monitoring systems. An operational flood monitoring system has been successfully implemented in several basins in Mozambique, and flood maps from the system have been used in conjunction with vulnerability baseline information to assess risk in a disaster preparedness and response atlas. Collaboration with existing drought monitoring systems in southern Africa has been enhanced through pre-season preparedness and post-season assessment forums involving technical experts, disaster managers and the donor community. In addition, the Water Division has made significant steps towards the development of a regional flood and drought monitoring system through its establishment of an Internet portal for the dissemination of hazard, vulnerability and response information. These activities have highlighted gaps in the information and operational capability of the Water Division, particularly in its monitoring of floods. Establishing a regional flood monitoring centre would help to address many of these deficiencies. Given the number of significant flood and drought events that have occurred in the region recently, it is imperative that flood and drought issues receive a higher funding priority and visibility in planning future activities to make this vision a reality.

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CHAPTER 22

PROGRESS TOWARDS MEETING THE MDGs ON WATER AND SANITATION

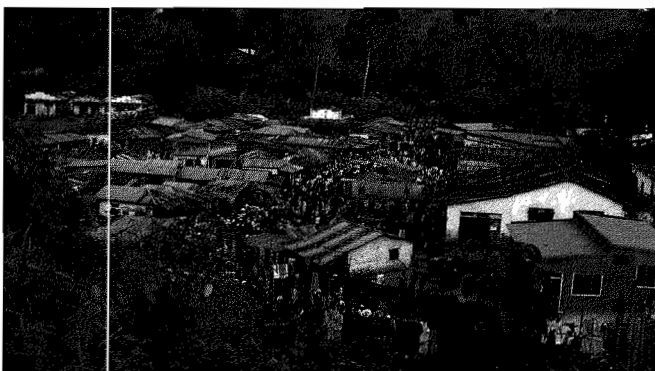
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ABSTRACT

The SADC Member States are counted amongst those where the achievement of the Millennium Development Goals (MDGs) is the most critical, due to the levels of underdevelopment and poverty in the region. The Water Division of the Directorate of Infrastructure of SADC has also identified the achievement of the MDGs in water supply and sanitation to be a key priority, including its contribution to reducing poverty in the region. A project on water supply and sanitation was commissioned as one of the group of projects under the Regional Strategic Action Plan (RSAP) to identify the key issues and to develop a regional support programme in water supply and sanitation.

The project was initiated in 2002, and country reports on the current situation in water supply and sanitation were compiled for seven countries. These study reports provided the background to the development of a regional programme for SADC. A number of issues in the delivery of water supply and sanitation services were identified for the regional programme, of which five were prioritised for immediate implementation. These are the study of alternative financing options, enhancing institutional performance, water supply and sanitation infrastructure project implementation support, development and implementation of a water supply and sanitation monitoring and reporting programme, and development and implementation of a knowledge management, advocacy and information-sharing programme. A number of projects have subsequently been initiated, but there remains a wide scope for further projects to achieve these objectives.



BACKGROUND

The 14 Member States of the Southern Africa Development Community face a daunting challenge to accelerate access to water and sanitation services

and to promote hygiene to the 210 million people who live in the region. The Millennium Development Goals (MDGs) for water supply and sanitation (WSS) - halving the number of people without adequate access to these services by 2015 - presents a considerable challenge for the region. Whilst a few of the SADC countries are on course to meet these MDGs, the majority will have to revise their current programmes of development significantly if they are to meet these goals. However, an equally daunting task is to ensure that the water supply and sanitation services provided remain viable and sustainable over the longer term. This latter requirement places emphasis on institutional stability, community participation, training and capacity building, cost effectiveness and affordability, and an alignment of policy, strategy and legislation.

The vision of SADC is for a region that has a healthy population that is developing sustainably, both socially and economically, and is at an acceptable level and rate of economic growth with an overall commitment to achieving the eradication of poverty. This is fully in line with the WSSD framework for an action plan on water and sanitation. 'The importance of water cannot be under-estimated. Poverty, hunger, environmental problems and diseases could be directly combated and significantly scaled back if fought with water access as a primary goal. Child and maternal mortality rates would drop, and other important issues, including education and gender equality, would indirectly benefit from achievement of the safe drinking water and basic sanitation targets identified within the MDGs.' Investing in the Future: Water and targets in the UN MDGs, Stockholm Water Front, April 2004.

The achievement of this vision within SADC involves taking urgent positive steps to ensuring the sustainable access to water and sanitation for all the people of the region. From a regional perspective, these steps are incorporated in the SADC Water Division's support initiative to create an enabling environment for individual Member States to overcome their individual backlogs in the delivery of basic water supply and sanitation services.

In the initial assessment of the key water resource issues faced by SADC countries, poor water resources infrastructure - resulting in severe limitations in access to water for safe drinking and sanitation - was identified as one of the most pressing needs. Elements of this need were captured in all of the strategic objectives of the SADC Regional Strategic Action Plan (RSAP) of 1998, with strategic object 7: Invest in Infrastructure encapsulating the main thrust of the plan dealing with this need. Project AAA.5 on water supply and

sanitation was prioritised for immediate implementation. In support of this urgency, the study found that although a number of States are likely to achieve the MDGs for water and sanitation on their own, it is unlikely that the critical States with the greatest backlogs will achieve the MDGs without support from a SADC-based programme. Furthermore, since water supply and sanitation impacts on many of the other MDGs and general development issues in SADC such as economic growth, poverty and health, the SADC Water Division has elected to place a significant priority on this initiative.

This project on a regional programme for water supply and sanitation was identified as a key strategy within the SADC Regional Indicative Strategic Development Plan of 2003, in line with the MDG targets of halving the number of people by 2015 without access to safe drinking water and sanitation services.

KEY ISSUES ADDRESSED AND MAJOR ACTIVITIES UNDERTAKEN

Project AAA.5: The Development of a Programme on Water Supply and Sanitation in the SADC Region was commissioned in 2001. The workshop and finalisation of the initial priorities for the regional programme were completed at the end of 2003. The project was divided into five phases that, together with the key activities, are given below:

Phase 1:

Brief assessment of current information and information gaps

During the 1990s, most SADC Member States had prepared a report on the status of water within their national boundaries. These reports provided information on the water resources, water resource management policies, socio-economic situation, major water schemes, water uses (agriculture, commercial and industrial, energy and domestic), and legal and regulatory systems governing the use and disposal of water and wastewater. In a few reports, information was also provided on the level of water supply and sanitation to different settlement types.

In order to formulate an effective and meaningful regional water supply and sanitation programme, additional information on the situation in each country was required.

Phase 2:

Formulation of key information requirements and terms for country situation reports

Terms of reference were developed for compiling more comprehensive country situation reports on water supply and sanitation. These terms of reference were then submitted to all Member States, requesting them to undertake these studies. Funding was made available for seven

States to pilot the studies, namely
Botswana, Lesotho, Mozambique,
Namibia, Swaziland, Tanzania and

Zambia. By early 2003, the reports Country Reports available from the Water Division, Director of Infrastructure, SADC. from these studies were completed. Although the studies were not undertaken in the other States, some relevant information could be obtained from existing reports from these States.

Phase 3:

Development of country situation reports

During 2001 and 2002, country situation reports on water supply and sanitation provision were compiled in the seven selected States.

These reports addressed the following aspects related to the provision of water supply and sanitation services:

- Policies and strategies;
- Institutional set-up and management arrangements;
- Legal and regulatory measures;
- Capacity-building programmes;
- Technologies that have been adopted, and level of standardisation;
- Financial aspects of funding and operating schemes;
- Socio-economic issues;
- Private sector participation;
- Significant strengths;
- Areas of concern or constraints; and
- Major projects requiring support.

Although not all the reports were able to provide details on all aspects, they did provide significantly more information than had been previously available, enabling the following phases to be carried out with an improved level of backing and certainty.



Phase 4:

Compilation of a regional situation report on the water supply and sanitation status within SADC

A report Ian Pearson and John Mukumwa. The Development of a Programme on Water Supply and Sanitation in the SADC Region: REGIONAL SITUATION REPORT. SADC. September 2003 on the status of water supply and sanitation services within SADC was compiled from the seven country situation reports, as well as with information from the earlier water reports and various other reports that were available at the time of writing. The consolidated report gives a summary of the situation in each Member State, identifies regional strengths and weaknesses and proposes issues that could be addressed

within a regional (SADC) programme that would be of benefit to the Member States.

The main topics addressed within the report are:

- Policies and strategies;
- Institutions and responsibilities;
- Management of water supply and sanitation facilities;
- Relationships with NGOs and donor organisations;
- Water supply and sanitation coverage;
- Financial arrangements and indicators;
- Legal and regulatory issues;
- Capacity-building programmes;
- Strategic management approaches;
- Technologies;
- Socio-economic issues; and
- Private sector participation.

Phase 5:

Development and workshopping of the regional programme on water supply and sanitation

The final phase of this programme was the formulation of a regional programme on water supply and sanitation. A key consideration of the programme was to identify issues that could be addressed at a regional level, which would be of benefit to a number of Member States. Although the regional situation report had identified a range of possible interventions, only the first five priority projects were detailed in this phase. The proposed programme was discussed at a workshop for all regional stakeholders, held in Gaborone in August 2003. The comments from the workshop were incorporated into the programme, and the proposal finalised in September 2003.

The five priority projects are as follows:

- Development and documentation of alternative financing options for water supply and sanitation services to achieve the MDGs and national targets;
- Enhancing institutional performance in the WSS sector to be able to achieve the MDGs and national targets;
- Water supply and sanitation infrastructure project development, planning and implementation support;
- Development and implementation of a water supply and sanitation monitoring and reporting programme; and
- Development and implementation of a knowledge management, advocacy and information-sharing programme on basic water supply and sanitation to meet the MDGs.

ANALYSIS AND DISCUSSION OF THE LESSONS LEARNT

The Millennium Development Goals for water supply and sanitation will not be achieved in many of the SADC Member States (nor within the SADC region as a whole) without major interventions to boost the delivery of these services within a few key States where service levels are currently very low. These include Angola, the Democratic Republic of the Congo, Mozambique, South Africa and Tanzania where some 80% of the unserved communities are located. Estimated figures for water supply coverage (figures dated between 1999 and 2003) were as follows:

Country	No of people served (rural)	No of people unserved (rural)	No of people served (urban)	No of people unserved (urban)	Target to reduce backlog by 50%
Angola	Figures not available				
Botswana	1 354 935				
DR of Congo	5 616 000	29 481 000	13 413 000	6 903 000	18 192 000
Lesotho	982 100	627 990	355 180	246 820	437 405
Madagascar					
Malawi	4 457 000	4 457 000	1 332 000	254 000	2 355 500
Mauritius		0		0	0
Mozambique	4 467 284	8 296 461	1 212 593	2 427 208	50361 834
Namibia	844 000	434 800	537 100	10 900	222 850
South Africa	10 230 000	9 900 000	22 000 000	1 300 000	5 600 000
Swaziland	400 000	370 000	220 000	0	185 000
Tanzania	12 375 000	12 375 000	5 775 000	2 475 000	7 425 000
Zambia	2 830 000	3 600 000	2 811 000	1 200 000	2 400 000
Zimbabwe	Figures not available				

The situation with respect to sanitation coverage is even more severe, with few of the Member States having supplied services to 40% or more of their population.

Botswana, Mauritius and Zimbabwe have achieved some of the highest levels of service delivery in the region. These countries have sound policy frameworks, institutional structures and responsibilities, have allocated sufficient resources, and have promoted a partnership arrangement with the users, either through the paying of tariffs or through communities taking significant responsibility for and contributing to the capital and ongoing operation and maintenance resource requirements.



South Africa has embarked on an ambitious programme to provide water and sanitation services to all communities before 2008 and 2010 respectively. This is a result of the focused development programme of national government, the allocation of resources, the extensive use of the private sector, an ambitious decentralisation initiative (whereby all responsibility is to be delegated to local government or municipalities) and a high level of advocacy and information dissemination.

Tanzania is, likewise, making steady progress against the backlog, and will in all likelihood achieve the MDGs for water supply and sanitation.

On the other hand, the Democratic Republic of the Congo, which has the largest population in the region and almost 40% of the unserved communities of the whole SADC region, is unlikely to make significant progress before the civil war has been settled.

Angola has recently come out of a civil war, and has begun a programme of reconstruction that will include water supply and sanitation services. However, due to the reconstruction needs of all sectors of the country, water supply and sanitation will not receive above-average resources until the economy begins to stabilise and grow.

Mozambique is now on a significant growth path, following the end of the civil war more than 10 years ago. Water supply and sanitation service delivery is now being prioritised and the rate

of delivery is being accelerated. One of the key success factors of Mozambique's development has been the training and use of small contractors.

It should be noted that whereas different Member States employ different standards for the provision of acceptable basic services, these are adequately accommodated in the definitions of adequate level of service in the study. The main standards employed relate to the access to water (distance, minimum water per capita and number of people per water point), and to sanitation (one safe latrine per household). While numbers differ for different States, the proposed standards allow for different levels of service that accommodate these.

BEST PRACTICES AND CHALLENGES

The SADC RSAP Project AAA.5 has uncovered a number of good practices, and identified some of the key challenges within the water supply and sanitation sector.

These may be summarised as follows:

- National water policies that adequately address water supply and sanitation delivery provide the basis of an enabling environment for the equitable and sustainable provision of water supplies and sanitation services to all communities.
- Institutional arrangements have a significant effect on the delivery of services. More successful arrangements include a decentralised responsibility for rural water and sanitation, while parastatals have worked well within the urban environment.
- The management of water supply and sanitation infrastructure is usually more effective if undertaken as a partnership with communities in rural areas, while more direct control by local authorities suits urban environments.
- Other partnership arrangements have also been successful in the sector. These include partnerships with NGOs (particularly, but not exclusively, in the rural areas), donor agencies (including technical support) and private sector consortiums.
- All States use their own criteria and standards for water supply and sanitation supplies. These definitions are usually appropriate for the Member State, but makes comparisons difficult. A SADC standard that allows for a range of levels of service is proposed for measuring progress, identifying support needs and comparing achievements.



- Financing of water supply and sanitation services remains a critical factor in the progress towards meeting the MDGs. A number of country programmes have been successfully structured to leverage significant counterpart funding from communities, donors, private sector players and other development programmes. This has been proposed as an important component of the SADC regional programme on water supply and sanitation.
- The legal and regulatory frameworks of a number of countries have been successfully structured to support the ongoing maintenance and sustainability of water supply and sanitation services, including in low-income communities.
- Training and capacity building remains a key challenge for the region. Currently, skills are not equitably distributed across the region, but there are a number of institutions providing curricula that are relevant to building capacity in all Member States.
- Two strategic approaches to the delivery of water supply and sanitation services in the region are proving to be very effective. These are demand management (particularly in urban areas) and demand-responsive approach (particularly in rural communities).

The region has been instrumental in developing and/or promoting a number of technologies that support the sustainable delivery of water supplies and sanitation. These include the VIP, SanPlat and Urine Diversion latrines, the Afridev and other handpumps, spring protection, ferro-cement reservoir construction and slow sand filters for water purification.

Some of the key challenges facing the sector were expounded at the Gaborone workshop of August 2003. These were as follows:

- The SADC countries face daunting challenges, amongst which the acceleration in the delivery of water supply and sanitation services and hygiene programmes will strongly depend on the capacity of Member States to develop comprehensive water policies and strategies, at national and regional levels.
- The WSS MDGs can be viewed as opportunities and incentives to accelerate the delivery of water and sanitation services and hygiene programmes.
- There is a need amongst the SADC Member States to develop and share practical information on policy development, financing mechanisms and capacity development options that have proved to be effective.
- There is a need to work collectively towards a better understanding of other key ingredients for successful water supply, sanitation and hygiene services and programmes.

SADC, as a political body, has a vital role to take the lead and facilitate:

- the strengthening of the collaboration amongst the Member States and the region,

and the rest of the African continent;

- The regular updating of the WSS status report and the establishment of a harmonised M&E evaluation system to enhance comparison and the exchange of information and data;
- The political endorsement and effective implementation of the WSS support, including building the synergy with other relevant initiatives;
- The implementation of the national WSS MDG action plan, and the sharing of knowledge and best practices on success stories; and
- The translation of the recommendations of the workshop statement into a concrete plan of actions for regional cooperation.

PERSPECTIVES FOR THE FUTURE

The attainment of the water supply and sanitation MDGs in the SADC Member States remains a priority of the water managers of all Member States, and also of the SADC Water Division. However, unless countries work closely together, share experiences (and, in some cases, resources) the MDGs will not be achieved in all countries by 2015.

The SADC Water Division's programme on water supply and sanitation has proposed a number of key activities to be undertaken to support the provision of services in Member States, and to monitor the progress towards the achievement of the MDGs. Should the programme receive the full support of Member States and partnership organisations, Member States will benefit significantly in terms of the sharing of benefits, resources, knowledge and best practices, and being capacitated to plan and implement their own programmes more effectively. This support from a regional programme is considered vital for those Member States that are less likely to achieve the MDGs. The programme will also be beneficial to engendering a common purpose between Member States, and a culture of practical cooperation.

PART H

COMPLETION



PART H

CONCLUSION

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The proposals in the Regional Strategic Action Plan for Integrated Water Resource Management have been implemented since the RSAP was first presented in December 1998. The broad strategy was translated into a number of project proposals, of which 31 were prioritised. The SADC Member States, the Water Division in the SADC Secretariat and the cooperating partners in the international community have all contributed to the execution of most of these projects. The Mid-term Review (MTR) found that most of the objectives of the RSAP, most notably that of creating an enabling environment for infrastructure development, had been substantially achieved. This book chronicles many of the lessons and best practices that have emanated from the process. It also captures some of the exciting developments in the water sector that will guide the future focus of SADC in this field.

SOME OF THE ACHIEVEMENTS

The SADC States have demonstrated that international cooperation over scarce resources is possible. At a time when many writers had turned their attention to the potential for conflict arising over international water issues and when, in some regions of the world, tension over the issue was rising, the revision of the Protocol on Shared Watercourses immediately aligned the region with the best international practice and the United Nations Convention on Non-navigational Uses of Shared Watercourses. It was not that there was no cause for tension in SADC. Indeed, for example, there was considerable dissatisfaction from downstream countries about upstream abstractions and water quality. The important point is that the Protocol provided the framework within which more detailed negotiations could be reflected in agreements such as Incomaputo. The Regional Water Policy concluded by SADC reflects commitment to joint and prudent management of the resource.

Although the RSAP initiative had started out with high expectations of regional infrastructure, it was soon realised that the focus during the first phase would need to be on creating an enabling environment. Although the Lesotho Highlands Water Project and the Komati Basin Development Project predated the Protocol, their realisation undoubtedly benefited from the positive environment created by the regional negotiations. Both are fine examples of *international projects* that became possible in a conducive environment, and which present useful pointers for the future in SADC.

One of the basic tenants of integrated water resource management is that a *participatory approach* should be followed. The experiences from Botswana, Swaziland and Zimbabwe, as well as the region-wide initiatives of the Global Water Partnership - Southern Africa, which are included in this volume, show how this has been embraced in the region and is being successfully undertaken. Although there are differences in the detail, all exhibit a belief by the authorities that local inputs are an important ingredient of successful water resource management.

Finally, each *project delivered outputs* that made a difference in some way to the overall gains. Noteworthy are the regional water policy, the revision of the Protocol and its implementation, the establishment of WaterNet and the harmonisation of water legislation.



SOME OF THE LESSONS AND BEST PRACTICES

The RSAP has shown that *local communities can be mobilised* and they can make an impact on water resources planning, even at the level of interacting - as in the Okavango case - with counterparts in co-basin States. Precursors are commitment by the river basin organisations to the process, extensive empowerment initiatives and active advocacy and support from civil society organisations.

SADC has demonstrated that a process such as the RSAP is necessary if a *comprehensive programme* that avoids ad hoc action is to be developed. The RSAP drew all of the cooperating partners into a forum where common goals and vision could be shared. The Water Strategy Reference Group, originally conceived as an advisor to SADC in the implementation of the RSAP, became equally important as a meeting place where the agencies could share experiences, and together plan concerted support for the RSAP.

There have been many *international agreements* among the SADC Member States. Some of these, such as the ZAMCOM Agreement, have taken a long time to negotiate.

How they have been achieved provides many detailed lessons, but the list provided by Sakupwanya, from experiences on the Zambezi, provides a succinct framework, namely:

- The need for political commitment and guidance at the highest possible level;
- The riparians must have a shared vision;
- A legal framework should be in place;
- Ownership and leadership of the process must rest with the riparian States;
- There is a need for mutual trust and confidence-building processes amongst the riparians;
- Cooperation cannot be forced; and
- A process rather than a project management approach must be followed.

The establishment of a *permanent secretariat for a river basin organisation* has proven to be a complex process. The typical commission, set up as an advisory mechanism to governments, has been successful as a negotiating forum. However, as Hart reports, there are still many decisions to be made before a permanent secretariat, as the first step towards a fully functional river basin management organisation with executive powers, can be set up. Nevertheless, executive organisations such as the Zambezi River Authority and KOBWA, have proven that they are able to manage large projects effectively, and they provide valuable lessons in organisational development.

A GLIMPSE AT THE FUTURE

It was never thought that the environment, in which the first RSAP-IWRM had to be implemented, was static. Both from the international community - in the form, for example, of the Millennium Declaration and the World Summit on Sustainable Development - as well as from within the SADC - in the form, for example, of the revision to the Protocol and the adoption of the multi-sectoral Regional Indicative Strategic Development Plan - new priorities, new refinements of ideas and new events that arose during the implementation of the first phase of the RSAP have necessitated its formal revision and update. Key among these is a stronger development thrust in addition to regional integration and, with this, more direct focus on poverty eradication. Already, for some time, there has been attention to the MDGs, and the role of water resources in food security has come to the fore as SADC implements the RISDP. The MTR led immediately to proposals for the revision of the RSAP. The strategic objectives for RSAP2 have been defined to reflect that those of the initiation phase of the RSAP1 have been achieved, and to align the water sector with the broader SADC-RISDP. The objectives are intended to consolidate the enabling environment, and to promote water as an important cross-sectoral development tool.

Important are:

- To maintain and sustain an enabling environment for regional water resource development and management;
- To provide a framework for sustainable, effective and efficient planning and management of shared river basins, at regional and related national levels;
- To promote and support strategic infrastructure development for regional integration, socio-economic development and poverty alleviation;
- To develop, promote and facilitate best practices regarding effective participation by various individual and institutional stakeholders in water resource development and management, including women, youth and other disadvantaged groups; and
- To build and strengthen human and institutional capacity for sustainable management of water resources at basin, national and regional levels.

Based on these strategic objectives, the programme has been restructured into four interdependent strategic clusters, each with a focus as follows:

STRATEGIC CLUSTER	FOCUS
Regional Water Resource Development Planning and Management	<ul style="list-style-type: none"> - Resource assessment and monitoring for both surface water and groundwater. - Development of planning mechanisms and support so as to utilise the collected data, taking into account major developmental and environmental issues. - Development of operational procedures for managing water infrastructure and the resource in general.
Infrastructure Development Support	<ul style="list-style-type: none"> - Support mechanisms for the development of strategic and integrated infrastructure in order to achieve regional integration and development, socio-economic development and poverty alleviation, with particular emphasis on energy generation, agriculture, food security and water and sanitation.
Water Governance	<ul style="list-style-type: none"> - Maintain and sustain an enabling environment as represented by the Protocol on Shared Watercourses, to ensure a level playing field between Member States. - Developing, promoting and implementing best practices regarding effective participation by various stakeholders in water resource development and management, including women, youth and other disadvantaged groups.
Capacity Building	<ul style="list-style-type: none"> - Equipping various actors in the water and related sectors with the requisite competencies (technical, managerial and negotiation skills) to be able to deliver the expected goods and services adequately for the benefit of individuals, communities and Member States through building and strengthening human and institutional capacity for sustainable management of water resources, at community, national and regional levels.

Finally, projects have been restructured to meet the new imperatives, and the governance system has been further developed. RSAP2 is set to guide the SADC water sector for the period 2005 to 2010.

AUTHORS

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Ruhiza Jean Boroto is a Democratic Republic of Congo-born water resource engineer who has worked from South Africa since 1991.

He was, until 2005, the water expert at GWP Southern Africa, where he led the development of the Framework for Action to achieve the Southern Africa Vision for Water Life and Environment. He has 15 years experience as a lecturer, researcher, civil servant and consultant. He was director of project planning in South Africa's Department of Water Affairs and Forestry before joining GWP. He now works independently and provides expertise on strategic issues in integrated water resource management in Africa. Recently, he has supported projects dealing with irrigation, operational management of dams, hydrological and hydraulic investigations, institutional development, water demand management, climate change, rainwater harvesting and community participation in water resource management. He is a member of several professional organisations and serves on the board of the Southern Africa Research and Development Centre. He has published on water issues in southern Africa.

Thomas Chiramba holds a PhD in civil engineering and in his early career taught and researched at university. Over the past 20 years, Dr Chiramba has specialized in diverse aspects of water resources development and management. He worked for consulting firms and in the public sector as a City Engineer. He later joined international development institutions including USAID, GTZ, UNDP and UNOPS as a technical advisor to several governments in southern Africa. In various capacities, Dr Chiramba has played a leading role in policy development, institutional strengthening, operations and maintenance of water schemes as well as the design and implementation of large scale urban water supply and sewerage infrastructure development programmes. Since 1999, he has overseen the implementation of a complex regional program the SADC Regional Strategic Action Plan on Integrated Water Resources Management. Within the context of this program, Dr Chiramba has led the processes of understanding the broad challenges presented by the trans-boundary / shared waters of the sub-region.

Robin Clanahan holds a BSc in Civil Engineering and MPhil in Environmental Management. He specialises in the water sector and has more than 40 years experience in the design and management of water development projects including engineering, associated environmental assessments and socio-economic rehabilitation. He was the first CEO of the bi-national Komati Basin Water Authority. He was also chairperson of numerous forums set up by South Africa's Department of Water Affairs and Forestry for the initial phases of community participation in the formation of the Catchment Management Agency for the Komati Water Management Area. He was lead author for the SADC GTZ Key Dams Issues short report.

Dr Uwe Cusnick is a management consultant and organisational development expert based in Frankfurt, Germany. He has wide international experience, including projects in Latin America and Africa. His clients include international donors and development finance organisations.

Jeff Davies is a hydrogeologist with the British Geological Survey based at Wallingford, UK. During his 30-year career, he has undertaken hydrogeological studies in more than 20 countries. An expert in aquifer resource assessment with a wide knowledge of geophysical methods, borehole design and drilling, he has studied groundwater occurrence throughout western and southern Africa, in southern and eastern Asia, and in Fiji in the Pacific. He has managed research projects, assessing low permeability rock aquifers in sub-Saharan Africa and alluvial sediments in Fiji and Bangladesh, and has acted as hydrogeological consultant to the World Bank in Bangladesh, the SADC region and Nigeria, the EU in Lesotho, and DFID in Montserrat and Tanzania. He holds a BSc in Geology from the University of Wales, Swansea and an MSc in Hydrogeology from the University of Birmingham. He is a chartered geologist.

John L Farr is a water resource consultant and IWRM specialist, with almost 30 years experience in the field of groundwater exploration and resource evaluation in Africa. He has extensive senior management involvement in major projects and governmental/donor advisory groups and is managing director of Wellfield Consulting Services Pty Ltd, a renowned water and natural resources consultancy group in southern Africa. Over the past 25 years, he has directed company development in the fields of regional and international groundwater resource investigation, drilling engineering, low-cost rural water supplies, environmental/pollution assessment and water/sanitation / solid waste engineering. He holds a BSc in Geology and an MSc in Hydrogeology from the University of Birmingham, UK and is a chartered geologist. He is currently president of the Groundwater Association of Botswana, and is active in the GWP - Botswana chapter.

Robert Gumirehete is a hydrogeologist with over 21 years of groundwater and geotechnical experience in the southern Africa region, at senior technical and managerial level. Project experience includes the planning and execution of resources evaluation programmes, both at local and sub-regional levels, for both urban and rural water supplies. Key fields of experience are remote sensing, geophysical surveys, geological and hydrogeological mapping, drilling and testing contract preparation and execution, hydrogeological/hydrochemical field data collection and analysis. He is principal consultant with Wellfield Consulting Services in Botswana, and has co-authored many groundwater resource reports. He holds a BSc in Geology from the University of Botswana and an MSc in Hydrogeology from the University of Birmingham, UK.

Tim Hart is a development consultant specialising in aspects of social and institutional development. He has been active in the field for over 30 years, and has worked extensively in southern and South Africa, mainly in the water and mining sectors. He has undertaken projects for most of the international donors active in Africa, and has advised the SADC Water Division periodically since 2000. He is the author of over 50 scholarly publications.

Brian Hollingworth holds MSc, MBA and LLb degrees and is a South African independent development specialist in the water field. He recently left the Development Bank of Southern Africa, where his duties included analytical work on policy and best practice, the management of development projects and evaluation assignments. Over the last four years, he has been chairperson of the South African Multi-stakeholder Initiative on the World Commission on Dams. His forte is the intersection of engineering and law. He is a past deputy-chairperson of the South Africa Water Tribunal, an independent administrative appeal mechanism mandated by the National Water Act. He is an accomplished writer, and recently completed the South Africa National Water Report for the United Nations Economic Commission for Africa.

Lewis Jonker is the academic development coordinator in the Science Faculty at the University of the Western Cape, where he manages curriculum development, amongst other responsibilities. He holds a BSc (Hons) and MEd from the University of the Western Cape. In 2003 and 2004, he was a visiting lecturer in the Department of Civil Engineering at the University of Zimbabwe, where he was responsible for assisting the WaterNet Steering Committee in implementing the WaterNet Project.

Doctor Lukhele is chief executive officer of the Swaziland Water and Agricultural Development Enterprise (SWADE), a parastatal responsible for the planning and implementation of large water resource projects in Swaziland. SWADE is currently implementing two of Swaziland's large dam and irrigation projects, namely the Komati and Lower Usuthu projects, which together will develop about 16 000 ha, benefiting over 50 000 people. Lukhele is a water resource engineer with many years of experience at managing water projects, with special emphasis on cross-boundary issues. He is part of Swaziland's delegation to the Joint Water Commissions with Moç'8dambique and South Africa and the Tripartite Permanent Technical Committee between the three countries. He has contributed to publications on the management of international river basins.

Dr Emmanuel Manzungu holds a PhD in irrigation management from Wageningen University of Environmental Sciences in the Netherlands. He has written extensively on irrigation and water resource management. He has also co-edited three books on the same theme: *The Practice of Smallholder Irrigation*, *Water for Agriculture in Zimbabwe* and *Managing Common Property in an Age of Globalisation*:

Zimbabwean Experiences. Currently he is a research associate with the Department of Soil Science and Agricultural Engineering, University of Zimbabwe, where he is conducting research on various aspects of water resource management in southern Africa.

Montshiwa Monty Montshiwa is into transboundary natural resources management. He is currently managing a Swedish International Development Agency-funded programme in the Okavango River Basin, known as Every River Has Its People. His mandates include developing implementation strategies, monitoring implementation and programme marketing in all the partner countries and internationally. Before his current assignment, he worked as an environmental consultant for almost five years with Ecosurv Environmental Consultants, where he served as the company's environmental planner. His duties included developing natural resources management plans, environmental policies and international environmental law. He was involved in a number of consultancies, including developing strategies for the definition of roles and responsibilities in natural resources management, both at national and regional level.

Ngoni Mudege is a founder member and currently the executive director of the Institute of Water and Sanitation Development. He is Zimbabwean, and specialises in the water resource management field. He has worked for the government of Zimbabwe and the UNDP-World Bank, and has undertaken a number of consultancy assignments in the region on behalf of funding organisations and SADC. He is a founder member of a number of regional and international networks including WaterNet, Streams of Knowledge and ITN-Africa. He currently focuses on institutional issues of water resource management, sanitation and capacity building.

Mutandwa N Mutede holds a BSc (Hons) in Civil Engineering, an MSc in Planning and Management for Development and a Certified Diploma in Accounting and Finance. He has spent most of his career dealing with water resource planning, development and management in the Department of Water Resources in Zimbabwe, where he is currently a chief engineer responsible for planning. He was involved in the reforms of the water sector as a member of the Urban, Industrial and Mining Subcommittee of the Water Resources Management Strategy project. He is a technical advisor to the Mazowe Catchment Planning Project. He has also served as an assessor in the Water Court, and is currently the ministry's representative on the Zimbabwe National Water Authority Board, a contact point for the SADC Regional Strategic Action Plan and a member of the Limpopo Basin Permanent Technical Committee. He has a special interest in the organisational development and dynamics of water resources.

The late **Jerry Ndamba** was a Zimbabwean with extensive research experience in health sciences. At the time of

his death, he was deputy director of Research and Technical Services at the Institute of Water and Sanitation Development. He was responsible for managing the regional Water Research Fund for Southern Africa (WARFSA), and was instrumental in setting up the management systems for the Fund.

Ian Pearson holds an MSc in Civil Engineering and is a South African consultant, specialising in water supply and sanitation for developing communities. He worked for the South African Department of Water Affairs and the CSIR (a South African research and development institution) before starting a consulting company in 1998. He has extensive experience in rural and peri-urban projects and the development of related national, provincial and regional water and sanitation policy and strategies. His work has also led to the compilation of guidelines and manuals for the strategies developed, and the compilation of technical guidelines for specific requirements. He has also provided support for the development and implementation of monitoring and evaluation programmes, including undertaking the evaluation of water supply and/or sanitation programmes and projects. This includes the management of projects funded by DFID. His current area of speciality is all aspects of sanitation.

Victoria 'Mamabusane' Qheku has a BSc degree from the National University of Lesotho and a Post-Graduate Diploma in Environmental Science and Technology from the Institute of Hydraulic Engineering in Delft. She has worked for the Lesotho Water and Sewerage Authority and the Lesotho Pharmaceutical Corporation. In 1991, she joined the Lesotho Highlands Development Authority as a limnologist in the Water Resources and Environment branches, and was later transferred to the Public Relations branch. Her tasks are the preparation of technical reports and media materials on activities at the Lesotho Highlands Water Project.

Nick S Robins is a hydrogeologist with the British Geological Survey. Interested in the optimisation of groundwater resource potential through the understanding of aquifer flow systems, his particular interests include hard rock and karst hydrogeology, Quaternary hydrogeology and island groundwater systems. He has extensive experience in sub-Saharan Africa, where topics include drought management; the Middle East, looking particularly at karst and alluvial aquifers; and Central America. He has been involved with the investigation of hard rock hydrogeology, both in northern Britain and elsewhere, for much of his career. He was awarded a DSc in Earth Sciences by the University of Birmingham for his contribution to hard rock hydrogeology. He is a former chair of the Hydrogeology Group of the Geological Society, London, and is currently a member of the Geological Society Books Editorial Committee and the Editorial Panel of the CIWEM Journal. He has published nearly 90 papers, and is author of a number of technical books.

Dr Peter B Robinson qualified as an electrical engineer, but switched to economics when he had the opportunity to

study at Oxford University as a Rhodes Scholar. He did his doctorate in engineering-economic systems at Stanford University in California. For the past 24 years, he has been an economic consultant and lecturer in the SADC region, working on many aspects of southern African economies. In respect of water sector reforms, he has worked in Angola, Kenya, Malawi, Zambia and Zimbabwe, and has also been involved in a number of regional water studies for SADC. He has directed projects on water pricing options, water sector subsidies and the design of financing mechanisms for water sector regulatory institutions. For the past five years, he has taught the economics module of the WaterNet / WREM regional masters programme. He is a member of the Regional Technical Committee of the Global Water Partnership in Southern Africa.

Jeffer K Sakupwanya is a water resource management expert in the southern Africa region. As a water resource management strategist, he was part of the team that pioneered water sector reforms in Zimbabwe. This team established a national water authority and a new water law, and produced an integrated water resource management strategy for the country. Over the last three-and-a-half years, he has facilitated processes in the Zambezi River Basin to establish a watercourse commission and develop an integrated water resource management strategy for the Basin. He is a board member of the Southern Africa Water Research Fund.

Geraldine Schoeman is a South African specialist in social and institutional development, strategic change management and skills development, specifically in the water services (water supply and sanitation) and water resource fields. She has more than 25 years of experience in constraints analysis and strategic institutional change management, and translating regulatory and policy requirements into strategic implementation frameworks at national, regional and local spheres, with a particular focus on the needs of the poor. Her work focus is informed by extensive practical experience at grassroots level, through her work in poor and marginalised communities. In addition, she is an executive director of a training trust, which offers skills development in strategic institutional management, water operations, water reticulation and water purification, as well as community-based water resource management.

Andrew Takawira is a young Zimbabwean water engineer who has also trained in development management. He has worked with the Global Water Partnership - Southern Africa for the past four years. He has been involved in promoting more integrated approaches to water management and encouraging the sustainable use of water for social and economic development, through partnerships in IWRM.

He has worked mainly in building a water information system in southern Africa, and is the GWP-IWRM Tool Box Focal Point in southern Africa.

Stéfan van Biljon practiced as a hydrologist with the Department of Water Affairs and Forestry of South Africa for more than 36 years. His main responsibilities centred on quantitative surface water resource analyses. This included the research and application of time series analyses (with particular attention to risk-based stochastic processes), optimisation of reservoir operating rules and numerous assessments on water resource potential (including the Lesotho Highlands Water Project). He contributed as a member of steering committees of research projects funded by the Water Research Commission. During the last 15 years, he was director of Hydrology, assuming responsibility for South African water resource monitoring and assessment. He was recently appointed as the project manager for the second phase of the SADC-HYCOS project.

James P Verdin holds BSc and MSc degrees in Civil Engineering and a PhD in Geography. As the international program manager at the US Geological Survey's National Center for Earth Resources Observation and Science (EROS), he oversees a large portfolio of application projects, including the Famine Early Warning System Network (FEWS NET). He was a key partner in the design and implementation of the Lower Limpopo Flood Warning System and the Southern Africa Flood and Drought Network. He has over 25 years of experience in applying remote sensing to water resource issues, and he serves on the Committee on Hydrologic Forecasting of the World Meteorologic Organization. He is also a member of the American Geophysical Union, the American Society for Photogrammetry and Remote Sensing and the American Association of Geographers.

APPENDICES

APPENDIX 1, APPENDIX 2 & APPENDIX 3

Appendix 1 - LIST OF COOPERATING PARTNERS IN THE RSAP-IWRM

SHORT NAME	FULL NAME
ADB	African Development Bank
BTC, Belgium	Belgium Technical Cooperation
BGR, Germany	Bundesanstalt für Geowissenschaften und Rohstoffe
CIDA Canada	Canadian International Development Aid
DANIDA, Denmark	Danish International Development Aid,
DFID, UK	Department for Foreign Investment and Aid
EU	European Union
FAO	World Food Organisation
Finland	Finland
French Technical Cooperation, France	French Technical Cooperation
GEF, France	Global Environmental Facility, France
GTZ, Germany	Deutsche Gesellschaft für Technische Zusammenarbeit, Germany
GWP	Global Water Partnership
GWPSA	Global Water Partnership Southern Africa
INWENT, Germany	Internationale Weiterbildung und Entwicklung GInbh Capacity Buldig International
FGEF, France	French Global Environmental Facility
IUCN	World Conservation Union
US State Department, US	US State Department
JICA	Japan International Cooperation Agency
KFW	Kredit fuer Wiederaufbean, Germany
DGIS, Netherlands	Directorate General for International Cooperation
Nordic Countries	Nordic Countries (Sweden, Norway, Denmark)
SIDA, Sweden	Swedish International Development Aid
SDC, Switzerland	Swiss Agency for Development and Cooperation
UNDP	United Nations Development Programme
UNDP/GEF	United Nations Development Programme / Global Environment Facility
UNEP	United Nations Environment Programme
UNESCO WWAP	United Nations Economic Social and Cultural Organisation: World Water Assessment Programme
USAID, USA	United States Agency for International Development, USA
WRC, RSA	Water Research Commission
WB/GEF	World Bank / Global Environment Facility
WB-WSP	World Bank Water Supply and Sanitation Programme
WMO	World Meteorological Organisation
WUP	Water Utilities Partnership

Appendix 2 - MEMBERS OF THE WATER RESOURCES TECHNICAL COMMITTEE

COUNTRY	MEMBER/S
ANGOLA	G. Da Silva, A. Fouseca
BOTSWANA	O. Katai, G. Gabaake
DRC	K. Matand
LESOTHO	M. Mojakisane, EM Lesoma
MALAWI	S. M. N. Mainala
MAURITIUS	DL Deepchand
MOZAMBIQUE	S. Saranga
NAMIBIA	P. Heyns, D. Biggs
SOUTH AFRICA	R. Tekateka, C. L. van den Berg, P. van Niekerk
SWAZILAND	R. S. Sangweni
TANZANIA	F. W. M. Massanja
ZAMBIA	A. Hussen
ZIMBABWE	G. Mawere, M. Mutede

Appendix 3

LIST OF RSAP PRIORITY PROJECTS

Group 1: Legislation, Policy and Strategic Plan

- PCN 11: Formulation of a Regional Water sector Policy and Strategy
- PCN 9: Guidelines for National Water Policy Formulation Review in Member States
- PCN 8: Support for the Implementation Programme for SADC protocol on Shared Watercourses
- PCN 1: Guidelines for Review and Formulation of National Water Legislation
- PCN 2: Regional Guidelines for Dam Safety Legislation and Procedures
- PCN 10: Support Development of National Water Sector Policies / Strategies in Selected Member States
- PCN 6: Groundwater Management Programme for the SADC Region

Group 2: Capacity Building and Training

- PCN 22: Human Resources Development Programme
- PCN 17: Training in Surveying, Mapping and Geographical Information Systems
- PCN 7: Water Sector Co-ordination Unit Capacity Building
- PCN 3: Capacity Building for Joint Integrated River Basin Management
- PCN 23: WaterNet

Group 3: Consultation, Participation and Awareness Creation

- PCN 24: Promotion of Stakeholder Participation in Water Resources Management
- PCN 21: Involving the Media in Water Issues
- PCN 4: Consultative Forums on Water Issues
- PCN 25: Feasibility Study for Creating a Fund to Support NGO and CBO Participation in Water Resources Management
- PCN 25: Programme on Means to Empower Women in Water Issues
- PCN 13: Study for Expanding Private Sector Participation in Water and Sanitation Services

Group 4: Information Collection, Analysis and Management

- PCN 15: Expansion of SADC HYCOS
- PCN 18: Upgrade and Modernize Water Resources Monitoring System on Lake Malawi/Nyasa
- PCN 19: Rehabilitation of Joint Monitoring Systems between Angola and Namibia
- PCN 31: Integrated Basin Management Plan for the Okavango River
- PCN 30: Pre-feasibility study of Future Development and Management Options on the Lower Orange River
- PCN 14: Assessment of Surface Water Resources
- PCN 12: Economic Accounting of Water use

Group 5: Infrastructure Investment

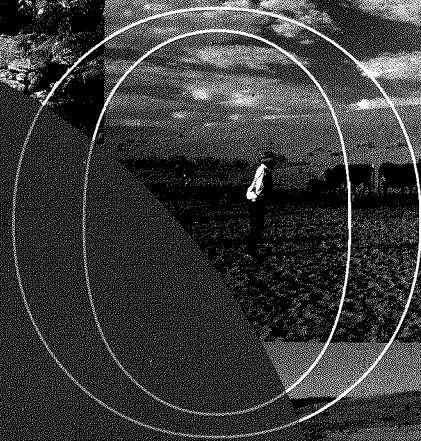
- PCN 27: Control and Development of Lake Malawi/Nyasa and Shire Rivers
- PCN 28: Study of the Navigability of the Shire and Zambezi Rivers
- PCN 29: Stabilisation of the Course of the Songwe River

Group 6: Stand Alone

- PCN 5: Development of a Programme on Water Supply and Sanitation for the SADC Region
- PCN 16: Regional Project to Control Infestation and Translocation of Aquatic Weeds



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